

# Accounting Principles: A Business Perspective

First Global Text Edition, Volume 1  
Financial Accounting

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## **Accounting principles:A business perspective**

### *Eighth edition*

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Professor Hermanson has been awarded two excellence in teaching awards, a doctoral fellow's award, and a Distinguished Alumni Professor award; and he was selected as the Outstanding Faculty Member for 1985 by the Federation of Schools of Accountancy. He has served as a consultant to many companies and organizations. In 1990, Professor Hermanson was named Accounting Educator of the Year by the Georgia Society of CPAs. His wife's name is Dianne, and he has two children, Dana and Susan, both of whom are accounting professors.

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Professor Edwards is a past president of the American Accounting Association and a past national vice president and executive committee member of the Institute of Management Accountants. He has served on the board of directors of the American Institute of Certified Public Accountants and as chairman of the Georgia State Board of Accountancy. He was an original trustee of the Financial Accounting Foundation, the parent organization of the FASB, and a member of the Public Review Board of Arthur Andersen & Co.

He has published in *The Accounting Review*, *The Journal of Accountancy*, *The Journal of Accounting Research*, *Management Accounting*, and *The Harvard Business History Review*. He is also the author of *History*

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of *Public Accounting in the United States*. He has served on various American Institute of Certified Public Accountants committees and boards, including the Objectives of Financial Statements Committee, Standards of Professional Conduct Committee, and the CPA Board of Examiners. He was the managing editor of the centennial issue of *The Journal of Accountancy*.

In 1974, Beta Alpha Psi, the National Accounting Fraternity, selected Professor Edwards for its first annual Outstanding Accountant of the Year award. This selection is made from industry, government, and educational leaders. In 1975, he was selected by the American Accounting Association as its Outstanding Educator.

He has served the AICPA as president of the Benevolent Fund, chairman of the Awards Committee, member of the Professional Ethics Committee and Program for World Congress of Accountants. He was on the Education Standards Committee of the International Federation of Accountants and the Committee on Planning for the Institute of Management Accountants. He was the director of the Seminar for Management Accountants-Financial Reporting for the American Accounting Association. He is also a member of the Financial Executives Institute.

He received the 1993 AICPA Gold Medal Award, the highest award given by the Institute. A Doctor Honoris Causa (Honorary Doctorate) from the University of Paris was awarded to him in 1994. He is the first accountant to receive this distinction in France. The Academy of Accounting Historians awarded him the 1994 Hourglass Award which is the highest international honor in the field of Accounting History. He was inducted into the Ohio State University Accounting Hall of Fame in 2001. His wife's name is Clara, and he has one son, Jim.

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Professor Maher is the coauthor of two leading textbooks, *Cost Accounting* and *Managerial Accounting*. He has coauthored several additional books and monographs, including *Internal Controls in US Corporations* (Financial Executives Research Foundation, 1980); and *Management Incentive Compensation Plans* (National Association of Accountants, 1986). His articles have appeared in *Management Accounting*, *The Journal of Accountancy*, *The Accounting Review*, *The Journal of Accounting Research*, *Financial Executive*, and *The Wall Street Journal*, among others.

For his research on internal controls, Professor Maher was awarded the American Accounting Association Competitive Manuscript Award and the AICPA Notable Contribution in Literature Award. He has also been awarded the American Tax Association Manuscript Award. From the students at the Graduate School of Management, University of California, Davis, he has received the Annual Outstanding Teacher Award three times and twice received a special award for outstanding service. In 1989, Gonzaga University honored Maher with its Outstanding Alumni Merit Award.

### Preface

#### *Philosophy and purpose*

Imagine that you have graduated from college without taking an accounting course. You are employed by a company as a sales person, and you eventually become the sales manager of a territory. While attending a sales managers' meeting, financial results are reviewed by the Vice President of Sales and terms such as gross margin



percentage, cash flows from operating activities, and LIFO inventory methods are being discussed. The Vice President eventually asks you to discuss these topics as they relate to your territory. You try to do so, but it is obvious to everyone in the meeting that you do not know what you are talking about.

Accounting principles courses teach you the "language of business" so you understand terms and concepts used in business decisions. If you understand how accounting information is prepared, you will be in an even stronger position when faced with a management decision based on accounting information.

The importance of transactions analysis and proper recording of transactions has clearly been demonstrated in some of the recent business failures that have been reported in the press. If the financial statements of an enterprise are to properly represent the results of operations and the financial condition of the company, the transactions must be analyzed and recorded in the accounts following generally accepted accounting principles. The debits and credits are important not only to accounting majors but also to those entering or engaged in a business career to become managers because the ultimate effects of these journal entries are reflected in the financial statements. If expenses are reported as assets, liabilities and their related expenses are omitted from the financial statements, or reported revenues are recorded prematurely or do not really exist, the financial statements are misleading. The financial statements are only useful and meaningful if they are fair and clearly represent the business events of the company.

We wrote this text to give you an understanding of how to use accounting information to analyze business performance and make business decisions. The text takes a business perspective. We use the annual reports of real companies to illustrate many of the accounting concepts. You are familiar with many of the companies we use, such as The Limited, The Home Depot, and Coca-Cola Company.

Gaining an understanding of accounting terminology and concepts, however, is not enough to ensure your success. You also need to be able to find information on the Internet, analyze various business situations, work effectively as a member of a team, and communicate your ideas clearly. This text was developed to help you develop these skills.

### *Curriculum concerns*

Significant changes have been recommended for accounting education. Some parties have expressed concern that recent accounting graduates do not possess the necessary set of skills to succeed in an accounting career. The typical accounting graduate seems unable to successfully deal with complex and unstructured "real world" accounting problems and generally lacks communication and interpersonal skills. One recommendation is the greater use of active learning techniques in a re-energized classroom environment. The traditional lecture and structured problem solving method approach would be supplemented or replaced with a more informal classroom setting dealing with cases, simulations, and group projects. Both inside and outside the classroom, there would be two-way communication between (1) professor and student and (2) student and student. Study groups would be formed so that students could tutor other students. The purposes of these recommendations include enhancing students' critical thinking skills, written and oral communication skills, and interpersonal skills.

One of the most important benefits you can obtain from a college education is that you "learn how to learn". The concept that you gain all of your learning in school and then spend the rest of your life applying that knowledge is not valid. Change is occurring at an increasingly rapid pace. You will probably hold many different jobs during your career, and you will probably work for many different companies. Much of the information you learn in college will

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be obsolete in just a few years. Therefore, you will be expected to engage in life-long learning. Memorizing is much less important than learning how to think critically.

With this changing environment in mind, we have developed a text that will lend itself to developing the skills that will lead to success in your future career in business. The section at the end of each chapter titled, "Beyond the numbers—Critical thinking", provides the opportunity for you to address unstructured case situations, the analysis of real companies' financial situations, ethics cases, and team projects. Each chapter also includes one or two **Internet projects** in the section titled "Using the Internet—A view of the real world". For many of these items, you will use written and oral communication skills in presenting your results.

### *Objectives and overall approach of the eighth edition*

The Accounting Education Change Commission (AECC) made specific recommendations regarding teaching materials and methods used in the first-year accounting course. As a result, significant changes have taken place in that course at many universities. The AECC states:

*The first course in accounting can significantly benefit those who enter business, government, and other organizations, where decision-makers use accounting information. These individuals will be better prepared for their responsibilities if they understand the role of accounting information in decision-making by managers, investors, government regulators, and others. All organizations have accountability responsibilities to their constituents, and accounting, properly used, is a powerful tool in creating information to improve the decisions that affect those constituents.<sup>1</sup>*

One of the purposes of the first course should be to recruit accounting majors. To help accomplish this, the text has a section preceding each chapter entitled, "Careers in accounting".

We retained a solid coverage of accounting that serves business students well regardless of the majors they select. Those who choose not to major in accounting, which is a majority of those taking this course, will become better users of accounting information because they will know something about the preparation of that information.

### *Approach and organization*

#### *Business emphasis*

Without actual business experience, business students sometimes lack a frame of reference in attempting to apply accounting concepts to business transactions. We seek to involve the business student more in real world business applications as we introduce and explain the subject matter.

- **"An accounting perspective: Business insight"** boxes throughout the text provide examples of how companies featured in text examples use accounting information every day, or they provide other useful information.
- **"Accounting perspective: Uses of technology"** boxes throughout the text demonstrate how technology has affected the way accounting information is prepared, manipulated, and accessed.
- Some chapters contain **"A broader perspective"**. These situations, taken from annual reports of real companies and from articles in current business periodicals such as *Accounting Today*, and *Management*

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<sup>1</sup> Accounting Education Change Commission, Position Statement No. Two, "The First Course in Account" (Torrance, CA, June 1992), pp. 1-2.

*Accounting*, relate to subject matter discussed in that chapter or present other useful information. These real world examples demonstrate the business relevance of accounting.

- Real world questions and real world business decision cases are included in almost every chapter.
- The annual report appendix included with this text contains significant portions of the annual report of The Limited, Inc. Many of the real world questions and business decision cases are based on this annual report.
- Numerous illustrations adapted from *Accounting Trends & Techniques* show the frequency of use in business of various accounting techniques. Placed throughout the text, these illustrations give students real world data to consider while learning about different accounting techniques.
- Throughout the text we have included numerous references to the annual reports of many companies.
- Chapters 1-16 contain a section entitled, "Analyzing and using the financial results". This section discusses and illustrates a ratio or other analysis technique that pertains to the content of the chapter. For instance, this section in Chapter 4 discusses the current ratio as it relates to a classified balance sheet.
- Some of the chapters contain end-of-chapter questions, exercises, or business decision cases that require the student to refer to the Annual report appendix and answer certain questions. As stated earlier, this appendix is included with the text and contains the significant portions of the annual report of The Limited, Inc.
- Each chapter contains a section entitled, "Beyond the numbers—Critical thinking". This section contains business decision cases, annual report analysis problems, writing assignments based on the Ethical perspective and Broader perspective boxes, group projects, and Internet projects.

### Pedagogy

Students often come into accounting principles courses feeling anxious about learning the subject matter. Recognizing this apprehension, we studied ways to make learning easier and came up with some helpful ideas on how to make this edition work even better for students.

- Improvements in the text's content reflect feedback from adopters, suggestions by reviewers, and a serious study of the learning process itself by the authors and editors. New subject matter is introduced only after the stage has been set by transitional paragraphs between topic headings. These paragraphs provide students with the reasons for proceeding to the new material and explain the progression of topics within the chapter.
- The Introduction contains a section entitled "How to study the chapters in this text", which should be very helpful to students.
- Each chapter has an "Understanding the learning objectives" section. These "summaries" enable the student to determine how well the learning objectives were accomplished. We were the first authors (1974) to ever include Learning objectives in an accounting text. These objectives have been included at the beginning of the chapter, as marginal notes within the chapter, at the end of the chapter, and in supplements such as the Test bank, Instructors' resource guide, Computerized test bank, and Study guide. The objectives are also indicated for each exercise and problem.
- Demonstration problems and solutions are included for each chapter, and a different one appears for each chapter in the Study guide. These demonstration problems help students to assess their own progress by showing them how problems that focus on the topic(s) covered in the chapter are worked before students do assigned homework problems.

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- Key terms are printed for emphasis. End-of-chapter glossaries contain the definition.
- Each chapter includes a "Self-test" consisting of true-false and multiple-choice questions. The answers and explanations appear at the end of the chapter. These self-tests are designed to determine whether the student has learned the essential information in each chapter.
- In the margin beside each exercise and problem, we have included a description of the requirements and the related Learning objective(s). These descriptions let students know what they are expected to do in the problem.
- Throughout the text we use examples taken from everyday life to relate an accounting concept being introduced or discussed to students' experiences.

### Ethics

There is no better time to emphasize high ethical standards to students. This text includes many items throughout the text entitled, "An ethical perspective". These items present situations in which students are likely to find themselves throughout their careers. They range from resisting pressure by a superior or a client to do the wrong thing to deciding between alternative corporate behaviors that have environmental and profit consequences.

### End-of-chapter materials

Describing teaching methods, the AECC stated, "Teachers...should place a priority on their interaction with students and on interaction among students. Students' involvement should be promoted by methods such as cases, simulations, and group projects..."<sup>2</sup> A section entitled "Beyond the numbers—Critical thinking" at the end of every chapter is designed to implement these recommendations. Business decision cases require critical thinking in complex situations often based on real companies. The Annual report analysis section requires analyzing annual reports and interpreting the results in writing. The Ethics cases require students to respond in writing to situations they are likely to encounter in their careers. These cases do not necessarily have one right answer. The Group projects for each chapter teach students how to work effectively in teams, a skill that was stressed by the AECC and is becoming increasingly necessary for success in business. The Internet projects teach students how to retrieve useful information from the Internet.

A team approach can also be introduced in the classroom using the regular exercises and problems in the text. Teams can be assigned the task of presenting their solutions to exercises or problems to the rest of the class. Using this team approach in class can help re-energize the classroom by creating an active, informal environment in which students learn from each other. (Two additional group projects are described in the Instructor's resource guide. These projects are designed to be used throughout the semester or quarter.)

We have included a vast amount of other resource materials for each chapter within the text from which the instructor may draw: (1) one of the largest selections of end-of-chapter questions, exercises, and problems available; (2) several comprehensive review problems that allow students to review all major concepts covered to that point; and (3) from one to three business decision cases per chapter. Other key features regarding end-of-chapter material follow.

- A uniform chart of accounts appears in a separate file you can download. This uniform chart of accounts is used consistently throughout the first 11 chapters. We believe students will benefit from using the same chart of accounts for all homework problems in those chapters.

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<sup>2</sup> Ibid, p.2.

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- A comprehensive review problem at the end of Chapter 4 serves as a mini practice set to test all material covered to that point. Another comprehensive problem at the end of Chapter 19 reviews the material covered in Chapters 18 and 19. Two comprehensive budgeting problems are also included as business decision cases at the end of Chapter 23.
- Some of the end-of-chapter problem materials (questions, exercises, problems, business decision cases, other "Beyond the numbers" items, and comprehensive review problems) have been updated. Each exercise and problem is identified with the learning objective(s) to which it relates.
- All end-of-chapter exercises and problems have been traced back to the chapters to ensure that nothing is asked of a student that does not appear in the book. This feature was a strength of previous editions, ensuring that instructors could confidently assign problems without having to check for applicability. Also, we took notes while teaching from the text and clarified problem and exercise instructions that seemed confusing to our students.

## Acknowledgments

The development of all eight editions of *Accounting: A Business Perspective* was an evolving and challenging process. Significant changes have taken place in the first course in accounting in schools across the country, and the authors and publisher worked hard throughout the development of this text to stay on top of those changes. We are grateful to the following individuals for their valuable contributions and suggestions which we have incorporated in the various editions of this text. The affiliations shown for all individuals are as of the time of their contributions.

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## The accounting environment

### Learning objectives

After studying this introduction, you should be able to:

- Define accounting.
- Describe the functions performed by accountants.
- Describe employment opportunities in accounting.
- Differentiate between financial and managerial accounting.
- Identify several organizations that have a role in the development of financial accounting standards.

You have embarked on the challenging and rewarding study of accounting—an old and time-honored discipline. History indicates that all developed societies require certain accounting records. Record-keeping in an accounting sense is thought to have begun about 4000 BCE

The record-keeping, control, and verification problems of the ancient world had many characteristics similar to those we encounter today. For example, ancient governments also kept records of receipts and disbursements and used procedures to check on the honesty and reliability of employees.

A study of the evolution of accounting suggests that accounting processes have developed primarily in response to business needs. Also, economic progress has affected the development of accounting processes. History shows that the higher the level of civilization, the more elaborate the accounting methods.

The emergence of double-entry bookkeeping was a crucial event in accounting history. In 1494, a Franciscan monk, Luca Pacioli, described the double-entry Method of Venice system in his text called *Summa de Arithmetica, Geometric, Proportion et Proportionate* (Everything about arithmetic, geometry, and proportion). Many consider Pacioli's *Summa* to be a reworked version of a manuscript that circulated among teachers and pupils of the Venetian school of commerce and arithmetic.

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Since Pacioli's days, the roles of accountants and professional accounting organizations have expanded in business and society. As professionals, accountants have a responsibility for placing public service above their commitment to personal economic gain. Complementing their obligation to society, accountants have analytical and evaluative skills needed in the solution of ever-growing world problems. The special abilities of accountants, their independence, and their high ethical standards permit them to make significant and unique contributions to business and areas of public interest.

You probably will find that of all the business knowledge you have acquired or will learn, the study of accounting will be the most useful. Your financial and economic decisions as a student and consumer involve accounting information. When you file income tax returns, accounting information helps determine your taxes payable. Understanding the discipline of accounting also can influence many of your future professional decisions. You cannot escape the effects of accounting information on your personal and professional life.

Every profit-seeking business organization that has economic resources, such as money, machinery, and buildings, uses accounting information. For this reason, accounting is called the language of business. Accounting also serves as the language providing financial information about not-for-profit organizations such as governments, churches, charities, fraternities, and hospitals. However, this text concentrates on accounting for business firms.

The accounting system of a profit-seeking business is an information system designed to provide relevant financial information on the resources of a business and the effects of their use. Information is relevant if it has some impact on a decision that must be made. Companies present this relevant information in their financial statements. In preparing these statements, accountants consider the users of the information, such as owners and creditors, and decisions they make that require financial information.

As a background for studying accounting, this Introduction defines accounting and lists the functions accountants perform. In addition to surveying employment opportunities in accounting, it differentiates between financial and managerial accounting. Because accounting information must conform to certain standards, we discuss several prominent organizations contributing to these standards. As you continue your study of accounting in this text, accounting—the language of business—will become your language also. You will realize that you are constantly exposed to accounting information in your everyday life.

### Accounting defined

The American Accounting Association—one of the accounting organizations discussed later in this Introduction—defines accounting as "the process of identifying, measuring, and communicating economic information to permit informed judgments and decisions by the users of the information".<sup>3</sup> This information is primarily financial—stated in money terms. Accounting, then, is a measurement and communication process used to report on the activities of profit-seeking business organizations and not-for-profit organizations. As a measurement and communication process for business, accounting supplies information that permits informed judgments and decisions by users of the data.

The accounting process provides financial data for a broad range of individuals whose objectives in studying the data vary widely. Bank officials, for example, may study a company's financial statements to evaluate the company's ability to repay a loan. Prospective investors may compare accounting data from several companies to decide which

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3 American Accounting Association, *A Statement of Basic Accounting Theory* (Evanston, III., 1966), p. 1.

company represents the best investment. Accounting also supplies management with significant financial data useful for decision making.

Reliable information is necessary before decision makers can make a sound decision involving the allocation of scarce resources. Accounting information is valuable because decision makers can use it to evaluate the financial consequences of various alternatives. Accountants eliminate the need for a crystal ball to estimate the future. They can reduce uncertainty by using professional judgment to quantify the future financial impact of taking action or delaying action.

Although accounting information plays a significant role in reducing uncertainty within the organization, it also provides financial data for persons outside the company. This information tells how management has discharged its responsibility for protecting and managing the company's resources. Stockholders have the right to know how a company is managing its investments. In fulfilling this obligation, accountants prepare financial statements such as an income statement, a statement of retained earnings, a balance sheet, and a statement of cash flows. In addition, they prepare tax returns for federal and state governments, as well as fulfill other governmental filing requirements.

Accounting is often confused with bookkeeping. Bookkeeping is a mechanical process that records the routine economic activities of a business. Accounting includes bookkeeping but goes well beyond it in scope. Accountants analyze and interpret financial information, prepare financial statements, conduct audits, design accounting systems, prepare special business and financial studies, prepare forecasts and budgets, and provide tax services.

Specifically the accounting process consists of the following groups of functions (see Exhibit 1 below):

- Accountants observe many events (or activities) and identify and measure in financial terms (dollars) those events considered evidence of economic activity. (Often, these three functions are collectively referred to as analyze.) The purchase and sale of goods and services are economic events.
- Next, the economic events are recorded, classified into meaningful groups, and summarized.
- Accountants report on economic events (or business activity) by preparing financial statements and special reports. Often accountants interpret these statements and reports for various groups such as management, investors, and creditors. Interpretation may involve determining how the business is performing compared to prior years and other similar businesses.

### Employment opportunities in accounting

During the last half-century, accounting has gained the same professional status as the medical and legal professions. Today, the accountants in the United States number well over a million. In addition, several million people hold accounting-related positions. Typically, accountants provide services in various branches of accounting. These include public accounting, management (industrial) accounting, governmental or other not-for-profit accounting, and higher education. The demand for accountants will likely increase dramatically in the future. This increase is greater than for any other profession. You may want to consider accounting as a career.

**Public accounting firms** offer professional accounting and related services for a fee to companies, other organizations, and individuals. An accountant may become a **Certified Public Accountant (CPA)** by passing an examination prepared and graded by the American Institute of Certified Public Accountants (AICPA). The exam is administered by computer. In addition to passing the exam, CPA candidates must meet other requirements, which include obtaining a state license. These requirements vary by state. A number of states require a CPA candidate to have completed specific accounting courses and earned a certain number of college credits (five years of study in

## Accounting principles: A business perspective

many states); worked a certain number of years in public accounting, industry, or government; and lived in that state a certain length of time before taking the CPA examination. As of the year 2000, five years of course work were required to become a member of the AICPA.

After a candidate passes the CPA examination, some states (called one-tier states) insist that the candidate meet all requirements before the state grants the CPA certificate and license to practice. Other states (called two-tier states) issue the CPA certificate immediately after the candidate passes the exam. However, these states issue the license to practice only after all other requirements have been met. CPAs who want to renew their licenses to practice must stay current through continuing professional education programs and must prove that they have done so. No one can claim to be a CPA and offer the services normally provided by a CPA unless that person holds an active license to practice.

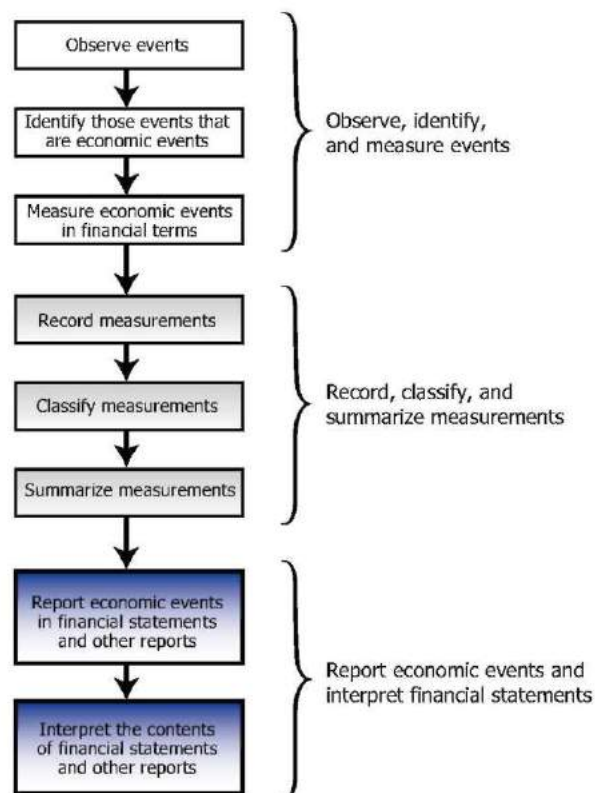


Exhibit 1: Functions performed by accountants.

The public accounting profession in the United States consists of the Big-Four international CPA firms, several national firms, many regional firms, and numerous local firms. The Big-Four firms include Deloitte & Touche, Ernst & Young, KPMG, and Pricewaterhouse Coopers. At all levels, these public accounting firms provide auditing, tax, and, for nonaudit clients, management advisory (or consulting) services.

**Auditing** A business seeking a loan or attempting to have its securities traded on a stock exchange usually must provide financial statements to support its request. Users of a company's financial statements are more confident that the company is presenting its statements fairly when a CPA has audited the statements. For this reason, companies hire CPA firms to conduct examinations (**independent audits**) of their accounting and related records. **Independent auditors** of the CPA firm check some of the company's records by contacting external

sources. For example, the accountant may contact a bank to verify the cash balances of the client. After completing a company audit, independent auditors give an **independent auditor's opinion or report**. (For an example of an auditor's opinion, see The Limited, Inc. annual report in the Annual report appendix at the end of the text.) This report states whether the company's financial statements fairly (equitably) report the economic performance and financial condition of the business. As you will learn in the next section, auditors within a business also conduct audits, which are not independent audits. Currently auditing standards are established by the Public Company Accounting Oversight Board.

In 2002 The Sarbanes-Oxley Act was passed. The Act was passed as one result of the large losses to the employees and investors from accounting fraud situations involving companies such as Enron and WorldCom. The Act created the Public Company Accounting Oversight Board. The Board consists of five members appointed and overseen by the Securities and Exchange Commission. The Board oversees and investigates the audits and auditors of public companies and can sanction both firms and individuals for violations of laws, regulations, and rules. The Chief Executive Officer and Chief Financial Officer of a public company must now certify the company's financial statements. Corporate audit committees, rather than the corporate management, are now responsible for hiring, compensating, and overseeing the external auditors.

**Tax services** CPAs often provide expert advice on tax planning and preparing federal, state, and local tax returns. The objective in preparing tax returns is to use legal means to minimize the taxes paid. Almost every major business decision has a tax impact. Tax planning helps clients know the tax effects of each financial decision.

**Management advisory (or consulting) services** Before Sarbanes-Oxley management advisory services were the fastest growing service area for most large and many smaller CPA firms. Management frequently identifies projects for which it decides to retain the services of a CPA. However, the Sarbanes-Oxley Act specifically prohibits providing certain types of consulting services to a publicly-held company by its external auditor. These services include bookkeeping, information systems design and implementation, appraisals or valuation services, actuarial services, internal audits, management and human resources services, broker/dealer and investment services, and legal or expert services related to audit services. Accounting firms can perform many of these services for publicly held companies they do not audit. Other services not specifically banned are allowed if pre-approved by the company's audit committee.

In contrast to public accountants, who provide accounting services for many clients, management accountants provide accounting services for a single business. In a company with several management accountants, the person in charge of the accounting activity is often the **controller** or **chief financial officer**.

Management accountants may or may not be CPAs. If management accountants pass an examination prepared and graded by the Institute of Certified Management Accountants (ICMA) and meet certain other requirements, they become **Certified Management Accountants (CMAs)**. The ICMA is an affiliate of the Institute of Management Accountants, an organization primarily consisting of management accountants employed in private industry.

A career in management accounting can be very challenging and rewarding. Many management accountants specialize in one particular area of accounting. For example, some may specialize in measuring and controlling costs, others in budgeting (the development of plans for future operations), and still others in financial accounting and reporting. Many management accountants become specialists in the design and installation of computerized accounting systems. Other management accountants are **internal auditors** who conduct **internal audits**. They

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ensure that the company's divisions and departments follow the policies and procedures of management. This last group of management accountants may earn the designation of **Certified Internal Auditor (CIA)**. The Institute of Internal Auditors (IIA) grants the CIA certificate to accountants after they have successfully completed the IIA examination and met certain other requirements.

Many accountants, including CPAs, work in **governmental and other not-for-profit accounting**. They have essentially the same educational background and training as accountants in public accounting and management accounting.

Governmental agencies at the federal, state, and local levels employ governmental accountants. Often the duties of these accountants relate to tax revenues and expenditures. For example, Internal Revenue Service employees use their accounting backgrounds in reviewing tax returns and investigating tax fraud. Government agencies that regulate business activity, such as a state public service commission that regulates public utilities (e.g. telephone company, electric company), usually employ governmental accountants. These agencies often employ governmental accountants who can review and evaluate the utilities' financial statements and rate increase requests. Also, FBI agents trained as accountants find their accounting backgrounds useful in investigating criminals involved in illegal business activities, such as drugs or gambling.

Not-for-profit organizations, such as churches, charities, fraternities, and universities, need accountants to record and account for funds received and disbursed. Even though these agencies do not have a profit motive, they should operate efficiently and use resources effectively.

Approximately 10,000 accountants are employed in higher education. The activities of these **academic accountants** include teaching accounting courses, conducting scholarly and applied research and publishing the results, and performing service for the institution and the community. Faculty positions exist in two-year colleges, four-year colleges, and universities with graduate programs. A significant shortage of accounting faculty has developed due to the retirement beginning in the late 1990s of many faculty members. Starting salaries will continue to rise significantly because of the shortage. You may want to talk with some of your professors about the advantages and disadvantages of pursuing an accounting career in higher education.

A section preceding each chapter, entitled "Careers in accounting", describes various accounting careers. You might find one that you would like to pursue.

### Financial accounting versus managerial accounting

An accounting information system provides data to help decision makers both outside and inside the business. Decision makers outside the business are affected in some way by the performance of the business. Decision makers inside the business are responsible for the performance of the business. For this reason, accounting is divided into two categories: financial accounting for those outside and managerial accounting for those inside.

**Financial accounting** information appears in financial statements that are intended primarily for external use (although management also uses them for certain internal decisions). Stockholders and creditors are two of the outside parties who need financial accounting information. These outside parties decide on matters pertaining to the entire company, such as whether to increase or decrease their investment in a company or to extend credit to a company. Consequently, financial accounting information relates to the company as a whole, while managerial accounting focuses on the parts or segments of the company.

Management accountants in a company prepare the financial statements. Thus, management accountants must be knowledgeable concerning financial accounting and reporting. The financial statements are the representations of management, not the CPA firm that performs the audit.

The external users of accounting information fall into six groups; each has different interests in the company and wants answers to unique questions. The groups and some of their possible questions are:

- **Owners and prospective owners.** Has the company earned satisfactory income on its total investment? Should an investment be made in this company? Should the present investment be increased, decreased, or retained at the same level? Can the company install costly pollution control equipment and still be profitable?
- **Creditors and lenders.** Should a loan be granted to the company? Will the company be able to pay its debts as they become due?
- **Employees and their unions.** Does the company have the ability to pay increased wages? Is the company financially able to provide long-term employment for its workforce?
- **Customers.** Does the company offer useful products at fair prices? Will the company survive long enough to honor its product warranties?
- **Governmental units.** Is the company, such as a local public utility, charging a fair rate for its services?
- **General public.** Is the company providing useful products and gainful employment for citizens without causing serious environmental problems?

General-purpose financial statements provide much of the information needed by external users of financial accounting. These **financial statements** are formal reports providing information on a company's financial position, cash inflows and outflows, and the results of operations. Many companies publish these statements in annual reports. (See The Limited, Inc., annual report in the Annual report appendix.) The **annual report** also contains the independent auditor's opinion as to the fairness of the financial statements, as well as information about the company's activities, products, and plans.

Financial accounting information is historical in nature, reporting on what has happened in the past. To facilitate comparisons between companies, this information must conform to certain accounting standards or principles called **generally accepted accounting principles (GAAP)**. These generally accepted accounting principles for businesses or governmental organizations have developed through accounting practice or been established by an authoritative organization. We describe several of these authoritative organizations in the next major section of this Introduction.

Managerial accounting information is for internal use and provides special information for the managers of a company. The information managers use may range from broad, long-range planning data to detailed explanations of why actual costs varied from cost estimates. Managerial accounting information should:

- Relate to the part of the company for which the manager is responsible. For example, a production manager wants information on costs of production but not of advertising.
- Involve planning for the future. For instance, a budget would show financial plans for the coming year.
- Meet two tests: the accounting information must be useful (relevant) and must not cost more to gather and process than it is worth.

Managerial accounting generates information that managers can use to make sound decisions. The four major types of internal management decisions are:

- **Financial decisions**—deciding what amounts of capital (funds) are needed to run the business and whether to secure these funds from owners (stockholders) or creditors. In this sense, capital means money used by the company to purchase resources such as machinery and buildings and to pay expenses of conducting the business.
- **Resource allocation decisions**—deciding how the total capital of a company is to be invested, such as the amount to be invested in machinery.
- **Production decisions**—deciding what products are to be produced, by what means, and when.
- **Marketing decisions**—setting selling prices and advertising budgets; determining the location of a company's markets and how to reach them.

### Development of financial accounting standards

Several organizations are influential in the establishment of generally accepted accounting principles (GAAP) for businesses or governmental organizations. These are the American Institute of Certified Public Accountants, the Financial Accounting Standards Board, the Governmental Accounting Standards Board, the Securities and Exchange Commission, the American Accounting Association, the Financial Executives Institute, and the Institute of Management Accountants. Each organization has contributed in a different way to the development of GAAP.

The American Institute of Certified Public Accountants (AICPA) is a professional organization of CPAs. Many of these CPAs are in public accounting practice. Until recent years, the AICPA was the dominant organization in the development of accounting standards. In a 20-year period ending in 1959, the AICPA Committee on Accounting Procedure issued 51 *Accounting Research Bulletins* recommending certain principles or practices. From 1959 through 1973, the committee's successor, the **Accounting Principles Board (APB)**, issued 31 numbered *Opinions* that CPAs generally are required to follow. Through its monthly magazine, the *Journal of Accountancy*, its research division, and its other divisions and committees, the AICPA continues to influence the development of accounting standards and practices. Two of its committees—the Accounting Standards Committee and the Auditing Standards Committee—are particularly influential in providing input to the Financial Accounting Standards Board (the current rule-making body) and to the Securities and Exchange Commission and other regulatory agencies.

In 1973, an independent, seven-member, full-time **Financial Accounting Standards Board (FASB)** replaced the Accounting Principles Board. The FASB has issued numerous *Statements of Financial Accounting Standards*. The old *Accounting Research Bulletins* and *Accounting Principles Board Opinions* are still effective unless specifically superseded by a Financial Accounting Standards Board Statement. The FASB is the *private sector* organization now responsible for the development of new financial accounting standards.

The Emerging Issues Task Force of the FASB interprets official pronouncements for general application by accounting practitioners. The conclusions of this task force must also be followed in filings with the Securities and Exchange Commission.

In 1984, the **Governmental Accounting Standards Board (GASB)** was established with a full-time chairperson and four part-time members. The GASB issues statements on accounting and financial reporting in the governmental area. This organization is the *private sector* organization now responsible for the development of new governmental accounting concepts and standards. The GASB also has the authority to issue interpretations of these standards.



Created under the Securities and Exchange Act of 1934, the **Securities and Exchange Commission (SEC)** is a government agency that administers important acts dealing with the interstate sale of securities (stocks and bonds). The SEC has the authority to prescribe accounting and reporting practices for companies under its jurisdiction. This includes virtually every major US business corporation. Instead of exercising this power, the SEC has adopted a policy of working closely with the accounting profession, especially the FASB, in the development of accounting standards. The SEC indicates to the FASB the accounting topics it believes the FASB should address.

Consisting largely of accounting educators, the **American Accounting Association (AAA)** has sought to encourage research and study at a theoretical level into the concepts, standards, and principles of accounting. One of its quarterly magazines, *The Accounting Review*, carries many articles reporting on scholarly accounting research. Another quarterly journal, *Accounting Horizons*, reports on more practical matters directly related to accounting practice. A third journal, *Issues in Accounting Education*, contains articles relating to accounting education matters. Students may join the AAA as associate members by contacting the American Accounting Association, 5717 Bessie Drive, Sarasota, Florida 34233.

The **Financial Executives Institute** is an organization established in 1931 whose members are primarily financial policy-making executives. Many of its members are chief financial officers (CFOs) of very large corporations. The role of the CFO has evolved in recent years from number cruncher to strategic planner. These CFOs played a major role in restructuring American businesses in the early 1990s. Slightly more than 14,000 financial officers, representing approximately 7,000 companies in the United States and Canada, are members of the FEI. Through its Committee on Corporate Reporting (CCR) and other means, the FEI is very effective in representing the views of the private financial sector to the FASB and to the Securities and Exchange Commission and other regulatory agencies.

The **Institute of Management Accountants** (formerly the National Association of Accountants) is an organization with approximately 70,000 members, consisting of management accountants in private industry, CPAs, and academics. The primary focus of the organization is on the use of management accounting information for internal decision making. However, management accountants prepare the financial statements for external users. Thus, through its Management Accounting Practices (MAP) Committee and other means, the IMA provides input on financial accounting standards to the Financial Accounting Standards Board and to the Securities and Exchange Commission and other regulatory agencies.

Many other organizations such as the Financial Analysts Federation (composed of investment advisers and investors), the Securities Industry Associates (composed of investment bankers), and CPA firms have committees or task forces that respond to Exposure Drafts of proposed FASB Statements. Their reactions are in the form of written statements sent to the FASB and testimony given at FASB hearings. Many individuals also make their reactions known to the FASB.

### **Ethical behavior of accountants**

Several accounting organizations have codes of ethics governing the behavior of their members. For instance, both the American Institute of Certified Public Accountants and the Institute of Management Accountants have formulated such codes. Many business firms have also developed codes of ethics for their employees to follow.

Ethical behavior involves more than merely making sure you are not violating a code of ethics. Most of us sense what is right and wrong. Yet get-rich-quick opportunities can tempt many of us. Almost any day, newspaper

## Accounting principles:A business perspective

headlines reveal public officials and business leaders who did not do the right thing. Greed won out over their sense of right and wrong. These individuals followed slogans such as: "Get yours while the getting is good"; "Do unto others before they do unto you"; and "You have done wrong only if you get caught". More appropriate slogans might be: "If it seems too good to be true, it usually is"; "There are no free lunches"; and the golden rule, "Do unto others as you would have them do unto you".

An accountant's most valuable asset is an honest reputation. Those who take the high road of ethical behavior receive praise and honor; they are sought out for their advice and services. They also like themselves and what they represent. Occasionally, accountants do take the low road and suffer the consequences. They sometimes find their names mentioned in *The Wall Street Journal* and news programs in an unfavorable light, and former friends and colleagues look down on them. Some of these individuals are removed from the profession. Fortunately, the accounting profession has many leaders who have taken the high road, gained the respect of friends and colleagues, and become role models for all of us to follow.

Many chapters in the text include an ethics case entitled, "An ethical perspective". We know you will benefit from thinking about the situational ethics in these cases. Often you will not have much difficulty in determining "right and wrong". Instead of making the cases "close calls", we have attempted to include situations business students might actually encounter in their careers.

### Critical thinking and communication skills

Accountants in practice and business executives have generally been dissatisfied with accounting graduates' ability to think critically and to communicate their ideas effectively. The Accounting Education Change Commission has recommended that changes be made in the education of accountants to remove these complaints.

To address these concerns, we have included a section at the end of each chapter entitled, "Beyond the numbers—Critical thinking". In that section, you are required to work relatively unstructured business decision cases, analyze real-world annual report data, write about situations involving ethics, and participate in group projects. Most of the other end-of-chapter materials also involve analysis and written communication of ideas.

In some of the cases, analyses, ethics situations, and group projects, you are asked to write a memorandum regarding the situation. In writing such a memorandum, identify your role (auditor, consultant), the audience (management, stockholders, and creditors), and the task (the specific assignment). Present your ideas clearly and concisely.

The purpose of the group projects is to assist you in learning to listen to and work with others. These skills are important in succeeding in the business world. Team players listen to the views of others and work cohesively with them to achieve group goals.

### Internet skills

The Internet is a fact of life. It is important for accountants and students to be able to use the Internet to find relevant information. Thus, each chapter contains approximately two Internet projects related to accounting. Your instructor might assign some of these, or you could pursue them on your own.

### How to study the chapters in this text

In studying each chapter:

- Begin by reading the learning objectives at the beginning of each chapter.
- Read "Understanding the learning objectives" at the end of the chapter for a preview of the chapter content.

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- Read the chapter content. Each exercise at the end of the chapters identifies the learning objective(s) to which it pertains. If you learn best by reading about a concept and then working a short exercise that illustrates that concept, work the exercises as you read the chapter.

- Reread "Understanding the learning objectives" to determine if you have achieved each objective.

- Study the Key terms to see if you understand each term. If you do not understand a certain term, refer to the page indicated to read about the term in its original context.

- Take the Self-test and then check your answers with those at the end of the chapter.

- Work the Demonstration problem to further reinforce your understanding of the chapter content. Then, compare your solution to the correct solution that follows immediately.

- Look over the questions at the end of the chapter and think out an answer to each one. If you cannot answer a particular question, refer back into the chapter for the needed information.

- Work at least some of the exercises at the end of the chapter.

- Work the Problems assigned by your instructor, using the forms available. They can be downloaded from the publisher's website ([www.freeloadpress.com](http://www.freeloadpress.com)).

- Study the items in the "Beyond the numbers—Critical thinking" section and the "Using the Internet—A view of the real world" section at the end of each chapter to relate what you have learned to real-world situations.

- Work the Study guide for the chapter. The Study guide is a supplement that contains (for each chapter) Learning objectives; Demonstration problem and solution (different from the one in the text); Matching, Completion, True-false, and Multiple-choice questions; and Solutions to all questions and exercises in the study guide. The Study guide can be downloaded from the publisher's website ([www.freeloadpress.com](http://www.freeloadpress.com)).

If you perform each of these steps for each chapter, you should do well in the course. Remember that a knowledge of accounting will serve you well regardless of the career you pursue.

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### International accounting standards

In recent years, there has been a movement to develop a single set of global accounting standards for use around the world. Proponents of this movement say that it will boost cross-border investment, deepen international capital markets and save multinational companies, who must currently report under multiple systems, a lot of time and money. The International Accounting Standards Committee (IASC) Foundation was established as an independent, not-for profit, private sector organisation to work towards this goal. It seeks to develop a globally accepted set of financial reporting standards (IFRSs) under the direction of its standards-setting body, the International Accounting Standards Board (IASB). The AICPA (as well as the other entities mentioned above) supports this effort and, as of early 2010, states on its website that:

“The growing acceptance of International Financial Reporting Standards (IFRS) as a basis for U.S. financial reporting represents a fundamental change for the U.S. accounting profession. Today approximately 113 countries require or allow the use of IFRS for the preparation of financial statements by publicly held companies. In the United States, the Securities and Exchange Commission (SEC) has been taking steps to set a date to allow U.S. public companies to use IFRS, and perhaps make its adoption mandatory. In fact, on November 14, 2008, the SEC released for

public comment a proposed roadmap with a timeline and key milestones for adopting IFRS beginning in 2014". Clearly, many new issues can emerge between now and 2014, but the direction seems to be clear. The AICPA has a link on its website to a page with current information on the planned migration to IFRS. You might like to check it out from time to time at [http://www.ifrs.com/Backgrounder\\_Get\\_Ready.html](http://www.ifrs.com/Backgrounder_Get_Ready.html). There is also a wealth of information on the IFRS website at <http://ifrs.org>.

Students from countries other than the US should check the website of the professional accounting organization in your country for an update on the current status. For example, if you go to the website of the Institute of Chartered Accountants of India at <http://icai.org> and search on IFRS you will find a number of links to documents covering the planned migration to IFRS in India.

# 1. Accounting and its use in business decisions

## Learning objectives

- Identify and describe the three basic forms of business organizations.
- Distinguish among the three types of activities performed by business organizations.
- Describe the content and purposes of the income statement, statement of retained earnings, balance sheet, and statement of cash flows.
- State the basic accounting equation and describe its relationship to the balance sheet.
- Using the underlying assumptions or concepts, analyze business transactions and determine their effects on items in the financial statements.
- Prepare an income statement, a statement of retained earnings, and a balance sheet.
- Analyze and use the financial results—the equity ratio.

## A career as an entrepreneur

When today's college students are polled about their long-term career choice, a surprisingly large number respond that they wish to someday own and manage their own business. In fact, the aspiration to start a business, to be an entrepreneur, is nearly universal. It is widely acknowledged that a degree in accounting offers many advantages to a would-be entrepreneur. In fact, if you ask owners of small businesses which skill they wish they had more expertise in, they will very frequently reply "accounting". No matter what the business may be, the owner and/or manager must be able to understand the accounting and financial consequences of business decisions.

Most successful entrepreneurs have learned that it takes a lot more than a great marketing idea or product innovation to make a successful business. There are many steps involved before an idea becomes a successful and rewarding business. Entrepreneurs must be able to raise capital, either from banks or investors. Once a business has been launched, the entrepreneur must be a manager—a manager of people, inventory, facilities, customer relationships, and relationships with the very banks and investors that provided the capital. Business owners quickly learn that in order to survive they need to be well-rounded, savvy individuals who can successfully manage these diverse relationships. An accounting education is ideal for providing this versatile background.

In addition to providing a good foundation for entrepreneurship in any business, an accounting degree offers other ways of building your own business. For example, a large percentage of public accountants work as sole proprietors—building and managing their own professional practice. This can be a very rewarding career, working closely with individuals and small businesses. One advantage of this career is that you can establish your practice in virtually any location ranging from large cities to rural settings. Finally, many accountants who have gained specialized expertise and experience in a particular field start their own practice as consultants. Expertise such as this, which may be in a field outside of traditional accounting practice, can generate billing rates well in the excess of USD 100 an hour.

## 1. Accounting and its use in business decisions

The introduction to this text provided a background for your study of accounting. Now you are ready to learn about the forms of business organizations and the types of business activities they perform. This chapter presents the financial statements used by businesses. These financial statements show the results of decisions made by management. Investors, creditors, and managers use these statements in evaluating management's past decisions and as a basis for making future decisions.

In this chapter, you also study the accounting process (or accounting cycle) that accountants use to prepare those financial statements. This accounting process uses financial data such as the records of sales made to customers and purchases made from suppliers. In a systematic manner, accountants analyze, record, classify, summarize, and finally report these data in the financial statements of businesses. As you study this chapter, you will begin to understand the unique, systematic nature of accounting—the language of business.

### Forms of business organizations

Accountants frequently refer to a business organization as an **accounting entity** or a **business entity**. A business entity is any business organization, such as a hardware store or grocery store, that exists as an economic unit. For accounting purposes, each business organization or **entity** has an existence separate from its owner(s), creditors, employees, customers, and other businesses.<sup>4</sup> This separate existence of the business organization is known as the **business entity concept**. Thus, in the accounting records of the business entity, the activities of each business should be kept separate from the activities of other businesses and from the personal financial activities of the owner(s).

Assume, for example, that you own two businesses, a physical fitness center and a horse stable. According to the business entity concept, you would consider each business as an independent business unit. Thus, you would normally keep separate accounting records for each business. Now assume your physical fitness center is unprofitable because you are not charging enough for the use of your exercise equipment. You can determine this fact because you are treating your physical fitness center and horse stable as two separate business entities. You must also keep your personal financial activities separate from your two businesses. Therefore, you cannot include the car you drive only for personal use as a business activity of your physical fitness center or your horse stable. However, the use of your truck to pick up feed for your horse stable is a business activity of your horse stable.

As you will see shortly, the business entity concept applies to the three forms of businesses—single proprietorships, partnerships, and corporations. Thus, for accounting purposes, all three business forms are separate from other business entities and from their owner(s). Since most large businesses are corporations, we use the corporate approach in this text and include only a brief discussion of single proprietorships and partnerships.

A **single proprietorship** is an unincorporated business owned by an individual and often managed by that same person. Single proprietors include physicians, lawyers, electricians, and other people in business for themselves. Many small service businesses and retail establishments are also single proprietorships. No legal formalities are necessary to organize such businesses, and usually business operations can begin with only a limited investment.

In a single proprietorship, the owner is solely responsible for all debts of the business. For accounting purposes, however, the business is a separate entity from the owner. Thus, single proprietors must keep the financial activities

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<sup>4</sup> When first studying any discipline, students encounter new terms. Usually these terms are set in bold. The boldface color terms are also listed and defined at the end of each chapter (see Key terms).

of the business, such as the receipt of fees from selling services to the public, separate from their personal financial activities. For example, owners of single proprietorships should not enter the cost of personal houses or car payments in the financial records of their businesses.

A **partnership** is an unincorporated business owned by two or more persons associated as partners. Often the same persons who own the business also manage the business. Many small retail establishments and professional practices, such as dentists, physicians, attorneys, and many CPA firms, are partnerships.

A partnership begins with a verbal or written agreement. A written agreement is preferable because it provides a permanent record of the terms of the partnership. These terms include the initial investment of each partner, the duties of each partner, the means of dividing profits or losses between the partners each year, and the settlement after the death or withdrawal of a partner. Each partner may be held liable for all the debts of the partnership and for the actions of each partner within the scope of the business. However, as with the single proprietorship, for accounting purposes, the partnership is a separate business entity.

A **corporation** is a business incorporated under the laws of a state and owned by a few stockholders or thousands of stockholders. Almost all large businesses and many small businesses are incorporated.

The corporation is unique in that it is a separate legal business entity. The owners of the corporation are **stockholders**, or **shareholders**. They buy shares of stock, which are units of ownership, in the corporation. Should the corporation fail, the owners would only lose the amount they paid for their stock. The corporate form of business protects the personal assets of the owners from the creditors of the corporation.<sup>5</sup>

Stockholders do not directly manage the corporation. They elect a board of directors to represent their interests. The board of directors selects the officers of the corporation, such as the president and vice presidents, who manage the corporation for the stockholders.

Accounting is necessary for all three forms of business organizations, and each company must follow generally accepted accounting principles (GAAP). Since corporations have such an important impact on our economy, we use them in this text to illustrate basic accounting principles and concepts.

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### An accounting perspective:

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#### Business insight

Although corporations constitute about 17 per cent of all business organizations, they account for almost 90 per cent of all sales volume. Single proprietorships constitute about 75 per cent of all business organizations but account for less than 10 per cent of sales volume.

#### Types of activities performed by business organizations

The forms of business entities discussed in the previous section are classified according to the type of ownership of the business entity. Business entities can also be grouped by the type of business activities they perform—service

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- 5 When individuals seek a bank loan to finance the formation of a small corporation, the bank often requires those individuals to sign documents making them personally responsible for repaying the loan if the corporation cannot pay. In this instance, the individuals can lose their original investments plus the amount of the loan they are obligated to repay.

## 1. Accounting and its use in business decisions

companies, merchandising companies, and manufacturing companies. Any of these activities can be performed by companies using any of the three forms of business organizations.

- **Service companies** perform services for a fee. This group includes accounting firms, law firms, and dry cleaning establishments. The early chapters of this text describe accounting for service companies.
- **Merchandising companies** purchase goods that are ready for sale and then sell them to customers. Merchandising companies include auto dealerships, clothing stores, and supermarkets. We begin the description of accounting for merchandising companies in Chapter 6.
- **Manufacturing companies** buy materials, convert them into products, and then sell the products to other companies or to the final consumers. Manufacturing companies include steel mills, auto manufacturers, and clothing manufacturers.

All of these companies produce financial statements as the final end product of their accounting process. These financial statements provide relevant financial information both to those inside the company—management—and to those outside the company—creditors, stockholders, and other interested parties. The next section introduces four common financial statements—the income statement, the statement of retained earnings, the balance sheet, and the statement of cash flows.

### Financial statements of business organizations

Business entities may have many objectives and goals. For example, one of your objectives in owning a physical fitness center may be to improve *your* physical fitness. However, the two primary objectives of every business are profitability and solvency. **Profitability** is the ability to generate income. **Solvency** is the ability to pay debts as they become due. Unless a business can produce satisfactory income and pay its debts as they become due, the business cannot survive to realize its other objectives.

There are four basic financial statements. Together they present the profitability and strength of a company. The financial statement that reflects a company's profitability is the **income statement**. The **statement of retained earnings** shows the change in retained earnings between the beginning and end of a period (e.g. a month or a year). The **balance sheet** reflects a company's solvency and financial position. The **statement of cash flows** shows the cash inflows and outflows for a company over a period of time. The headings and elements of each statement are similar from company to company. You can see this similarity in the financial statements of actual companies in the appendix of this textbook.

The **income statement**, sometimes called an earnings statement, reports the profitability of a business organization for a *stated period of time*. In accounting, we measure profitability for a period, such as a month or year, by comparing the revenues earned with the expenses incurred to produce these revenues. **Revenues** are the inflows of assets (such as cash) resulting from the sale of products or the rendering of services to customers. We measure revenues by the prices agreed on in the exchanges in which a business delivers goods or renders services. **Expenses** are the costs incurred to produce revenues. Expenses are measured by the assets surrendered or consumed in serving customers. If the revenues of a period exceed the expenses of the same period, **net income** results. Thus,

$$\text{Net income} = \text{Revenues} - \text{Expenses}$$

Net income is often called the *earnings* of the company. When expenses exceed revenues, the business has a **net loss**, and it has operated unprofitably.



In Exhibit 3, Part A shows the income statement of Metro Courier, Inc., for July 2010. This corporation performs courier delivery services of documents and packages in San Diego in the state of California, USA.

Metro's income statement for the month ended 2010 July 31, shows that the revenues (or delivery fees) generated by serving customers for July totaled USD 5,700. Expenses for the month amounted to USD 3,600. As a result of these business activities, Metro's net income for July was USD 2,100. To determine its net income, the company subtracts its expenses of USD 3,600 from its revenues of USD 5,700. Even though corporations are taxable entities, we ignore corporate income taxes at this point.

One purpose of the *statement of retained earnings* is to connect the income statement and the balance sheet. The **statement of retained earnings** explains the changes in retained earnings between two balance sheet dates. These changes usually consist of the addition of net income (or deduction of net loss) and the deduction of dividends.

Dividends are the means by which a corporation rewards its stockholders (owners) for providing it with investment funds. A **dividend** is a payment (usually of cash) to the owners of the business; it is a distribution of income to owners rather than an expense of doing business. Corporations are not required to pay dividends and, because dividends are not an expense, they do not appear on the income statement.

The effect of a dividend is to reduce cash and retained earnings by the amount paid out. Then, the company no longer retains a portion of the income earned but passes it on to the stockholders. Receiving dividends is, of course, one of the primary reasons people invest in corporations.

The statement of retained earnings for Metro Courier, Inc., for July 2010 is relatively simple (see Part B of Exhibit 3). Organized on June 1, Metro did not earn any revenues or incur any expenses during June. So Metro's beginning retained earnings balance on July 1 is zero. Metro then adds its USD 2,100 net income for July. Since Metro paid no dividends in July, the USD 2,100 would be the ending balance of retained earnings. See below.

A. Income Statement		
METRO COURIER INC		
Income Statement For the Month Ended		
2010 July 31		
Revenues:		
Service revenue		\$ 5,700
Expenses:		
Salaries expense	\$ 2,600	
Rent expense	400	
Gas and oil expense	600	
Total expenses		3,600
Net income		\$ 2,100 (A)

B. Statement of Retained Earnings
METRO COURIER, INC. Statement of Retained Earnings For the Month Ended 2010 July 31

1. Accounting and its use in business decisions

Retained earnings, July 1	-0-
Add: Net income for July	(A)2,100
Retained earnings, July 31	\$ 2,100 (B)

C. Balance Sheet			
METRO COURIER, INC. Balance Sheet 2010 July 31			
Assets		Liabilities and Stockholder's Equity	
Cash	\$ 15,500	Liabilities:	
Account receivables	700	Accounts payable	\$ 600
Trucks	20,000	Notes payable	6,000
Office equipment	2,500	Total liabilities	\$ 6,600
		Stockholders equity:	
		Capital stock	\$ 30,000
		Retained earnings	(B)2,100
		Total stockholders' equity	\$ 32,100
Total assets	\$ 38,700	Total liabilities and stockholders' equity	\$ 38,700

Exhibit 2:

Next, Metro carries this USD 2,100 ending balance in retained earnings to the balance sheet (Part C). If there had been a net loss, it would have deducted the loss from the beginning balance on the statement of retained earnings. For instance, if during the next month (August) there is a net loss of USD 500, the loss would be deducted from the beginning balance in retained earnings of USD 2,100. The retained earnings balance at the end of August would be USD 1,600.

Dividends could also have affected the Retained Earnings balance. To give a more realistic illustration, assume that (1) Metro Courier, Inc.'s net income for August was actually USD 1,500 (revenues of USD 5,600 less expenses of USD 4,100) and (2) the company declared and paid dividends of USD 1,000. Then, Metro's statement of retained earnings for August would be:

METRO COURIER, INC. Statement of Retained Earnings For the Month Ended 2010 August 31	
Retained earnings, August 1.....	\$2,100
Add: Net income for August.....	1,500
Total.....	\$3,600
Less: Dividends.....	1,000
Retained earnings, August 31.....	\$2,600

The **balance sheet**, sometimes called the *statement of financial position*, lists the company's assets, liabilities, and stockholders' equity (including dollar amounts) as of a specific moment in time. That specific moment is the close of business on the date of the balance sheet. Notice how the heading of the balance sheet differs from the headings on the income statement and statement of retained earnings. A balance sheet is like a photograph; it captures the financial position of a company at a particular *point* in time. The other two statements are for a *period* of time. As you study about the assets, liabilities, and stockholders' equity contained in a balance sheet, you will understand why this financial statement provides information about the solvency of the business.

**Assets** are things of value owned by the business. They are also called the *resources* of the business. Examples include cash, machines, and buildings. Assets have value because a business can use or exchange them to produce

the services or products of the business. In Part C of Exhibit 3 the assets of Metro Courier, Inc., amount to USD 38,700. Metro’s assets consist of cash, **accounts receivable** (amounts due from customers for services previously rendered), trucks, and office equipment.

**Liabilities** are the debts owed by a business. Typically, a business must pay its debts by certain dates. A business incurs many of its liabilities by purchasing items on credit. Metro’s liabilities consist of **accounts payable** (amounts owed to suppliers for previous purchases) and **notes payable** (written promises to pay a specific sum of money) totaling USD 6,600.<sup>6</sup>

Metro Courier, Inc., is a corporation. The owners’ interest in a corporation is referred to as **stockholders’ equity**. Metro’s stockholders’ equity consists of (1) USD 30,000 paid for shares of capital stock and (2) retained earnings of USD 2,100. **Capital stock** shows the amount of the owners’ investment in the corporation. **Retained earnings** generally consists of the accumulated net income of the corporation minus dividends distributed to stockholders. We discuss these items later in the text. At this point, simply note that the balance sheet heading includes the name of the organization and the title and date of the statement. Notice also that the dollar amount of the total assets is equal to the claims on (or interest in) those assets. The balance sheet shows these claims under the heading “Liabilities and Stockholders’ Equity”.

Management is interested in the cash inflows to the company and the cash outflows from the company because these determine the company’s cash it has available to pay its bills when due. The **statement of cash flows** shows the cash inflows and cash outflows from operating, investing, and financing activities. *Operating activities* generally include the cash effects of transactions and other events that enter into the determination of net income. *Investing activities* generally include business transactions involving the acquisition or disposal of long-term assets such as land, buildings, and equipment. **Financing activities** generally include the cash effects of transactions and other events involving creditors and owners (stockholders).

Chapter 16 describes the statement of cash flows in detail. Our purpose here is to merely introduce this important financial statement. Normally, a firm prepares a statement of cash flows for the same time period as the income statement. The following statement, however, shows the cash inflows and outflows for Metro Courier, Inc., since it was formed on 2010 June 1. Thus, this cash flow statement is for two months.

<b>METRO COURIER, INC.</b> <b>Statement of Cash Flows</b> <b>For the Two-Month Period Ended 2010 July 31</b>		
Cash flows from operating activities:		
Net income.....	\$2,100	
Adjustments to reconcile net income to net cash provided by operating activities:		
Increase in accounts receivable.....	(700)	
Increase in accounts payable.....	600	
Net cash provided by operating activities.....	\$2,000	
Cash flows from investing activities:		
Purchase of trucks.....	\$(20,000)	
Purchase of office equipment.....	(2,500)	
Net cash used by investing activities.....		(22,500)
Cash flows from financing activities:		
Proceeds from notes payable.....	\$6,000	
Proceeds from sale of capital stock.....	30,000	

6 Most notes bear interest, but in this chapter we assume that all notes bear no interest. Interest is an amount paid by the borrower to the lender (in addition to the amount of the loan) for use of the money over time.

## 1. Accounting and its use in business decisions

Net cash provided by financing activities.....		36,000
Net increase in cash.....		\$15,500

At this point in the course, you need to understand what a statement of cash flows is rather than how to prepare it. We do not ask you to prepare such a statement until you have studied Chapter 16.

The income statement, the statement of retained earnings, the balance sheet, and the statement of cash flows of Metro Courier, Inc., show the results of management's past decisions. They are the end products of the accounting process, which we explain in the next section. These financial statements give a picture of the solvency and profitability of the company. The accounting process details how this picture was made. Management and other interested parties use these statements to make future decisions. Management is the first to know the financial results; then, it publishes the financial statements to inform other users. The most recent financial statements for most companies can be found on their websites under "Investor Relations" or some similar heading.

### The financial accounting process

In this section, we explain the accounting equation—the framework for the entire accounting process. Then, we show you how to recognize a business transaction and describe underlying assumptions that accountants use to record business transactions. Next you learn how to analyze and record business transactions.

In the balance sheet presented in Exhibit 3 (Part C), the total assets of Metro Courier, Inc., were equal to its total liabilities and stockholders' equity. This equality shows that the assets of a business are equal to its equities; that is,

$$\text{Assets} = \text{Equities}$$

Assets were defined earlier as the things of value owned by the business, or the economic resources of the business. **Equities** are all claims to, or interests in, assets. For example, assume that you purchased a new company automobile for USD 15,000 by investing USD 10,000 in your own corporation and borrowing USD 5,000 in the name of the corporation from a bank. Your equity in the automobile is USD 10,000, and the bank's equity is USD 5,000. You can further describe the USD 5,000 as a liability because you owe the bank USD 5,000. If you are a corporation, you can describe your USD 10,000 equity as stockholders' equity or interest in the asset. Since the owners in a corporation are stockholders, the basic **accounting equation** becomes:

$$\text{Assets (A)} = \text{Liabilities (L)} + \text{Stockholders' equity (SE)}$$

From Metro's balance sheet in Exhibit 3 (Part C), we can enter in the amount of its assets, liabilities, and stockholders' equity:

$$A = L + SE$$

$$\text{USD } 38,700 = \text{USD } 6,600 + \text{USD } 32,100$$

Remember that someone must provide assets or resources—either a creditor or a stockholder. Therefore, this equation must always be in balance.

You can also look at the right side of this equation in another manner. The liabilities and stockholders' equity show the sources of an existing group of assets. Thus, liabilities are not only claims against assets but also sources of assets.

Together, creditors and owners provide all the assets in a corporation. The higher the proportion of assets provided by owners, the more solvent the company. However, companies can sometimes improve their profitability by borrowing from creditors and using the funds effectively. As a business engages in economic activity, the dollar

amounts and composition of its assets, liabilities, and stockholders' equity change. *However, the equality of the basic accounting equation always holds.*

An accounting **transaction** is a business activity or event that causes a measurable change in the accounting equation,  $\text{Assets} = \text{Liabilities} + \text{Stockholders' equity}$ . An exchange of cash for merchandise is a transaction. The exchange takes place at an agreed price that provides an objective measure of economic activity. For example, the objective measure of the exchange may be USD 5,000. These two factors—evidence and measurement—make possible the recording of a transaction. Merely placing an order for goods is not a recordable transaction because no exchange has taken place.

A source document usually supports the evidence of the transaction. A **source document** is any written or printed evidence of a business transaction that describes the essential facts of that transaction. Examples of source documents are receipts for cash paid or received, checks written or received, bills sent to customers for services performed or bills received from suppliers for items purchased, cash register tapes, sales tickets, and notes given or received. We handle source documents constantly in our everyday life. Each source document initiates the process of recording a transaction.

### Underlying assumptions or concepts

In recording business transactions, accountants rely on certain underlying assumptions or concepts. Both preparers and users of financial statements must understand these assumptions:

- **Business entity concept (or accounting entity concept).** Data gathered in an accounting system relates to a specific business unit or **entity**. The business entity concept assumes that each business has an existence separate from its owners, creditors, employees, customers, other interested parties, and other businesses.
- **Money measurement concept.** Economic activity is initially recorded and reported in a common monetary unit of measure—the dollar in the United States. This form of measurement is known as *money measurement*.
- **Exchange-price (or cost) concept (principle).** Most of the amounts in an accounting system are the objective money prices determined in the exchange process. As a result, we record most assets at their acquisition cost. **Cost** is the sacrifice made or the resources given up, measured in money terms, to acquire some desired thing, such as a new truck (asset).
- **Going-concern (continuity) concept.** Unless strong evidence exists to the contrary, accountants assume that the business entity will continue operations into the indefinite future. Accountants call this assumption the *going-concern or continuity* concept. Assuming that the entity will continue indefinitely allows accountants to value long-term assets, such as land, at cost on the balance sheet since they are to be used rather than sold. Market values of these assets would be relevant only if they were for sale. For instance, accountants would still record land purchased in 1988 at its cost of USD 100,000 on the 2010 December 31, balance sheet even though its market value has risen to USD 300,000.
- **Periodicity (time periods) concept.** According to the *periodicity (time periods)* concept or assumption, an entity's life can be meaningfully subdivided into time periods (such as months or years) to report the results of its economic activities.

## 1. Accounting and its use in business decisions

Now that you understand business transactions and the five basic accounting assumptions, you are ready to follow some business transactions step by step. To begin, we divide Metro's transactions into two groups: (1) transactions affecting only the balance sheet in June, and (2) transactions affecting the income statement and/or the balance sheet in July. Note that we could also classify these transactions as operating, investing, or financing activities, as shown in the statement of cash flows.

### Transactions affecting only the balance sheet

Since each transaction affecting a business entity must be recorded in the accounting records, analyzing a transaction before actually recording it is an important part of financial accounting. An error in transaction analysis results in incorrect financial statements.

To illustrate the analysis of transactions and their effects on the basic accounting equation, the activities of Metro Courier, Inc., that led to the statements in Exhibit 3 follow. The first set of transactions (for June), 1a, 2a, and so on, are repeated in the summary of transactions, Exhibit 2 (Part A). The second set of transactions (for July) (1b–6b) are repeated in Exhibit 4 (Part A).

#### 1a. Owners invested cash

When Metro Courier, Inc., was organized as a corporation on 2010 June 1, the company issued shares of capital stock for USD 30,000 cash to Ron Chaney, his wife, and their son. This transaction increased assets (cash) of Metro by USD 30,000 and increased equities (the capital stock element of stockholders' equity) by USD 30,000. Consequently, the transaction yields the following basic accounting equation:

Trans- action	Explan- ation	Assets				=Liabilities +		Stockholders' Equity
		Cash	Accounts Receiv- able	Trucks	Office Equip- ment	Accounts Payable	Notes Payable +	Capital Stock
1a	Beginning balances Stockholder s invested cash	\$ -0- 30,000	\$ -0-	\$ -0-	\$ -0-	= \$ -0-	\$ -0-	\$ -0- 30,000
	Balance after transaction	\$ 30,000						\$ 30,000
		Increased by \$30,000						Increased by \$30,000

#### 2a. Borrowed money

The company borrowed USD 6,000 from Chaney's father. Chaney signed the note for the company. The note bore no interest and the company promised to repay (recorded as a *note payable*) the amount borrowed within one year. After including the effects of this transaction, the basic accounting equation is:

Trans- action	Explan- ation	Assets				= Liabilities +		Stockholder's Equity
		Cash	Accounts Receivable	Trucks	Office Equipment	Accounts Payable	Notes Payable	Capital + Stock
	Balances before transaction	\$ 30,000	\$ -0-	\$ -0-	\$ -0-	= \$ -0-	\$ -0-	\$ 30,000
2a	Borrowed money	6,000					6,000	
	Balance after transaction	\$ 36,000				=	\$ 6,000	+ \$ 30,000
		Increased by \$6,000					Increased by \$6,000	

### 3a. Purchased trucks and office equipment for cash

Metro paid USD 20,000 cash for two used delivery trucks and USD 1,500 for office equipment. Trucks and office equipment are assets because the company uses them to earn revenues in the future. Note that this transaction does not change the total amount of assets in the basic equation but only changes the composition of the assets. This transaction decreased cash and increased trucks and office equipment (assets) by the total amount of the cash decrease. Metro received two assets and gave up one asset of equal value. Total assets are still USD 36,000. The accounting equation now is:

Assets				=	Liabilities +		Stockholders' Equity
Cash	Accounts Receivable	Trucks	Office Equipment		Accounts Payable	Notes Payable	Capital + Stock
\$ 36,000	\$ -0-	\$ -0-	\$ -0-	=	\$ -0-	\$ 6,000	+ \$ 30,000
(21,500)		20,000	1,500				
\$ 14,500		\$ 20,000	\$ 1,500	=		\$ 6,000	+ \$ 30,000
Decreased by \$21,500		Increased by \$20,000	Increased by \$1,500				

### 4a. Purchased office equipment on account (for credit)

Metro purchased an additional USD 1,000 of office equipment on account, agreeing to pay within 10 days after receiving the bill. (To purchase an item *on account* means to buy it on credit.) This transaction increased assets (office equipment) and liabilities (accounts payable) by USD 1,000. As stated earlier, accounts payable are amounts owed to suppliers for items purchased on credit. Now you can see the USD 1,000 increase in the assets and liabilities as follows:

Assets				=	Liabilities +		Stockholders' Equity
Cash	Accounts Receivable	Trucks	Office Equipment		Accounts Payable	Notes Payable +	Capital Stock
\$ 14,500		\$ 20,000	\$ 1,500	=		\$ 6,000	\$ 30,000
			1,000		1,000		
\$ 14,500		\$ 20,000	\$ 2,500	=	\$ 1,000	\$ 6,000 +	\$ 30,000
			Increased by \$1,000		Increased by \$1,000		

### 5a. Paid an account payable

Eight days after receiving the bill, Metro paid USD 1,000 for the office equipment purchased on account (transaction 4a). This transaction reduced cash by USD 1,000 and reduced accounts payable by USD 1,000. Thus, the assets and liabilities both are reduced by USD 1,000, and the equation again balances as follows:

Transaction	Explanation	Assets				=	Liabilities +		Stockholders equity
		Cash	Accounts Receivable	Trucks	Office Equipment		Accounts Payable	Notes Payable	+ Capital Stock
	Balances before transaction	\$ 14,500	\$ -0-	\$ 20,000	\$ 2,500	=	\$ 1,000	\$ 6,000	+ \$30,000
5a	Paid an account payable	(1,000)					(1,000)		
	Balance after transaction	\$ 13,500	\$ -0-	\$ 20,000	\$ 2,500		\$ -0-	\$ 6,000	+\$30,000
		Decreased by \$1,000					Decreased by \$1,000		

## A. Summary of Transactions

## 1. Accounting and its use in business decisions

METRO COURIER, INC. Summary of Transactions Month of June 2010								
Transaction	Explanation	Assets				=Liabilities +		Stockholders' Equity Capital + Stock
		Cash	Accounts Receivable	Trucks	Office Equipment	Accounts Payable	Notes Payable	
	Beginning balances	\$ -0	\$ -0-	\$ -0-	\$ -0-	= \$ -0-	\$ -0-	\$ -0-
1a	Stockholders invested cash	30,000						30,000
		\$ 30,000						\$ 30,000
2a	Borrowed money	6,000				= 6,000		
		\$ 36,000				= \$6000		+\$30,000
3a	Purchased trucks and office equipment for cash	(21,500)		20,000	1,500			
		\$ 14,500		\$20,000	\$ 1,500	= \$ 6,000		+ \$ 30,000
4a	Purchased office equipment on account				1,000	1,000	\$ 6,000	+ \$ 30,000
		\$ 14,500		\$20,000	\$ 2,500	= \$ 1,000	\$ 6,000	+ \$ 30,000
5a	Paid an account payable	(1,000)				(1,000)		
	End-of-month balances	\$ 13,500(A)	\$ -0-	\$20,000(B)	\$ 2,500(C)	= \$ -0-	\$6,000(D)	+ \$ 30,000(E)

B. Balance Sheet				
METRO COURIER, INC. Balance Sheet 2010 June 30				
Assets		Liabilities and Stockholders' Equity		
Cash	(A) \$ 13,500	Liabilities:		
Trucks	(B) 20,000	Notes Payable	(D) \$6,000	
Office equipment	(C)2,500	Total Liabilities		\$ 6,000
		Stockholders' equity:		
		Capital stock		(E) 30,000
Total assets	\$ 36,000	Total liabilities and stockholders' equity		\$ 36,000

Exhibit 3:

Exhibit 2, Part A, is a *summary of transactions* prepared in accounting equation form for June. A **summary of transactions** is a teaching tool used to show the effects of transactions on the accounting equation. Note that the stockholders' equity has remained at USD 30,000. This amount changes as the business begins to earn revenues or incur expenses. You can see how the totals at the bottom of Part A of Exhibit 2 tie into the balance sheet shown in Part B. The date on the balance sheet is 2010 June 30. These totals become the beginning balances for July 2010.

Thus far, all transactions have consisted of exchanges or acquisitions of assets either by borrowing or by owner investment. We used this procedure to help you focus on the accounting equation as it relates to the balance sheet. However, people do not form a business only to hold existing assets. They form businesses so their assets can generate greater amounts of assets. Thus, a business increases its assets by providing goods or services to customers. The results of these activities appear in the income statement. The section that follows shows more of Metro's transactions as it began earning revenues and incurring expenses.

### Transactions affecting the income statement and/or balance sheet

To survive, a business must be profitable. This means that the revenues earned by providing goods and services to customers must exceed the expenses incurred.

In July 2010, Metro Courier, Inc., began selling services and incurring expenses. The explanations of transactions that follow allow you to participate in this process and learn the necessary accounting procedures.

#### 1b. Earned service revenue and received cash

As its first transaction in July, Metro performed delivery services for customers and received USD 4,800 cash. This transaction increased an asset (cash) by USD 4,800. Stockholders' equity (retained earnings) also increased by USD 4,800, and the accounting equation was in balance.



The USD 4,800 is a revenue earned by the business and, as such, increases stockholders' equity (in the form of retained earnings) because stockholders prosper when the business earns profits. Likewise, if the corporation sustains a loss, the loss would reduce retained earnings.

Revenues increase the amount of retained earnings while expenses and dividends decrease them. (In this first chapter, we show all of these items as immediately affecting retained earnings. In later chapters, the revenues, expenses, and dividends are accounted for separately from retained earnings during the accounting period and are transferred to retained earnings only at the end of the accounting period as part of the closing process described in Chapter 4.) The effects of this USD 4,800 transaction on the financial position of Metro are:

Metro would record the increase in stockholders' equity brought about by the revenue transaction as a separate account, retained earnings. This does not increase capital stock because the Capital Stock account increases only when the company issues shares of stock. The expectation is that revenue transactions will exceed expenses and yield net income. If net income is not distributed to stockholders, it is in fact retained. Later chapters show that because of complexities in handling large numbers of transactions, revenues and expenses affect retained earnings only at the end of an accounting period. The preceding procedure is a shortcut used to explain why the accounting equation remains in balance.

Transaction	Explanation	Assets				=Liabilities +		Stockholders' Equity	
		Cash	Accounts Receivable	Trucks	Office Equipment	Accounts Payable	Notes Payable	Capital + Stock	Retained Earnings
	Beginning balances (Exhibit 2)	\$ 13,500	\$ -0-	\$ 20,000	\$ 2,500 =	\$ -0-	\$ 6,000	\$ 30,000	\$ -0-
1b	Earned service revenue and received cash	4,800							4,800
	Balances after transaction	\$ 18,300		\$ 20,000	\$ 2,500 =		\$ 6,000	+ \$ 30,000	\$ 4,800
		Increased by \$4,800							Increased by \$4,800

### *2b. Service revenue earned on account (for credit)*

Metro performed courier delivery services for a customer who agreed to pay USD 900 at a later date. The company granted credit rather than requiring the customer to pay cash immediately. This is called earning revenue *on account*. The transaction consists of exchanging services for the customer's promise to pay later. This transaction is similar to the preceding transaction in that stockholders' equity (retained earnings) increases because the company has earned revenues. However, the transaction differs because the company has not received cash. Instead, the company has received another asset, an *account receivable*. As noted earlier, an account receivable is the amount due from a customer for goods or services already provided. The company has a legal right to collect from the customer in the future. Accounting recognizes such claims as assets. The accounting equation, including this USD 900 item, is as follows:

Transaction	Explanation	Assets				Liabilities		Stockholders' + Equity	
		Cash	Accounts Receivable	Trucks	Office Equipment	Accounts Payable	Notes Payable	Capital + Stock	Retained Earnings
	Balances before transaction	\$ 18,300		\$ 20,000	\$ 2,500 =	\$ 6,000		\$ 30,000	\$ 4,800
2b	Earned service revenue on account		\$ 900						900
	Balances after transaction	\$ 18,300	\$ 900	\$ 20,000	\$ 2,500 =	\$ 6,000		+ \$ 30,000	\$ 5,700
			Increased by \$900						Increased by \$900

## 1. Accounting and its use in business decisions

### *3b. Collected cash on accounts receivable*

Metro collected USD 200 on account from the customer in transaction 2b. The customer will pay the remaining USD 700 later. This transaction affects only the balance sheet and consists of giving up a claim on a customer in exchange for cash. The transaction increases cash by USD 200 and decreases accounts receivable by USD 200. Note that this transaction consists solely of a change in the composition of the assets. When the company performed the services, it recorded the revenue. Therefore, the company does not record the revenue again when collecting the cash.

Transaction	Explanation	Assets				= Liabilities +		Stockholders' + Equity
		Cash	Accounts Receivable	Trucks	Office Equipment	Accounts Payable	Notes Payable	+ Capital Stock
	Balances before transaction	\$ 18,300	\$ 900	\$ 20,000	\$ 2,500		\$ 6,000	\$ 30,000
3b	Collected cash on account	\$ 200	(200)					
	Balances after transaction	\$ 18,500	\$ 700	\$ 20,000	\$ 2,500		\$ 6,000	+ \$ 30,000
		Increased by \$200	Decreased by \$200					

### *4b. Paid salaries*

Metro paid employees USD 2,600 in salaries. This transaction is an exchange of cash for employee services. Typically, companies pay employees for their services after they perform their work. Salaries (or wages) are costs companies incur to produce revenues, and companies consider them an expense. Thus, the accountant treats the transaction as a decrease in an asset (cash) and a decrease in stockholders' equity (retained earnings) because the company has incurred an expense. Expense transactions reduce net income. Since net income becomes a part of the retained earnings balance, expense transactions also reduce the retained earnings.

Assets				= Liabilities +		Stockholders' Equity	
Cash	Accounts Receivable	Trucks	Office Equipment	Accounts Payable	Notes Payable +	Capital Stock	Retained Earnings
\$ 18,500 (2,600)	\$ 700	\$ 20,000	\$ 2,500	=	\$ 6,000	\$ 30,000	\$ 5,700 (2,600)
\$ 15,900	\$ 700	\$ 20,000	\$ 2,500	=	\$ 6,000 +	\$ 30,000	\$ 3,100
Decreased by \$2,600							Decreased by \$2,600

### *5b. Paid rent*

In July, Metro paid USD 400 cash for office space rental. This transaction causes a decrease in cash of USD 400 and a decrease in retained earnings of USD 400 because of the incurrence of rent expense.

Transaction 5b has the following effects on the amounts in the accounting equation:

Assets				= Liabilities +		Stockholders' Equity	
Cash	Accounts Receivable	Trucks	Office Equipment	Accounts Payable	Notes Payable	+ Capital Stock	Retained Earnings
\$ 15,900 (400)	\$ 700	\$ 20,000	\$ 2,500	=	\$ 6,000	\$ 30,000	\$ 3,100 (400)
\$ 15,500	\$ 700	\$ 20,000	\$ 2,500	=	\$ 6,000	+ \$ 30,000	\$ 2,700
Decreased by \$400							Decreased by \$400

### *6b. Received bill for gas and oil used*

At the end of the month, Metro received a USD 600 bill for gas and oil consumed during the month. This transaction involves an increase in accounts payable (a liability) because Metro has not yet paid the bill and a decrease in retained earnings because Metro has incurred an expense. Metro's accounting equation now reads:

Assets				=Liabilities +		Stockholders' +Equity	
Cash	Accounts Receivable	Trucks	Office Equipment	Accounts Payable	Notes Payable	Capital + Stock	Retained Earnings
\$ 15,500	\$ 700	\$ 20,000	\$ 2,500 =		\$ 6,000	\$ 30,000	\$ 2,700
				600			(600)
\$ 15,500	\$ 700	\$ 20,000	\$ 2,500 =	\$ 600	\$ 6,000	+ \$ 30,000	\$ 2,100
				Increased by \$600			Decreased by \$600

### Summary of balance sheet and income statement transactions

Part A of Exhibit 4 summarizes the effects of all the preceding transactions on the assets, liabilities, and stockholders' equity of Metro Courier, Inc., in July. The beginning balances are the ending balances in Part A of Exhibit 2. The summary shows subtotals after each transaction; these subtotals are optional and may be omitted. Note how the accounting equation remains in balance after each transaction and at the end of the month.

The ending balances in each of the columns in Part A of Exhibit 4 are the dollar amounts in Part B and those reported earlier in the balance sheet in Part C of Exhibit 3. The itemized data in the Retained Earnings column are the revenue and expense items in Part C of Exhibit 4 and those reported earlier in the income statement in Part A of Exhibit 3. The beginning balance in the Retained Earnings column (USD 0) plus net income for the month (USD 2,100) is equal to the ending balance in retained earnings (USD 2,100) shown earlier in Part B of Exhibit 3. Remember that the financial statements are not an end in themselves, but are prepared to assist users of those statements to make informed decisions. Throughout the text we show how people use accounting information in decision making.

### Dividends paid to owners (stockholders)

Stockholders' equity is (1) increased by capital contributed by stockholders and by revenues earned through operations and (2) decreased by expenses incurred in producing revenues. The payment of cash or other assets to stockholders in the form of dividends also reduces stockholders' equity. Thus, if the owners receive a cash dividend, the effect would be to reduce the retained earnings part of stockholders' equity; the amount of dividends is not an expense but a distribution of income.

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### An ethical perspective: State university

James Stevens was taking an accounting course at State University. Also, he was helping companies find accounting systems that would fit their information needs. He advised one of his clients to acquire a software computer package that could record the business transactions and prepare the financial statements. The licensing agreement with the software company specified that the basic charge for one site was USD 4,000 and that USD 1,000 must be paid for each additional site where the software was used.

James was pleased that his recommendation to acquire the software was followed. However, he was upset that management wanted him to install the software at eight other sites in the company and did not intend to pay the extra USD 8,000 due the software company. A member of management stated, "The software company will never know the difference and, besides, everyone else seems to be pirating software. If they do find out, we will pay the extra fee at that time. Our expenses are high

1. Accounting and its use in business decisions

enough without paying these unnecessary costs.” James believed he might lose this client if he did not do as management instructed.

An accounting perspective:

Uses of technology

Accountants and others can access the home pages of companies to find their annual reports and other information, home pages of CPA firms to find employment opportunities and services offered, and home pages of government agencies, universities, and any other agency that has established a home page. By making on-screen choices you can discover all kinds of interesting information about almost anything. You can access libraries, even in foreign countries, newspapers, such as The Wall Street Journal, and find addresses and phone numbers of anyone in the nation. We have included some Internet Projects at the end of the chapters to give you some experience at “surfing the net” for accounting applications.

A. Summary of Transactions									
METRO COURIER, INC. Summary of Transactions Month of July 2010									
Trans- action	Explanation	Assets				-Liabilities +		Stockholders' Equity	
		Cash	Accounts Receiv- able	Trucks	Office Equipment	Accounts Payable	Notes Payable +	Capital Stock	Retained Earnings
	Beginning balances (Illustration 1.2)	\$ 13,500	\$ -0-	\$ 20,000	\$ 2,500 =	\$ -0-	\$ 6,000 +	\$ 30,000	\$ -0-
1b	Earned service revenue and received cash	4,800							4,800(A)
		\$ 18,300		\$ 20,000	\$ 2,500 =		\$ 6,000 +	\$ 30,000	\$ 4,800
2b	Earned service revenue on account		900						900(B)
		\$ 18,300	\$ 900	\$ 20,000	\$ 2,500 =		\$ 6,000 +	\$ 30,000	\$ 5,700
3b	Collected cash on account	200	(200)						
		\$ 18,500	\$ 700	\$ 20,000	\$ 2,500 =		\$ 6,000 +	\$ 30,000	\$ 5,700
4b	Paid salaries	(2,600)							(2,600)(C)
		\$ 15,900	\$ 700	\$ 20,000	\$ 2,500 =		\$ 6,000 +	\$ 30,000	\$ 3,100
5b	Paid rent	(400)							(400)(D)
		\$ 15,500	\$ 700	\$ 20,000	\$ 2,500 =		\$ 6,000 +	\$ 30,000	\$ 2,700
6b	Received bill for gas and oil used					600			(600)(E)
	End-of-month balances	\$15,500(F)	\$ 700(G)	\$ 20,000(H)	\$ 2,500 = (I)	\$ 600(J)	\$ 6,000 + (K)	\$ 30,000(L)	\$ 2,100(M)
				\$38,700			\$6,600		\$32,100

B. Balance Sheet			
METRO COURIER, INC. Balance Sheet 2010 July 31			
Assets		Liabilities and Stockholders'	
Cash	(F)\$15,500	Liabilities:	
Accounts receivable	(G)700	Accounts payable	(J)\$600
Trucks	(H)20,000	Notes payable	(K)6,000
Office equipment	(I)2,500	Total liabilities	Stockholders' equity \$6,600

		Capital stock	(L)\$30,000
		Retained earnings	(M)2,100
		Total stockholders' equity	\$32,100
Total assets	\$38,700	Total liabilities and stockholders' equity	\$38,700

<b>C. Income Statement</b>		
<b>METRO COURIER, INC.</b>		
<b>Income Statement</b>		
<b>For the Month Ended 2010 July 31</b>		
Revenues:		
Service revenue		(A+B)\$ 5,700
Expenses:		
Salaries expense	(C)\$ 2,600	
Rent expense	(D)400	
Gas & oil expense	(F)600	
Total expenses		3,600
Net income		\$ 2,100

Exhibit 4:

### Analyzing and using the financial results—the equity ratio

The two basic sources of equity in a company are stockholders and creditors; their combined interests are called *total equities*. To find the **equity ratio**, divide stockholders' equity by total equities or total assets, since total equities equals total assets. In formula format:

$$\text{Equity ratio} = \frac{\text{Stockholders' equity}}{\text{Total equities}}$$

The higher the proportion of equities (or assets) supplied by the owners, the more solvent the company. However, a high portion of debt may indicate higher profitability because quite often the interest rate on debt is lower than the rate of earnings realized from using the proceeds of the debt.

An example illustrates this concept: Suppose that a company with USD 100,000 in assets could have raised the funds to acquire those assets in these two ways:

<b>Case 1</b>	
Assets.....\$100,000	Liabilities.....\$20,000
	Stockholders' equity.....\$80,000
<b>Case 2</b>	
Assets.....\$100,000	Liabilities.....\$80,000
	Stockholders' equity.....\$20,000

When a company suffers operating losses, its assets decrease. In Case 1, the assets would have to shrink by 80 per cent before the liabilities would equal the assets. In Case 2, the assets would have to shrink only 20 per cent before the liabilities would equal the assets. When the liabilities exceed the assets, the company is said to be insolvent. Therefore, creditors are safer in Case 1 and will more readily lend money to the company.

However, if funds borrowed at 10 per cent are used to produce earnings at a 20 per cent rate, Case 2 is preferable in terms of profitability. Therefore, owners are better off in Case 2 if the borrowed funds can earn more than they cost.

Next, we examine the recent equity ratios of some actual companies:

Name of Company	Stockholders' Equity (\$ millions)	Total Equities (\$ millions)	Equity Ratio
Johnson & Johnson	\$ 23,734	\$ 37,053	64.1%
3M Corporation	6,166	15,205	40.6
General Electric Company	53,597	460,097	11.6

## 1. Accounting and its use in business decisions

As you can see from the preceding data, the equity ratios of actual companies vary widely. Companies such as Johnson & Johnson and 3M Corporation employ a higher proportion of stockholders' equity (a lower proportion of debt) than GE in an effort to have stronger balance sheets (more solvency). GE employs a greater proportion of debt, possibly in an attempt to increase profitability. Every company must strike a balance between solvency and profitability to ensure long-run survival. The correct balance between proportions of stockholder and creditor equities depends on the industry, general business conditions, and management philosophy.

Chapter 1 has introduced two important components of the accounting process—the accounting equation and the business transaction. In Chapter 2, you learn about debits and credits and how accountants use them in recording transactions. Understanding how data are accumulated, classified, and reported in financial statements helps you understand how to use financial statement data in making decisions.

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### An accounting perspective:

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#### Uses of technology

When you apply for your first job after graduation, prospective employers will expect you to know how to use a PC to perform many tasks. Therefore, before you graduate you should be able to use word processing, spreadsheet, and database software. You should be able to use the Internet to find useful information. In many universities, you can learn these skills in courses taken for credit. If your school does not offer credit courses, take noncredit courses or attend a training center.

#### Understanding the learning objectives

- A single proprietorship is an unincorporated business owned by an individual and often managed by that individual.
- A partnership is an unincorporated business owned by two or more persons associated as partners and is often managed by them.
- A corporation is a business incorporated under the laws of a state and owned by a few stockholders or by thousands of stockholders.
- Service companies perform services for a fee.
- Merchandising companies purchase goods that are ready for sale and then sell them to customers.
- Manufacturing companies buy materials, convert them into products, and then sell the products to other companies or to final customers.
- The income statement reports the revenues and expenses of a company and shows the profitability of that business organization for a stated period of time.
- The statement of retained earnings shows the change in retained earnings between the beginning of the period (e.g. a month) and its end.
- The balance sheet lists the assets, liabilities, and stockholders' equity (including dollar amounts) of a business organization at a specific moment in time.
- The statement of cash flows shows the cash inflows and cash outflows for a company for a stated period of time.

- The accounting equation is  $\text{Assets} = \text{Liabilities} + \text{Stockholders' equity}$ .
- The left side of the equation represents the left side of the balance sheet and shows things of value owned by the business.
  - The right side of the equation represents the right side of the balance sheet and shows who provided the funds to acquire the things of value (assets).
  - Some transactions affect only balance sheet items: assets (such as cash, accounts receivable, and equipment), liabilities (such as accounts payable and notes payable), and stockholders' equity (capital stock). Other transactions affect both balance sheet items and income statement items (revenues, expenses, and eventually retained earnings).
- Exhibit 2 (Part A) and Exhibit 4 (Part A) show the effects of business transactions on the accounting equation.
  - The income statement appears in Exhibit 3 (Part A) and Exhibit 4 (Part C).
  - The statement of retained earnings appears in Exhibit 3 (Part B).
  - The balance sheet appears in Exhibit 3 (Part C) and Exhibit 4 (Part B).
  - The equity ratio is the stockholders' equity divided by total equities (or total assets).
  - The equity ratio shows the percentage that assets would have to shrink before a company would become insolvent (liabilities exceed assets).

**Appendix: A comparison of corporate accounting with accounting for a sole proprietorship and a partnership**

Some textbook authors use a sole proprietorship and a partnership form of business ownership to illustrate accounting concepts and practices. In a survey of users and nonusers of our text, we learned that the majority preferred the corporate approach because most students will probably work for or invest in corporations. Also, many small businesses operate as corporations because of the investors' desire for limited liability.

This appendix briefly describes the differences in accounting for these three forms of business ownership. The major difference is in the stockholders' equity or owner's equity section of the balance sheet.

As you learned in this chapter, the stockholders' equity section of the balance sheet for a corporation consists of capital stock and retained earnings. The owner's equity section of the balance sheet for a sole proprietorship consists only of the owner's capital account. The owner's equity section of a partnership is similar to that of a single proprietorship except that it shows a capital account and its balance for each partner.

Corporation	Sole Proprietorship	Partnership
Stockholders' equity:	Owner's equity:	Partners' capital:
Capital stock...\$100,000	John Smith, Capital....\$150,000	John Smith, Capital..... \$75,000
Retained earnings..... 50,000		Sam Jones, Capital..... 75,000
Total.....\$150,000	\$150,000	\$150,000

The stockholders' equity section of a corporate balance sheet can become more complex as you will see later in the text. However, the items in the owner's equity section of the balance sheets of a sole proprietorship and a partnership always remain as just shown. In a sole proprietorship, the owner's capital balance consists of the owner's investments in the business, plus cumulative net income since the beginning of the business, less any amounts withdrawn by the owner. Thus, all of the amounts in the various stockholders' equity accounts for a corporation are in the owner's capital account in a single proprietorship. In a partnership, each partner's capital

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account balance consists of that partner's investments in the business, plus that partner's cumulative share of net income since that partner became a partner, less any amounts withdrawn by that partner.

The Dividends account in a corporation is similar to an owner's drawing account in a single proprietorship. These accounts both show amounts taken out of the business by the owners. In a partnership, each partner has a drawing account. Accountants treat asset, liability, revenue, and expense accounts similarly in all three forms of organization.

### Demonstration problem

On 2010 June 1, Green Hills Riding Stable, Incorporated, was organized. The following transactions occurred during June:

June 1 Shares of capital stock were issued for USD 10,000 cash.

4 A horse stable and riding equipment were rented (and paid for) for the month at a cost of USD 1,200.

8 Horse feed for the month was purchased on credit, USD 800.

15 Boarding fees of USD 3,000 for June were charged to those owning horses boarded at the stable. (Fee is due on July 10.)

20 Miscellaneous expenses of USD 600 were paid.

29 Land was purchased from a savings and loan association by borrowing USD 40,000 on a note from that association. The loan is due to be repaid in five years. Interest payments are due at the end of each month beginning July 31.

30 Salaries of USD 700 for the month were paid.

30 Riding and lesson fees were billed to customers in the amount of USD 2,800. (Fees are due on July 10.)

Prepare a summary of the preceding transactions. Use columns headed Cash, Accounts Receivable, Land, Accounts Payable, Notes Payable, Capital Stock, and Retained Earnings. Determine balances after each transaction to show that the basic accounting equation is in balance.

Prepare an income statement for June 2010.

Prepare a statement of retained earnings for June 2010.

Prepare a balance sheet as of 2010 June 30.

### Solution to demonstration problem

GREEN HILLS RIDING STABLE, INCORPORATED								
Summary of Transactions								
Month of June 2010								
		Assets		= Liabilities +			Stockholders Equity	
Date	Explanation	Cash	Accounts Receivable	Land	Accounts Payable	Notes Payable	Capital + Stock	Retained Earnings
June 1	Capital stock issued	\$ 10,000		=			\$ 10,000	
4	Rent expense	(1,200)						\$ (1,200)
		\$ 8,800		=			+ \$ 10,000	\$ (1,200)
8	Feed expense				\$ 800			(800)
		\$ 8,800		=	\$ 800		+ \$ 10,000	\$ (2,000)
15	Boarding fees		\$ 3,000					3,000
		\$ 8,800	\$ 3,000	=	\$ 800		+ \$ 10,000	\$ 1,000
20	Miscellaneous expenses	(600)						(600)
		\$ 8,200	\$ 3,000	=	800		+ \$ 10,000	\$ 400
29	Purchased land by borrowing			\$ 40,000		\$ 40,000		
		\$ 8,200	\$ 3,000	\$ 40,000 =	\$ 800	\$ 40,000	+ \$ 10,000	\$ 400



30	Salaries paid	(700)						(700)
		\$ 7,500	\$ 3,000	\$ 40,000 =	\$ 800	\$ 40,000	+ \$ 10,000	\$ (300)
30	Riding and lesson fees billed		2,800					2,800
		\$ 7,500	\$ 5,800	\$ 40,000	\$ 800	\$ 40,000	+ \$ 10,000	\$ 2,500

b)

<b>GREEN HILLS RIDING STABLE, INCORPORATE</b>		
<b>Income Statement</b>		
<b>For the Month Ended 2010 June 30</b>		
Revenues:		
Horse boarding fees revenue	\$ 3,000	
Riding and lesson fee revenue	2,800	
Total revenues		\$ 5,800
Expenses:		
Rent expense	\$ 1,200	
Feed expense	800	
Salaries expense	700	
Miscellaneous expense	600	
Total expenses		3,300
Net income		\$ 2,500

c)

<b>GREEN HILLS RIDING STABLE, INCORPORATED</b>	
<b>Statement of Retained Earnings</b>	
<b>For the Month Ended 2010 June 30</b>	
Retained earnings, June 1	\$ -0-
Add: Net income for June	2,500
Total	\$ 2,500
Less: Dividends	-0-
Retained earnings, June 30	\$ 2,500

d)

<b>GREEN HILLS RIDING STABLE, INCORPORATE</b>		
<b>Balance Sheet</b>		
<b>2010 June 30</b>		
<b>Assets</b>		
Cash		\$ 7,500
Accounts receivable		5,800
Land		40,000
Total assets		\$ 53,300
<b>Liabilities and Stockholders' Equity</b>		
Liabilities:		
Accounts payable		\$ 800
Notes payable		40,000
Total liabilities		\$ 40,800
Stockholders' equity:		
Capital stock	\$ 10,000	
Retained earnings	2,500	
Total stockholders' equity		\$ 12,500
Total liabilities and stockholders' equity		\$53,300.00

### Key terms

**Accounting equation** Assets = Equities; or Assets = Liabilities + Stockholders' equity.

**Accounts payable** Amounts owed to suppliers for goods or services purchased on credit.

**Accounts receivable** Amounts due from customers for services already provided.

## 1. Accounting and its use in business decisions

**Assets** Things of value owned by the business. Examples include cash, machines, and buildings. To their owners, assets possess service potential or utility that can be measured and expressed in money terms.

**Balance sheet** Financial statement that lists a company's assets, liabilities, and stockholders' equity (including dollar amounts) as of a specific moment in time. Also called a *statement of financial position*.

**Business entity concept (or accounting entity concept)** The separate existence of the business organization.

**Capital stock** The title given to an equity account showing the investment in a business corporation by its stockholders.

**Continuity** See *going-concern concept*.

**Corporation** Business incorporated under the laws of one of the states and owned by a few stockholders or by thousands of stockholders.

**Cost** Sacrifice made or the resources given up, measured in money terms, to acquire some desired thing, such as a new truck (asset).

**Dividend** Payment (usually of cash) to the owners of a corporation; it is a distribution of income to owners rather than an expense of doing business.

**Entity** A business unit that is deemed to have an existence separate and apart from its owners, creditors, employees, customers, other interested parties, and other businesses, and for which accounting records are maintained.

**Equities** Broadly speaking, all claims to, or interests in, assets; includes liabilities and stockholders' equity.

**Equity ratio** A ratio found by dividing stockholders' equity by total equities (or total assets).

**Exchange-price (or cost) concept (principle)** The objective money prices determined in the exchange process are used to record most assets.

**Expenses** Costs incurred to produce revenues, measured by the assets surrendered or consumed in serving customers.

**Going-concern (continuity) concept** The assumption by the accountant that unless strong evidence exists to the contrary, a business entity will continue operations into the indefinite future.

**Income statement** Financial statement that shows the revenues and expenses and reports the profitability of a business organization for a stated period of time. Sometimes called an *earnings statement*.

**Liabilities** Debts owed by a business—or creditors' equity. Examples: notes payable, accounts payable.

**Manufacturing companies** Companies that buy materials, convert them into products, and then sell the products to other companies or to final customers.

**Merchandising companies** Companies that purchase goods ready for sale and sell them to customers.

**Money measurement concept** Recording and reporting economic activity in a common monetary unit of measure such as the dollar.

**Net income** Amount by which the revenues of a period exceed the expenses of the same period.

**Net loss** Amount by which the expenses of a period exceed the revenues of the same period.

**Notes payable** Amounts owed to parties who loan the company money after the owner signs a written agreement (a note) for the company to repay each loan.

**Partnership** An unincorporated business owned by two or more persons associated as partners.

**Periodicity (time periods) concept** An assumption that an entity's life can be meaningfully subdivided into time periods (such as months or years) for purposes of reporting its economic activities.

**Profitability** Ability to generate income. The income statement reflects a company's profitability.

**Retained earnings** Accumulated net income less dividend distributions to stockholders.

**Revenues** Inflows of assets (such as cash) resulting from the sale of products or the rendering of services to customers.

**Service companies** Companies (such as accounting firms, law firms, or dry cleaning establishments) that perform services for a fee.

**Single proprietorship** An unincorporated business owned by an individual and often managed by that individual.

**Solvency** Ability to pay debts as they become due. The balance sheet reflects a company's solvency.

**Source document** Any written or printed evidence of a business transaction that describes the essential facts of that transaction, such as receipts for cash paid or received.

**Statement of cash flows** Financial statement showing cash inflows and outflows for a company over a period of time.

**Statement of retained earnings** Financial statement used to explain the changes in retained earnings that occurred between two balance sheet dates.

**Stockholders' equity** The owners' interest in a corporation.

**Stockholders or shareholders** Owners of a corporation; they buy shares of stock, which are units of ownership, in the corporation.

**Summary of transactions** Teaching tool used in Chapter 1 to show the effects of transactions on the accounting equation.

**Transaction** A business activity or event that causes a measurable change in the items in the accounting equation,  $\text{Assets} = \text{Liabilities} + \text{Stockholders' equity}$ .

### Self-test

#### True-False

Indicate whether each of the following statements is true or false.

The three forms of business organizations are single proprietorship, partnership, and trust.

The three types of business activity are service, merchandising, and manufacturing.

The income statement shows the profitability of the company and is dated as of a particular date, such as 2010 December 31.

The statement of retained earnings shows both the net income for the period and the beginning and ending balances of retained earnings.

The balance sheet contains the same major headings as appear in the accounting equation.

#### Multiple-choice

Select the best answer for each of the following questions.

The ending balance in retained earnings is shown in the:

- Income statement.
- Statement of retained earnings.
- Balance sheet.
- Both (b) and (c).

Which of the following is **not** a correct form of the accounting equation?

- $\text{Assets} = \text{Equities}$ .
- $\text{Assets} = \text{Liabilities} + \text{Stockholders' equity}$ .
- $\text{Assets} - \text{Liabilities} = \text{Stockholders' equity}$ .
- $\text{Assets} + \text{Stockholders' equity} = \text{Liabilities}$ .

Which of the following is not one of the five underlying assumptions or concepts mentioned in the chapter?

- Exchange-price concept.
- Inflation accounting concept.
- Business entity concept.
- Going-concern concept.

When the stockholders invest cash in the business, what is the effect?

- Liabilities increase and stockholders' equity increases.
- Both assets and liabilities increase.
- Both assets and stockholders' equity increase.

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d. None of the above.

When services are performed on account, what is the effect?

- a. Both cash and retained earnings decrease.
- b. Both cash and retained earnings increase.
- c. Both accounts receivable and retained earnings increase.
- d. Accounts payable increases and retained earnings decreases.

Now turn to “Answers to self-test” at the end of your chapter to check your answers.

### Questions

- Accounting has often been called the language of business. In what respects would you agree with this description? How might you argue that this description is deficient?
- Define asset, liability, and stockholders' equity.
- How do liabilities and stockholders' equity differ? How are they similar?
- How do accounts payable and notes payable differ? How are they similar?
- Define revenues. How are revenues measured?
- Define expenses. How are expenses measured?
- What is a balance sheet? On what aspect of a business does the balance sheet provide information?
- What is an income statement? On what aspect of a business does this statement provide information?
- What information does the statement of retained earnings provide?
- Identify the three types of activities shown in a statement of cash flows.
- What is a transaction? What use does the accountant make of transactions? Why?
- What is the accounting equation? Why must it always balance?
- Give an example from your personal life that illustrates your use of accounting information in reaching a decision.
- You have been elected to the governing board of your church. At the first meeting you attend, mention is made of building a new church. What accounting information would the board need in deciding whether or not to go ahead?
- A company purchased equipment for USD 2,000 cash. The vendor stated that the equipment was worth USD 2,400. At what amount should the equipment be recorded?
- What is meant by money measurement?
- Of what significance is the exchange-price (or cost) concept? How is the cost to acquire an asset determined?
- What effect does the going-concern (continuity) concept have on the amounts at which long-term assets are carried on the balance sheet?
- Of what importance is the periodicity (time periods) concept to the preparation of financial statements?
- Describe a transaction that would:
  - Increase both an asset and capital stock.
  - Increase both an asset and a liability.

- Increase one asset and decrease another asset.
- Decrease both a liability and an asset.
- Increase both an asset and retained earnings.
- Decrease both an asset and retained earnings.
- Increase a liability and decrease retained earnings.
- Decrease both an asset and retained earnings.
- Identify the causes of increases and decreases in stockholders' equity
- **Real world question:** Refer to the 2000 financial statements of The Limited in the Annual Report Appendix at the back of the text. What were the net income or loss amounts in the latest three years? Discuss the meaning of the changes after reading management's discussion and analysis of financial condition and results of operations.
- **Real world question:** Refer to the financial statements of The Limited in the Annual Report Appendix. Has the solvency of the company improved from one year to the next? Discuss.

### Exercises

**Exercise A** Match the descriptions in Column B with the appropriate terms in Column A.

	Column A		Column B
1.	Corporation.	a.	An unincorporated business owned by an individual.
2.	Merchandising company.	b.	The form of organization used by most large businesses.
3.	Partnership.	c.	Buys raw materials and converts them into finished products.
4.	Manufacturing company.	d.	Buys goods in their finished form and sells them to
5.	Service company.		customers in that same form.
6.	Single proprietorship.	e.	An unincorporated business with more than one owner.
		f.	Performs services for a fee.

**Exercise B** Assume that retained earnings increased by USD 3,600 from 2010 June 30, to 2011 June 30. A cash dividend of USD 300 was declared and paid during the year.

- a. Compute the net income for the year.
- b. Assume expenses for the year were USD 9,000. Compute the revenue for the year.

**Exercise C** On 2010 December 31, Perez Company had assets of USD 150,000, liabilities of USD 97,500, and capital stock of USD 30,000. During 2011, Perez earned revenues of USD 45,000 and incurred expenses of USD 33,750. Dividends declared and paid amounted to USD 3,000.

- a. Compute the company's retained earnings on 2010 December 31.
- b. Compute the company's retained earnings on 2011 December 31.

**Exercise D** At the start of the year, a company had liabilities of USD 50,000 and capital stock of USD 150,000. At the end of the year, retained earnings amounted to USD 135,000. Net income for the year was USD 45,000, and USD 15,000 of dividends were declared and paid. Compute retained earnings and total assets at the beginning of the year.

**Exercise E** For each of the following events, determine if it has an effect on the specific items (such as cash) in the accounting equation. For the events that do have an effect, present an analysis of the transaction showing its two sides or dual nature.

- a. Purchased equipment for cash, USD 12,000.
- b. Purchased a truck for USD 40,000, signed a note (with no interest) promising payment in 10 days.
- c. Paid USD 1,600 for the current month's utilities.

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- d. Paid for the truck purchased in (b).
- e. Employed Mary Childers as a salesperson at USD 1,200 per month. She is to start work next week.
- f. Signed an agreement with a bank in which the bank agreed to lend the company up to USD 200,000 any time within the next two years.

**Exercise F** Bradley Company, engaged in a courier service business, completed the following selected transactions during July 2010:

- a. Purchased office equipment on account.
- b. Paid an account payable.
- c. Earned service revenue on account.
- d. Borrowed money by signing a note at the bank.
- e. Paid salaries for month to employees.
- f. Received cash on account from a charge customer.
- g. Received gas and oil bill for month.
- h. Purchased delivery truck for cash.
- i. Declared and paid a cash dividend.

Using a tabular form similar to Exhibit 4 (Part A), indicate the effect of each transaction on the accounting equation using (+) for increase and (–) for decrease. No dollar amounts are needed, and you need not fill in the Explanation column.

**Exercise G** Indicate the amount of change (if any) in the stockholders' equity balance based on each of the following transactions:

- a. The stockholders invested USD 100,000 cash in the business by purchasing capital stock.
- b. Land costing USD 40,000 was purchased by paying cash.
- c. The company performed services for a customer who agreed to pay USD 18,000 in one month.
- d. Paid salaries for the month, USD 12,000.
- e. Paid USD 14,000 on an account payable.

**Exercise H** Give examples of transactions that would have the following effects on the items in a firm's financial statements:

- a. Increase cash; decrease some other asset.
- b. Decrease cash; increase some other asset.
- c. Increase an asset; increase a liability.
- d. Decrease retained earnings; decrease an asset.
- e. Increase an asset other than cash; increase retained earnings.
- f. Decrease an asset; decrease a liability.

**Exercise I** Which of the following transactions results in a decrease in retained earnings? Why?

- a. Employees were paid USD 20,000 for services received during the month.
- b. USD 175,000 was paid to acquire land.
- c. Paid an USD 18,000 note payable. No interest was involved.
- d. Paid a USD 200 account payable.

**Exercise J** Assume that the following items were included in the Retained Earnings column in the summary of transactions for Cinck Company for July 2010:

Salaries expense	\$120,000
Service revenue	300,000
Gas and oil expense	27,000
Rent expense	48,000
Dividends paid	40,000

Prepare an income statement for July 2010.

**Exercise K** Given the following facts, prepare a statement of retained earnings for Brindle Company, a tanning salon, for August 2010:

Balance in retained earnings at end of July, USD 188,000.

Dividends paid in August, USD 63,600.

Net income for August, USD 72,000.

The column totals of a summary of transactions for Speedy Printer Repair, Inc., as of 2010 December 31, were as follows:

Accounts payable	\$60,000
Accounts receivable	90,000
Capital stock	100,000
Cash	40,000
Land	80,000
Building	50,000
Equipment	30,000
Notes payable	20,000
Retained earnings	?

Prepare a balance sheet. We have purposely listed the accounts out of order.

**Exercise M** Merck & Co., Inc. is a world leader in the discovery, development, manufacture and marketing of a broad range of human and animal health products. The company, which has 70,000 employees, spends over USD 2 billion every year on the research and development of new drugs. As of the end of 2, its 2.2 billion shares are valued in the stock market for a total of USD 132 billion. Given the following data for Merck, calculate the equity ratios for 2003 and 2002. Then comment on the results.

	<b>2003</b>	<b>2002</b>
Stockholders' equity	USD 14,832,400,000	USD 13,241,600,000
Total equities	USD 39,910,400,000	USD 35,634,900,000

## Problems

**Problem A** Lakewood Personal Finance Company, which provides financial advisory services, engaged in the following transactions during May 2010:

May 1 Received USD 300,000 cash for shares of capital stock issued when company was organized.

2 The company borrowed USD 40,000 from the bank on a note.

7 The company bought USD 182,400 of computer equipment for cash.

11 Cash received for services performed to date was USD 15,200.

14 Services performed for a customer who agreed to pay within a month were USD 10,000.

15 Employee wages were paid, USD 13,200.

19 The company paid USD 14,000 on the note to the bank.

31 Interest paid to the bank for May was USD 140. (Interest is an expense, which reduces retained earnings.)

31 The customer of May 14 paid USD 3,200 of the amount owed to the company.

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31 An order was received from a customer for services to be rendered next week, which will be billed at USD 12,000.

Prepare a summary of transactions (see Part A of Exhibit 4). Use money columns headed Cash, Accounts Receivable, Equipment, Notes Payable, Capital Stock, and Retained Earnings. Determine balances after each transaction to show that the accounting equation balances.

**Problem B** Reliable Lawn Care Service, Inc., a company that takes care of lawns and shrubbery of personal residences, engaged in the following transactions in April 2010:

Apr.1 The company was organized and received USD 400,000 cash from the owners in exchange for capital stock issued.

4 The company bought equipment for cash, USD 101,760.

9 The company bought additional mowing equipment that cost USD 9,120 and agreed to pay for it in 30 days.

15 Cash received for services performed to date was USD 3,840.

16 Amount due from a customer for services performed totaled USD 5,280.

30 Of the receivable (see April 16), USD 3,072 was collected in cash.

30 Miscellaneous operating expenses of USD 6,240 were paid during the month.

30 An order was placed for miscellaneous equipment costing USD 28,800.

a. Prepare a summary of transactions (see Part A of Exhibit 4). Use money columns headed Cash, Accounts Receivable, Equipment, Accounts Payable, Capital Stock, and Retained Earnings. Determine balances after each transaction to show that the basic accounting equation balances.

b. Prepare a balance sheet as of April 30.

**Problem C** Analysis of the transactions of the Moonlight Drive-In Theater for June 2010 disclosed the following:

Ticket revenue	USD 180000
Equipment rent expense	50000
Film rent expense	53400
Concession revenue	29600
Advertising expense	18600
Salaries expense	60000
Utilities expense	14100
Cash dividends declared and paid	12000

Balance sheet amounts at June 30 include the following:

Cash	USD 140,000
Land	148000
Accounts payable	87600



Capital stock	114000
Retained earnings as of 2010 June 1	84900

- Prepare an income statement for June 2010.
- Prepare a statement of retained earnings for June 2010.
- Prepare a balance sheet as of 2010 June 30.
- How solvent does this company appear to be?

**Problem D** Little Folks Baseball, Inc., was formed by a group of parents to meet a need for a place for kids to play baseball. At the beginning of its second year of operations, its balance sheet appeared as follows:

<b>LITTLE FOLKS BASEBALL</b> <b>Balance Sheet 2010 April 30</b>		
<b>Assets</b>		
Cash		\$ 56,000
Accounts Receivable		80,000
Land		600,000
Total assets		\$ 736,000
<b>Liabilities and Stockholders' Equity</b>		
Liabilities:		
Accounts payable		\$ 64,000
Stockholders' Equity:		
Capital stock	\$ 400,000	
Retained earnings	272,000	672,000
Total liabilities and stockholders' equity		\$ 736,000

The summarized transactions for May 2010 are as follows:

- Issued additional capital stock for cash, USD 200,000.
  - Collected USD 80,000 on accounts receivable.
  - Paid USD 64,000 on accounts payable.
  - Received membership fees from parents (nonrefundable): in cash, USD 260,000; and on account, USD 120,000.
  - Incurred operating expenses: for cash, USD 60,000; and on account, USD 160,000.
  - Paid dividends of USD 16,000.
  - Purchased more land for cash, USD 96,000.
  - Placed an order for new equipment expected to cost USD 120,000.
- Prepare a summary of transactions (see Part A of Exhibit 4) using column headings as given in the balance sheet. Determine balances after each transaction.
  - Prepare an income statement for May 2010.
  - Prepare a statement of retained earnings for May 2010.
  - Prepare a balance sheet as of 2010 May 31.

The balance sheets for 2010 May 31, and 2010 April 30, and the income statement for May of the Target-Line Golf Driving Range follow. (Common practice is to show the most recent period first.)

<b>TARGET-LINE GOLF DRIVING RANGE</b> <b>Comparative Balance Sheet</b>		
	May 31,	April 30,

## 1. Accounting and its use in business decisions

	2010	2010
<b>Assets</b>		
Cash	\$56,400	\$46,800
Land	163,200	144,000
Total assets	\$219,600	\$190,800
<b>Liabilities and Stockholders' Equity</b>		
Accounts payable	\$18,000	\$27,600
Capital stock	144,000	144,000
Retained earnings	57,600	19,200
Total liabilities and stockholders' equity	\$219,600	\$190,800
<b>TARGET-LINE GOLF DRIVING RANGE</b>		
<b>Income Statement</b>		
<b>For the Month Ended 2010 May 31</b>		
Revenues:		
Service revenue		\$64,000
Expenses:		
Salaries expense	\$16,000	
Equipment rental expense	9,600	25,600
Net income		\$38,400

All revenues earned are on account.

State the probable cause(s) of the change in each of the balance sheet accounts from April 30 to 2010 May 31.

### Alternate problems

**Alternate problem A** Preston Auto Paint Company had the temporary free use of an old building and completed the following transactions in September 2010:

Sept. 1 The company was organized and received USD 100,000 cash from the issuance of capital stock.

5 The company bought painting and sanding equipment for cash at a cost of USD 25,000.

7 The company painted the auto fleet of a customer who agreed to pay USD 8,000 in one week. The customer furnished the special paint.

14 The company received the USD 8,000 from the transaction of September 7.

20 Additional sanding equipment that cost USD 2,800 was acquired today; payment was postponed until September 28.

28 USD 2,400 was paid on the liability incurred on September 20.

30 Employee salaries for the month, USD 2,200, were paid.

30 Placed an order for additional painting equipment advertised at USD 20,000.

Prepare a summary of transactions (see Part A of Exhibit 4) for the company for these transactions. Use money columns headed Cash, Accounts Receivable, Equipment, Accounts Payable, Capital Stock, and Retained Earnings.

Determine balances after each transaction to show that the basic accounting equation balances.

**Alternate problem B** Quick-Start Home Repair Company completed the following transactions in June 2010:

June 1 The company was organized and received USD 200,000 cash from the issuance of capital stock.

4 The company paid USD 48,000 cash for a truck.

7 The company borrowed USD 10,000 from its bank on a note.

9 Cash received for repair services performed was USD 4,500.

12 Expenses of operating the business so far this month were paid in cash, USD 3,400.

18 Repair services performed for a customer who agreed to pay within a month amounted to USD 5,400.

25 The company paid USD 4,065 on its loan from the bank, including USD 4,050 of principal and USD 15 of interest. (The principal is the amount of the loan. Interest is an expense, which reduces retained earnings.)

30 Miscellaneous expenses incurred in operating the business from June 13 to date were USD 3,825 and were paid in cash.

30 An order (contract) was received from a customer for repair services to be performed tomorrow, which will be billed at USD 3,000.

a. Prepare a summary of transactions (see Part A of Exhibit 4). Include money columns for Cash, Accounts Receivable, Trucks, Notes Payable, Capital Stock, and Retained Earnings. Determine balances after each transaction to show that the basic accounting equation balances.

b. Prepare a balance sheet as of 2010 June 30.

**Alternate problem C** Following are summarized transaction data for Luxury Apartments, Inc., for the year ending 2010 June 30. The company owns and operates an apartment building.

Rent revenue from building owned	USD 150,000
Building repairs	2870
Building cleaning, labor cost	3185
Property taxes on the building	4000
Insurance on the building	1225
Commissions paid to rental agent	5000
Legal and accounting fees (for preparation of tenant leases)	1260
Utilities expense	8225
Cost of new awnings (installed on June 30, will last 10 years)	5000

Of the USD 150,000 rent revenue, USD 5,000 was not collected in cash until 2010 July 5.

Prepare an income statement for the year ended 2010 June 30.

**Alternate problem D** The following data are for Central District Parking Corporation:

<b>CENTRAL DISTRICT PARKING CORPORATION</b>	
<b>Balance Sheet</b>	
<b>2010 October 1</b>	
<b>Assets</b>	
Cash	\$ 344,000
Accounts Receivable	18,000
Total assets	\$ 362,000
<b>Liabilities and Stockholders' Equity</b>	
Accounts payable	\$ 94,000
Capital stock	232,000
Retained earnings	36,000
Total liabilities and stockholders' equity	\$ 362,000

The summarized transactions for October 2010 are as follows:

Oct.1 The accounts payable owed as of September 30 (USD 94,000) were paid.

1. Accounting and its use in business decisions

- 1 The company paid rent for the premises for October, USD 19,200.
- 7 The company received cash of USD 4,200 for parking by daily customers during the week.
- 10 The company collected USD 14,400 of the accounts receivable in the balance sheet at September 30.
- 14 Cash receipts for the week from daily customers were USD 6,600.
- 15 Parking revenue earned but not yet collected from fleet customers was USD 6,000.
- 16 The company paid salaries of USD 2,400 for the period October 1–15.
- 19 The company paid advertising expenses of USD 1,200 for October.
- 21 Cash receipts for the week from daily customers were USD 7,200.
- 24 The company incurred miscellaneous expenses of USD 840. Payment will be due November 10.
- 31 Cash receipts for the last 10 days of the month from daily customers were USD 8,400.
- 31 The company paid salaries of USD 3,000 for the period October 16–31.
- 31 Billings to monthly customers totaled USD 21,600 for October.
- 31 Paid cash dividends of USD 24,000.

- a. Prepare a summary of transactions (see Part A of Exhibit 4) using column headings as given in the preceding balance sheet. Determine balances after each transaction.
- b. Prepare an income statement for October 2010.
- c. Prepare a statement of retained earnings for October 2010.
- d. Prepare a balance sheet as of 2010 October 31.

**Alternate problem E** The following balance sheets for 2010 June 30, and 2010 May 31, and the income statement for June are for Beach Camping Trailer Storage, Inc. (Common practice is to show the most recent period first.)

<b>BEACH CAMPING TRAILER STORAGE, INC</b>		
<b>Comparative Balance Sheet</b>		
	<b>June 30,</b>	<b>May 31,</b>
	<b>2010</b>	<b>2010</b>
<b>Assets</b>		
Cash	\$ 52,000	\$ 60,000
Accounts receivable	24,000	-0-
Land	36,000	36,000
Total assets	\$ 112,000	\$ 96,000
<b>Liabilities and Stockholders' Equity</b>		
Accounts payable	\$ 18,000	\$ 24,000
Capital stock	60,000	60,000
Retained earnings	34,000	12,000
Total liabilities and stockholders' equity	\$ 112,000	\$ 96,000
<b>BEACH CAMPING TRAILER STORAGE, INC. ,</b>		
<b>Income Statement For the Month Ended 2010 June 3</b>		
Revenues:		
Service revenue		\$ 100,000
Expenses:		
Salaries expense	\$ 48,000	
Supplies bought and used	24,000	72,000
Net income		\$ 28,000

A cash dividend of USD 6,000 was declared and paid in June.

State the probable causes of the changes in each of the balance sheet accounts from May 31 to 2010 June 30.

### Beyond the numbers—critical thinking

**Business decision case A** Upon graduation from high school, Jim Crane went to work for a builder of houses and small apartment buildings. During the next six years, Crane earned a reputation as an excellent employee—hardworking, dedicated, and dependable—in the light construction industry. He could handle almost any job requiring carpentry, electrical, or plumbing skills.

Crane then decided to go into business for himself under the name Jim’s Fix-It Shop, Inc. He invested cash, some power tools, and a used truck in his business. He completed many repair and remodeling jobs for homeowners and apartment owners. The demand for his services was so large that he had more work than he could handle. He operated out of his garage, which he had converted into a shop, adding several new pieces of power woodworking equipment.

Now, two years after going into business for himself, Crane must decide whether to continue in his own business or to accept a position as construction supervisor for a home builder. He has been offered an annual salary of USD 50,000 and a package of fringe benefits (medical and hospitalization insurance, pension contribution, vacation and sick pay, and life insurance) worth approximately USD 8,000 per year. The offer is attractive to Crane. But he dislikes giving up his business since he has thoroughly enjoyed being his own boss, even though it has led to an average workweek well in excess of the standard 40 hours

Suppose Crane comes to you for assistance in gathering the information needed to help him make a decision. He brings along the accounting records that have been maintained for his business by an experienced accountant. Using logic and your own life experiences, indicate the nature of the information Jim needs if he is to make an informed decision. Pay particular attention to the information likely to be found in his business accounting records. Does the accounting information available enter directly into the decision? Write a memorandum to Jim describing the information he will need to make an informed decision. The memo’s headings should include Date, To, From, and Subject. (See the format in Group Project E below.)

**Annual report analysis B** Recall that in this chapter we showed that the equity ratio is calculated by dividing stockholders’ equity by total equities (or total assets). Another format for analyzing solvency is to divide total debt by total equities. This latter calculation tells the proportion of assets financed by debt rather than the proportion of assets financed by stockholders’ equity. These two ratios are complements and must add to 100 per cent. Thus, if 25 per cent of assets were financed by debt, 75 per cent were financed by stockholders’ equity.

Using the following historical data from Gateway, calculate the “total-debt-to total-capital” ratio for each year.

	2003	2002	2001	2000	1999	1998	1997
Total liabilities (000's)	USD 1,772,205	USD 1,937,570	USD 1,546,005	USD 1,109,337	USD 857,870	USD 568,492	USD 394,545
Total stockholders equity	2380339	2017118	1344375	930044	815541	555519	376035

## 1. Accounting and its use in business decisions

Study these amounts and comment on the solvency of the company. Is there a trend in the company's solvency over time? Gateway has experienced tremendous growth in stockholders' equity during the past six years, but has also increased liabilities significantly. Could Gateway have grown this much without increasing liabilities?

**Annual report analysis C** Look at The Limited, Inc., annual report in the Annual report appendix. In that report you will find a letter outlining Management's responsibilities concerning the financial statements, as well as the report of the independent auditors.

Write answers to the following questions:

Who is responsible for preparing the financial statements?

Of what importance is the internal audit?

What is the role of the audit committee?

Why are no officers or employees on the audit committee?

What is the responsibility of the external independent auditor?

Does the independent auditor have absolute assurance that the financial statements are free of material misstatement?

To what extent does the independent auditor examine evidence?

**Ethics case- writing experience D** Refer to "An ethical perspective: State university". Write a short essay discussing the alternatives James Stevens could pursue and the likely outcomes of those alternatives. Which of the alternatives you have discussed would you recommend?

**Group project E** In teams of two or three students, interview a businessperson in your community. Ask how that person uses accounting information in making business decisions and obtain specific examples. Each team should write a memorandum to the instructor summarizing the results of the interview. Information contained in the memo should include:

Date:

To:

From:

Subject:

Content of the memo must include the name and title of the person interviewed, name of the company, date of the interview, examples of the use of accounting information for decision making, and any other pertinent information.

**Group project F** With a team composed of one or two other students, conceive of a business that you would like to form after graduation. Then describe approximately 15–20 transactions that the business might undertake in its first month of operations. Prepare a summary of transactions showing how each transaction affects the accounting equation. Identify each asset, liability, and stockholders' equity item in your summary of transactions. For instance, instead of grouping all assets in one number, show cash, accounts receivable, and so on in your accounting equation.

**Group project G** With a team of one or two other students and using library sources, write a paper on the American Institute of Certified Public Accountants, their services to members, and their activities. Be careful to cite sources for your information. Direct quotes should be labeled as such and should be single-spaced and indented if relatively long or in quote marks and not indented if relatively short. To quote without giving the source is plagiarism and should be avoided at all costs.

### Using the Internet—A view of the real world

Visit the following website for Nokia:

<http://www.nokia.com>

Write a short paper describing company information, products and services, and support available for their products.

Visit the following website for Ford Motor Company:

<http://www.ford.com>

When the web page appears, search for Investor Information and then locate the Ford Motor Company Annual Report. Based on your investigation, write a short paper describing the general content of the annual report.

### Answers to self-test

#### True-False

**False.** Corporation, not trust, is the third form.

**True.** The accounting for all three of these is covered in this text.

**False.** The income statement is dated using a period of time, such as “For the Year Ended 2010 December 31”.

**True.** In addition, the statement of retained earnings shows dividends declared.

**True.** Both show assets, liabilities, and stockholders’ equity.

#### Multiple-choice

**d.** The ending balance in retained earnings is shown in both the statement of retained earnings and in the balance sheet.

**d.** This form of the equation would not balance.

**b.** The inflation accounting concept was not one of the ones discussed. The other two were the money measurement concept and the periodicity concept.

**c.** When the stockholders invest cash, assets and stockholders’ equity increase.

**c.** The performance of services on account increases both accounts receivable and retained earnings.

# 2. Recording business transactions

## Learning objectives

After studying this chapter, you should be able to:

- Use the account as the basic classifying and storage unit for accounting information.
- Express the effects of business transactions in terms of debits and credits to different types of accounts.
- List the steps in the accounting cycle.
- Record the effects of business transactions in a journal.
- Post journal entries to the accounts in the ledger.
- Prepare a trial balance to test the equality of debits and credits in the journalizing and posting process.
- Analyze and use the financial results—horizontal and vertical analyses.

## Salary potential of accountants

Selecting a major represents much more than the choice of courses a student takes in college. To a significant degree, the student's major, along with academic performance, will determine the career paths available upon graduation. Few professionals would recommend a specific career choice based solely on salaries. However, as students select their major and map out their career path, it is important that they make informed decisions with respect to the potential financial rewards of the various options. Outlined below is information on selected salaries for many accounting-related careers. These salaries, current as of 2009, should be viewed only as guidelines. Salaries at all levels can vary significantly between locations. Also, one should add 10 to 15 per cent to the listed salary for professional certifications (such as the CPA) or for a graduate degree (Masters of Accounting or MBA).

### Salaries for Public Accounting, Non-Partners

#### Position

#### Large CPA Firms:

Position	Salary Range
Starting Salaries	\$35,750 - \$42,500
Salary between 1-3 years	\$41,000 - \$51,250
Manager/Director	\$77,750 - \$119,000

#### Small CPA Firms:

Starting Salaries	\$29,500 - \$36,250
Salary between 1-3 years	\$33,750 - \$42,500
Manager/Director	\$62,750 - \$84,500

### Salaries for Corporate Accounting - Large Corporations

#### Position

Position	Salary Range
Chief Financial Officer/Treasurer	\$244,500 - \$347,000
Vice President, Finance	\$189,000 - \$293,500
Director of Finance	\$121,500 - \$178,250
Director of Accounting	\$115,250 - \$157,500
Controller	\$105,750 - \$147,250
Assistant Controller	\$89,750 - \$114,750
Tax Director	\$117,000 - \$209,750
Tax Manager	\$78,000 - \$113,750
Audit Director	\$127,750 - \$200,750
General Accounting - Manager	\$61,250 - \$83,250
General Accounting - 1-3 years experience	\$37,500 - \$48,750
General Accounting - starting salary	\$31,750 - \$39,750



## 2. Recording business transactions

Students interested in a career in accounting and finance can find detailed information for these and many other accounting related careers at Robert Half ([www.roberthalf.com](http://www.roberthalf.com)). Also, accounting professors are generally familiar with starting salaries and job opportunities for accounting graduates, so you may want to address more specific questions about potential careers and salaries with them.

In Chapter 1, we illustrated the income statement, statement of retained earnings, balance sheet, and statement of cash flows. These statements are the end products of the financial accounting process, which is based on the accounting equation. The financial accounting process quantifies past management decisions. The results of these decisions are communicated to users—management, creditors, and investors—and serve as a basis for making future decisions.

The raw data of accounting are the business transactions. We recorded the transactions in Chapter 1 as increases or decreases in the assets, liabilities, and stockholders' equity items of the accounting equation. This procedure showed you how various transactions affected the accounting equation. When working through these sample transactions, you probably suspected that listing all transactions as increases or decreases in the transactions summary columns would be too cumbersome in practice. Most businesses, even small ones, enter into many transactions every day. Chapter 2 teaches you how to actually record business transactions in the accounting process.

To explain the dual procedure of recording business transactions with debits and credits, we introduce you to some new tools: the T-account, the journal, and the ledger. Using these tools, you can follow a company through its various business transactions. Like accountants, you can use a trial balance to check the equality of your recorded debits and credits. This is the double-entry accounting system that the Franciscan monk, Luca Pacioli, described centuries ago. Understanding this system enables you to better understand the content of financial statements so you can use the information provided to make informed business decisions.

### **The account and rules of debit and credit**

A business may engage in thousands of transactions during a year. An accountant classifies and summarizes the data in these transactions to create useful information.

#### **Steps in recording business transactions**

Look at Exhibit 9 to see the steps in recording and posting the effects of a business transaction. Note that source documents provide the evidence that a business transaction occurred. These source documents include such items as bills received from suppliers for goods or services received, bills sent to customers for goods sold or services performed, and cash register tapes. The information in the source document serves as the basis for preparing a journal entry. Then a firm posts (transfers) that information to accounts in the ledger.

You can see from Exhibit 9 that after you prepare the journal entry, you post it to the accounts in the ledger. However, before you can record the journal entry, you must understand the rules of debit and credit. To teach you these rules, we begin by studying the nature of an account.

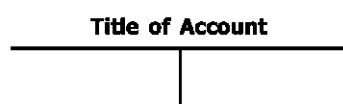
Fortunately, most business transactions are repetitive. This makes the task of accountants somewhat easier because they can classify the transactions into groups having common characteristics. For example, a company may have thousands of receipts or payments of cash during a year. As a result, a part of every cash transaction can be recorded and summarized in a single place called an account.

An **account** is a part of the accounting system used to classify and summarize the increases, decreases, and balances of each asset, liability, stockholders' equity item, dividend, revenue, and expense. Firms set up accounts for each different business element, such as cash, accounts receivable, and accounts payable. Every business has a Cash account in its accounting system because knowledge of the amount of cash on hand is useful information.

Accountants may differ on the account title (or name) they give the same item. For example, one accountant might name an account Notes Payable and another might call it Loans Payable. Both account titles refer to the amounts borrowed by the company. The account title should be logical to help the accountant group similar transactions into the same account. Once you give an account a title, you must use that same title throughout the accounting records.

The number of accounts in a company's accounting system depends on the information needs of those interested in the business. The main requirement is that each account provides information useful in making decisions. Thus, one account may be set up for all cash rather than having a separate account for each form of cash (coins on hand, currency on hand, and deposits in banks). The amount of cash is useful information; the form of cash often is not.

To illustrate recording the increases and decreases in an account, texts use the **T-account**, which looks like a capital letter T. The name of the account, such as Cash, appears across the top of the T. We record increases on one side of the vertical line of the T and decreases on the other side. A T-account appears as follows:



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### An accounting perspective:

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#### Business insight

Have you ever considered starting your own business? If so, you will need to understand accounting to successfully run your business. To know how well your business is doing, you must understand and analyze financial statements. Accounting information also tells you why you are performing as reported. If you are in business to sell or develop a certain product or perform a specific service, you cannot operate profitably or consider expanding unless you base your business decisions on accounting information.

## 2. Recording business transactions

**Illustration 2.1** The Steps in Recording and Posting the Effects of a Business Transaction

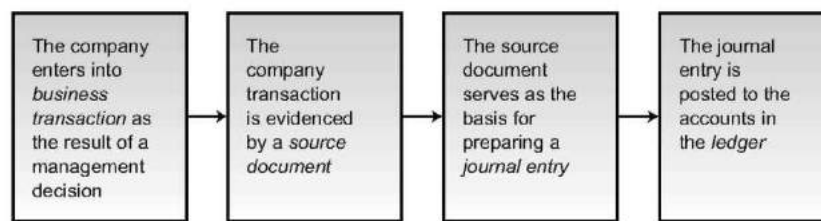


Exhibit 5: The steps in recording and posting the effects of a business transaction

In Chapter 1, you saw that each business transaction affects at least two items. For example, if you—an owner—invest cash in your business, the company's assets increase and its stockholders' equity increases. This result was illustrated in the summary of transactions in Exhibit 1.3. In the following sections, we use debits and credits and the double-entry procedure to record the increases and decreases caused by business transactions.

Accountants use the term **debit** instead of saying, "Place an entry on the left side of the T-account". They use the term **credit** for "Place an entry on the right side of the T-account". Debit (abbreviated Dr.) simply means left side; credit (abbreviated Cr.) means right side.<sup>7</sup> Thus, for all accounts a debit entry is an entry on the left side, while a credit entry is an entry on the right side.

### Any Account

Left, or debit, side	Right, or credit, side
-------------------------	---------------------------

After recognizing a business event as a business transaction, we analyze it to determine its increase or decrease effects on the assets, liabilities, stockholders' equity items, dividends, revenues, or expenses of the business. Then we translate these increase or decrease effects into debits and credits.

In each business transaction we record, the total dollar amount of debits must equal the total dollar amount of credits. When we debit one account (or accounts) for USD 100, we must credit another account (or accounts) for a total of USD 100. The accounting requirement that each transaction be recorded by an entry that has equal debits and credits is called **double-entry procedure**, or duality. This double-entry procedure keeps the accounting equation in balance.

The dual recording process produces two sets of accounts—those with debit balances and those with credit balances. The totals of these two groups of accounts must be equal. Then, some assurance exists that the arithmetic part of the transaction recording process has been properly carried out. Now, let us actually record business transactions in T-accounts using debits and credits.

### Recording changes in assets, liabilities, and stockholders' equity

While recording business transactions, remember that the foundation of the accounting process is the following basic accounting equation:

$$\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity}$$

<sup>7</sup> The abbreviations "Dr." and "Cr." are based on the Latin words "debere" and "credere". A synonym for *debit* an account is *charge* an account.

Recording transactions into the T-accounts is easier when you focus on the equal sign in the accounting equation. Assets, which are on the left of the equal sign, increase on the left side of the T-accounts. Liabilities and stockholders' equity, to the right of the equal sign, increase on the right side of the T-accounts. You already know that the left side of the T-account is the debit side and the right side is the credit side. So you should be able to fill in the rest of the rules of increases and decreases by deduction, such as:

<b>Assets</b>	=	<b>Liabilities</b>		+	<b>Stockholders' Equity</b>	
Debit for increases		Credit for decreases	Debit for decreases		Credit for increases	Debit for decreases

To summarize:

- Assets increase by debits (left side) to the T-account and decrease by credits (right side) to the T-account.
- Liabilities and stockholders' equity decrease by debits (left side) to the T-account and increase by credits (right side) to the T-account.

Applying these two rules keeps the accounting equation in balance. Now we apply the debit and credit rules for assets, liabilities, and stockholders' equity to business transactions.

Assume a corporation issues shares of its capital stock for USD 10,000 in transaction 1. (Note the figure in parentheses is the number of the transaction and ties the two sides of the transaction together.) The company records the receipt of USD 10,000 as follows:

<i>(Dr.)</i>	<b>Cash</b>		<i>(Cr.)</i>	<i>(Dr.)</i>	<b>Capital Stock</b>		<i>(Cr.)</i>
(1)	<b>10,000</b>			(1)		<b>10,000</b>	

This transaction increases the asset, cash, which is recorded on the left side of the Cash account. Then, the transaction increases stockholders' equity, which is recorded on the right side of the Capital Stock account.

Assume the company borrowed USD 5,000 from a bank on a note (transaction 2). A **note** is an unconditional written promise to pay to another party (the bank) the amount owed either when demanded or at a specified date, usually with interest at a specified rate. The firm records this transaction as follows:

<i>(Dr.)</i>	<b>Cash</b>		<i>(Cr.)</i>	<i>(Dr.)</i>	<b>Notes Payable</b>		<i>(Cr.)</i>
(1)				(2)			
(2)							<b>5,000</b>
	<b>10,000</b>						
	<b>5,000</b>						

Observe that liabilities, Notes Payable, increase with an entry on the right (credit) side of the account.

**Recording changes in revenues and expenses** In Chapter 1, we recorded the revenues and expenses directly in the Retained Earnings account. However, this is not done in practice because of the volume of revenue and expense transactions. Instead, businesses treat the expense accounts as if they were subclassifications of the debit side of the Retained Earnings account, and the revenue accounts as if they were subclassifications of the credit side. Since firms need the amounts of revenues and expenses to prepare the income statement, they keep a separate account for each type of revenue and expense. The recording rules for revenues and expenses are:

- Record increases in revenues on the right (credit) side of the T-account and decreases on the left (debit) side. The reasoning behind this rule is that revenues increase retained earnings, and increases in retained earnings are recorded on the right side.
- Record increases in expenses on the left (debit) side of the T-account and decreases on the right (credit) side. The reasoning behind this rule is that expenses decrease retained earnings, and decreases in retained earnings are recorded on the left side.

## 2. Recording business transactions

To illustrate these rules, assume the same company received USD 1,000 cash from a customer for services rendered (transaction 3). The Cash account, an asset, increases on the left (debit) side of the T-account; and the Service Revenue account, an increase in retained earnings, increases on the right (credit) side.

<i>(Dr.)</i>	<b>Cash</b>	<i>(Cr)</i>	<i>(Dr.)</i>	<b>Service Revenue</b>	<i>(Cr)</i>
(1)	10,000				(3) 1,000
(2)	5,000				
(3)	1,000				

Now assume this company paid USD 600 in salaries to employees (transaction 4). The Cash account, an asset, decreases on the right (credit) side of the T-account; and the Salaries Expense account, a decrease in retained earnings, increases on the left (debit) side.<sup>8</sup>

<i>(Dr.)</i>	<b>Cash</b>	<i>(Cr)</i>	<i>(Dr.)</i>	<b>Salaries Expense</b>	<i>(Cr)</i>
(1)	10,000	(4) 600	(4)	600	
(2)	5,000				
(3)	1,000				

**Recording changes in dividends** Since dividends decrease retained earnings, increases appear on the left side of the Dividends account and decreases on the right side. Thus, the firm records payment of a USD 2,000 cash dividend (transaction 5) as follows:

<i>(Dr.)</i>	<b>Cash</b>	<i>(Cr)</i>	<i>(Dr.)</i>	<b>Dividends<sup>9</sup></b>	<i>(Cr)</i>
(1)	10,000	(4) 600	(5)	2,000	
(2)	5,000	(5) 2,000			
(3)	1,000				

9

At the end of the accounting period, the accountant transfers any balances in the expense, revenue, and Dividends accounts to the Retained Earnings account. This transfer occurs only after the information in the expense and revenue accounts has been used to prepare the income statement. We discuss and illustrate this step in Chapter 4.

To determine the balance of any T-account, total the debits to the account, total the credits to the account, and subtract the smaller sum from the larger. If the sum of the debits exceeds the sum of the credits, the account has a **debit balance**. For example, the following Cash account uses information from the preceding transactions. The account has a debit balance of USD 13,400, computed as total debits of USD 16,000 less total credits of USD 2,600.

<i>(Dr.)</i>	<b>Cash</b>	<i>(Cr)</i>
(1)	10,000	(4) 600
(2)	5,000	(5) 2,000
(3)	1,000	
	16,000	2,600
Dr. bal	13,400	

<sup>8</sup> Certain deductions are normally taken out of employees' pay for social security taxes, federal and state withholding, and so on. Those deductions are ignored here.

<sup>9</sup> As we illustrate later in the text, some companies debit dividends directly to the Retained Earnings account rather than to a Dividends account.

If, on the other hand, the sum of the credits exceeds the sum of the debits, the account has a **credit balance**. For instance, assume that a company has an Accounts Payable account with a total of USD 10,000 in debits and USD 13,000 in credits. The account has a credit balance of USD 3,000, as shown in the following T-account:

<i>(Dr.)</i>	<b>Accounts Payable</b>	<i>(Cr)</i>
10,000		7,000 6,000
10,000		13,000
		Cr. bal      3,000

**Normal balances** Since debits increase asset, expense, and Dividend accounts, they normally have debit (or left-side) balances. Conversely, because credits increase liability, capital stock, retained earnings, and revenue accounts, they normally have credit (or right-side) balances.

The following chart shows the normal balances of the seven accounts we have used:

<b>Types of Accounts</b>	<b>Normal</b>	<b>Balances</b>
	<b>Debit</b>	<b>Credit</b>
Assets	X	
Liabilities		X
Stockholders' Equity		
Capital Stock		X
Retained earnings		X
Dividends	X	
Expenses	X	
Revenues		X

At this point, you should memorize the six rules of debit and credit. Later, as you proceed in your study of accounting, the rules will become automatic. Then, you will no longer ask yourself, "Is this increase a debit or credit?"

Asset accounts increase on the debit side, while liability and stockholders' equity accounts increase on the credit side. When the account balances are totaled, they conform to the following independent equations:

$$\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity}$$

$$\text{Debits} = \text{Credits}$$

The arrangement of these two formulas gives the first three rules of debit and credit:

- Increases in asset accounts are debits; decreases are credits.
- Decreases in liability accounts are debits; increases are credits.
- Decreases in stockholders' equity accounts are debits; increases are credits.

## 2. Recording business transactions

Assets		Liabilities		+ Stockholder's Equity	
Asset Accounts		Liability Accounts		+ (Capital Stock and Retained Earnings)	
Debit*	Credit	Debit	Credit*	Debit	Credit*
+	-	-	+		+
Debit	Credit	Debit	Credit	Debit	Credit
for	for	for	for	for	for
increase	decrease	decrease	increase	decrease	increase
				Expense Accounts and Dividends Account	
<b>Debits</b>		<b>Credits</b>		<b>Debit*</b>	<b>Credit</b>
1. Increase assets.		1. Decreases assets.			
2. Decrease liabilities.		2. Increase liabilities.			
3. Decrease stockholders' equity.		3. Increase stockholders' equity.		+	-
4. Decrease revenues.		4. Increase revenues.		Debit	Credit
5. Increase expenses.		5. Decrease expenses.		for	for
6. Increase dividends.		6. Decrease dividends.		increase	decrease
					Debit
					Credit*
					+
					Credit
					for
					decrease
					increase

Exhibit 6: Rules of debit and credit

The debit and credit rules for expense and Dividends accounts and for revenue accounts follow logically if you remember that expenses and dividends are decreases in stockholders' equity and revenues are increases in stockholders' equity. Since stockholders' equity accounts decrease on the debit side, expense and Dividend accounts increase on the debit side. Since stockholders' equity accounts increase on the credit side, revenue accounts increase on the credit side. The last three debit and credit rules are:

- Decreases in revenue accounts are debits; increases are credits.
- Increases in expense accounts are debits; decreases are credits.
- Increases in Dividends accounts are debits; decreases are credits.

In Exhibit 6, we depict these six rules of debit and credit. Note first the treatment of expense and Dividends accounts as if they were subclassifications of the debit side of the Retained Earnings account. Second, note the treatment of the revenue accounts as if they were subclassifications of the credit side of the Retained Earnings account. Next, we discuss the accounting cycle and indicate where steps in the accounting cycle are discussed in Chapters 2 through 4.

### The accounting cycle

The **accounting cycle** is a series of steps performed during the accounting period (some throughout the period and some at the end) to analyze, record, classify, summarize, and report useful financial information for the purpose of preparing financial statements. Before you can visualize the eight steps in the accounting cycle, you must be able to recognize a business transaction. **Business transactions** are measurable events that affect the financial condition of a business. For example, assume that the owner of a business spilled a pot of coffee in her office or broke her leg while skiing. These two events may briefly interrupt the operation of the business. However, they are not measurable in terms that affect the solvency and profitability of the business.

Business transactions can be the exchange of goods for cash between the business and an external party, such as the sale of a book, or they can involve paying salaries to employees. These events have one fundamental criterion: They must have caused a measurable change in the amounts in the accounting equation,  $Assets = Liabilities +$

Stockholders' Equity. The evidence that a business event has occurred is a source document such as a sales ticket, check, and so on. Source documents are important because they are the ultimate proof of business transactions.<sup>10</sup>

After you have determined that an event is a measurable business transaction and have adequate proof of this transaction, mentally analyze the transaction's effects on the accounting equation. You learned how to do this in Chapter 1. This chapter and Chapters 3 and 4 describe the other steps in the accounting cycle. The eight steps in the accounting cycle and the chapters that discuss them are:

- Analyze transactions by examining source documents (Chapters 1 and 2).
- Journalize transactions in the journal (Chapter 2).
- Post journal entries to the accounts in the ledger (Chapter 2).
- Prepare a trial balance of the accounts (Chapter 2) and complete the work sheet (Chapter 4). (This step includes adjusting entries from Chapter 3.)
- Prepare financial statements (Chapter 4).
- Journalize and post adjusting entries (Chapters 3 and 4).
- Journalize and post closing entries (Chapter 4).
- Prepare a post-closing trial balance (Chapter 4).

This listing serves as a preview of what you will study in Chapters 2-4. Notice that firms perform the last five steps at the end of the accounting period. Step 5 precedes steps 6 and 7 because management needs the financial statements at the earliest possible date. After the statements have been delivered to management, the adjusting and closing entries can be journalized and posted. In Exhibit 7, we diagram the eight steps in the accounting cycle.

You can perform many of these steps on a computer with an accounting software package. However, you must understand a manual accounting system and all of the steps in the accounting cycle to understand what the computer is doing. This understanding removes the mystery of what the computer is doing when it takes in raw data and produces financial statements.

## The journal

In explaining the rules of debit and credit, we recorded transactions directly in the accounts. Each ledger (general ledger) account shows only the increases and decreases in that account. Thus, all the effects of a single business transaction would not appear in any one account. For example, the Cash account contains only data on changes in cash and does not show how the cash was generated or how it was spent. To have a permanent record of an entire transaction, the accountant uses a book or record known as a journal.

A **journal** is a chronological (arranged in order of time) record of business transactions. A **journal entry** is the recording of a business transaction in the journal. A journal entry shows all the effects of a business transaction as expressed in debit(s) and credit(s) and may include an explanation of the transaction. A transaction is entered in a journal before it is entered in ledger accounts. Because each transaction is initially recorded in a journal rather than directly in the ledger, a journal is called a book of original entry.

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<sup>10</sup> Many companies send and receive source documents electronically, rather than on paper. In such an electronic computer environment, source documents might exist only in the computer databases of the two parties involved in the transaction.



## 2. Recording business transactions

A business usually has more than one journal. Chapter 4 briefly describes several special journals. In this chapter, we use the basic form of journal, the general journal. As shown in Exhibit 8, a general journal contains the following columns:

**Illustration 2.3** Steps in the Accounting Cycle

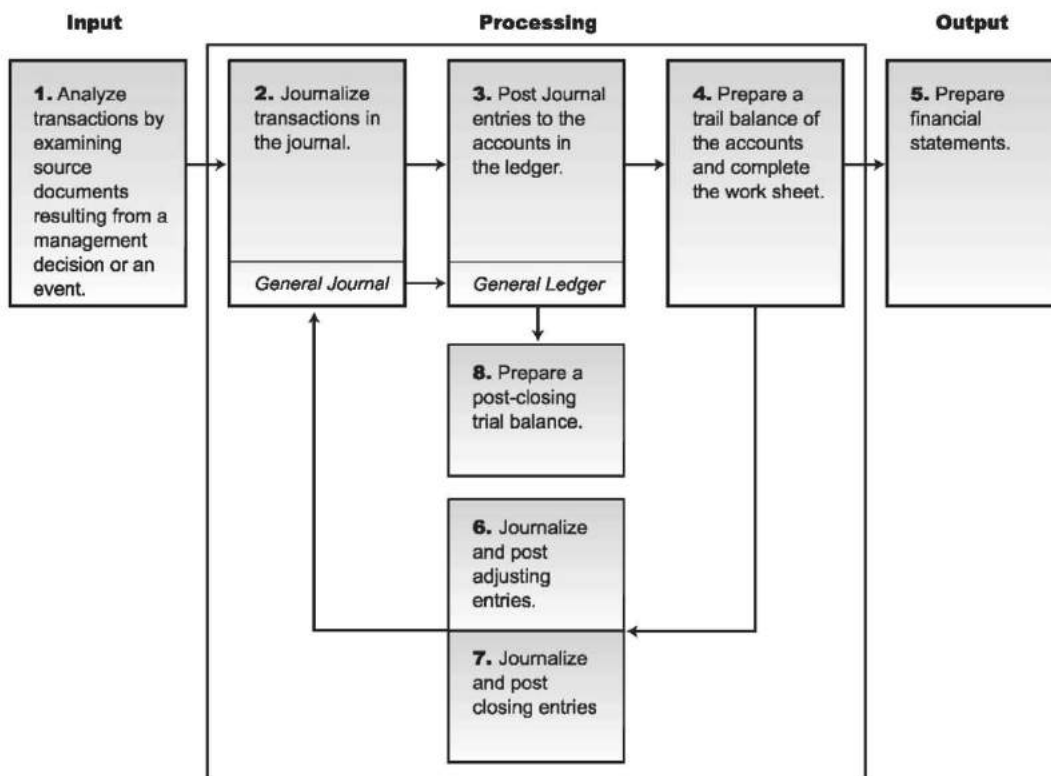


Exhibit 7: Steps in the accounting cycle

MICROTRAIN COMPANY General Journal														
Date		Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Nov.	28	Cash (+A)	100	5	0	0	0	0						
		Capital Stock (+SE)	300							5	0	0	0	0
		Stockholders invested \$50,000 cash in business.												

Exhibit 8: Journal entry

- **Date column.** The first column on each journal page is for the date. For the first journal entry on a page, this column contains the year, month, and day (number). For all other journal entries on a page, this column contains only the day of the month, until the month changes.
- **Account titles and explanation column.** The first line of an entry shows the account debited. The second line shows the account credited. Notice that we indent the credit account title to the right. For instance, in Exhibit 8 we show the debit to the Cash account and then the credit to the Capital Stock

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account. Any necessary explanation of a transaction appears on the line(s) below the credit entry and is indented halfway between the accounts debited and credited. A journal entry explanation should be concise and yet complete enough to describe fully the transaction and prove the entry's accuracy. When a journal entry is self-explanatory, we omit the explanation.

- **Posting reference column.** This column shows the account number of the debited or credited account. For instance, in Exhibit 8, the number 100 in the first entry means that the Cash account number is 100. No number appears in this column until the information has been posted to the appropriate ledger account. We discuss posting later in the chapter.
- **Debit column.** In the debit column, the amount of the debit is on the same line as the title of the account debited.
- **Credit column.** In the credit column, the amount of the credit is on the same line as the title of the account credited.

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### An account perspective:

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#### Uses of technology

Preparing journal entries in a computerized system is different than in a manual system. The computer normally asks for the number of the account to be debited. After you type the account number, the computer shows the account title in its proper position. The cursor then moves to the debit column and waits for you to enter the amount of the debit. Then it asks if there are more debits. If not, the computer prompts you for the account number of the credit. After you type the account number, the computer supplies the account name of the credit and enters the same amount debited as the credit. When there is more than one credit, you can override the amount and enter the correct amount. Then you would enter the other credit in the same way. If your debits and credits are not equal, the computer warns you and makes you correct the error. You can supply an explanation for the entry from a standard list or type it in. As you enter the journal entries, the computer automatically posts them to the ledger accounts. At any time, you can have the computer print a trial balance.

A summary of the functions and advantages of using a journal follows:

The journal—

- Records transactions in chronological order.
- Shows the analysis of each transaction in debits and credits.
- Supplies an explanation of each transaction when necessary.
- Serves as a source for future reference to accounting transactions.
- Eliminates the need for lengthy explanations from the accounts.
- Makes possible posting to the ledger at convenient times.
- Assists in maintaining the ledger in balance because the debit(s) must always equal the credit(s) in each journal entry.

## 2. Recording business transactions

- Aids in tracing errors when the ledger is not in balance.

### The ledger

A **ledger** (general ledger) is the complete collection of all the accounts of a company. The ledger may be in loose-leaf form, in a bound volume, or in computer memory.

Accounts fall into two general groups: (1) *balance sheet accounts* (assets, liabilities, and stockholders' equity) and (2) *income statement accounts* (revenues and expenses). The terms real accounts and permanent accounts also refer to balance sheet accounts. Balance sheet accounts are **real accounts** because they are not subclassifications or subdivisions of any other account. They are **permanent accounts** because their balances are not transferred (or closed) to any other account at the end of the accounting period. Income statement accounts and the Dividends account are **nominal accounts** because they are merely subclassifications of the stockholders' equity accounts. Nominal literally means "in name only". Nominal accounts are also called **temporary accounts** because they temporarily contain revenue, expense, and dividend information that is transferred (or closed) to the Retained Earnings account at the end of the accounting period.

The **chart of accounts** is a complete listing of the titles and numbers of all the accounts in the ledger. The chart of accounts can be compared to a table of contents. The groups of accounts usually appear in this order: assets, liabilities, stockholders' equity, dividends, revenues, and expenses.

Individual accounts are in sequence in the ledger. Each account typically has an identification number and a title to help locate accounts when recording data. For example, a company might number asset accounts, 100-199; liability accounts, 200-299; stockholders' equity accounts and Dividends account, 300-399; revenue accounts, 400-499; and expense accounts, 500-599. We use this numbering system in this text. The uniform chart of accounts used in the first 11 chapters appears in a separate file at the end of the text. You should print that file and keep it handy for working certain problems and exercises. Companies may use other numbering systems. For instance, sometimes a company numbers its accounts in sequence starting with 1, 2, and so on. The important idea is that companies use some numbering system.

Now that you understand how to record debits and credits in an account and how all accounts together form a ledger, you are ready to study the accounting process in operation.

### The accounting process in operation

MicroTrain Company is a small corporation that provides on-site personal computer software training using the clients' equipment. The company offers beginning through advanced training with convenient scheduling. A small fleet of trucks transports personnel and teaching supplies to the clients' sites. The company rents a building and is responsible for paying the utilities.

We illustrate the capital stock transaction that occurred to form the company (in November) and the first month of operations (December). The accounting process used by this company is similar to that of any small company. The ledger accounts used by MicroTrain Company are:

	<b>Acct. No.</b>	<b>Account Title</b>	<b>Description</b>
	100	Cash	Bank deposits and cash on hand.
	103	Accounts Receivable	Amounts owed to the company by customers.
	107	Supplies on Hand	Items such as paper, envelopes, writing materials, and other materials used in performing training services for customers or in doing administrative and clerical office work.
Assets			

	108	Prepaid Insurance	Insurance policy premiums paid in advance of the periods for which the insurance coverage applies.
	112	Prepaid Rent	Rent paid in advance of the periods for which the rent payment applies.
	150	Trucks	Trucks used to transport personnel and training supplies to clients' locations.
	200	Accounts Payable	Amounts owed to creditors for items purchased
Liabilities	216	Unearned Service Fees	from them. Amounts received from customers before the training services have been performed for them.
Stockholders' equity	300	Capital Stock Retained	The stockholders' investment in the business. The earnings retained in the business.
Dividends	310	Earnings	
Revenues	320	Dividends	The amount of dividends declared to stockholders.
	400	Service Revenue	Amounts earned by performing training services for customers.
	505	Advertising Expense	The cost of advertising incurred in the current period.
	506	Gas and Oil Expense	The cost of gas and oil used in trucks in the
Expenses			current period.
	507	Salaries Expense	The amount of salaries incurred in the current period.
	511	Utilities Expense	The cost of utilities incurred in the current period.

Notice the gaps left between account numbers (100, 103, 107, etc.). These gaps allow the firm to later add new accounts between the existing accounts.

To begin, a transaction must be journalized. **Journalizing** is the process of entering the effects of a transaction in a journal. Then, the information is transferred, or posted, to the proper accounts in the ledger. **Posting** is the process of recording in the ledger accounts the information contained in the journal. We explain posting in more detail later in the chapter.

In the following example, notice that each business transaction affects two or more accounts in the ledger. Also note that the transaction date in both the general journal and the general ledger accounts is the same. In the ledger accounts, the date used is the date that the transaction was recorded in the general journal, even if the entry is not posted until several days later. Our example shows the journal entries posted to T-accounts. In practice, firms post journal entries to ledger accounts, as we show later in the chapter.

Accountants use the accrual basis of accounting. Under the **accrual basis of accounting**, they recognize revenues when the company makes a sale or performs a service, regardless of when the company receives the cash. They recognize expenses as incurred, whether or not the company has paid out cash. Chapter 3 discusses the accrual basis of accounting in more detail.

In the following MicroTrain Company example, transaction 1 increases (debits) Cash and increases (credits) Capital Stock by USD 50,000. First, MicroTrain records the transaction in the general journal; second, it posts the entry to the accounts in the general ledger.

**Transaction 1: 2010 Nov. 28 Stockholders invested \$50,000 and formed MicroTrain Company.**  
**General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Nov. 28	Cash (+A)	100	5	0	0	0	0						
	Capital Stock (+SE)	300						5	0	0	0	0	
	Stockholders invested \$50,000 cash in business.												

**General Ledger**

<b>Cash</b>				<b>Capital Stock</b>			
(Dr.)	Acct. No. 100	(Cr.)	(Dr.)	Acct. No. 300	(Cr.)		
2010				2010			
Nov. 28	50,000			Nov. 28	50,000		

## 2. Recording business transactions

No other transactions occurred in November. The company prepares financial statements at the end of each month. Exhibit 5 shows the company's balance sheet at 2010 November 30.

The balance sheet reflects ledger account balances as of the close of business on 2010 November 30. These closing balances are the beginning balances on 2010 December 1. The ledger accounts show these closing balances as beginning balances (Beg. bal.).

Now assume that in December 2010, MicroTrain Company engaged in the following transactions. We show the proper recording of each transaction in the journal and then in the ledger accounts (in T-account form), and describe the effects of each transaction.

<b>MICROTRAIN COMPANY Balance Sheet 2010 November 30</b>			
<b>Assets</b>		<b>Liabilities and Stockholders' Equity</b>	
Cash	\$50,000	Stockholders' equity:	
		Capital stock	\$50,000
Total Assets	\$50,000	Total liabilities and stockholders' equity	\$50,000

### Exhibit 9: Balance sheet

#### Transaction 2: Dec. 1 Paid cash for four small trucks, \$40,000.

##### General Journal

Date	Account Titles and Explanation	Post. Ref.	Debit						Credit								
2010 Dec. 1	Trucks (+A)	150		4	0	0	0	0	0	(A)							
	Cash (-A)	100										4	0	0	0	0	(B)
	To record the purchase of four trucks.																

##### General Ledger

##### Trucks

<i>(Dr.)</i>	Acct. No. 150	<i>(Cr.)</i>
2010 Dec. 1	<b>(A)40,000</b>	
	<b>Cash</b>	

<i>(Dr.)</i>	Acct. No. 100	<i>(Cr.)</i>
2010 Dec. 1	50,000	2010 Dec. 1
Dec. 1 Beg. bal.		<b>(B)40,000</b>
		<b>00</b>

#### Transaction 3: Dec. 1 Paid cash for insurance on the trucks to cover a one-year period from this date.

##### General Journal

Date	Account Titles and Explanation	Post. Ref.	Debit						Credit						
2010 Dec. 1	Prepaid Insurance (+A)	108			2	4	0	0							
	Cash (-A)	100									2	4	0	0	
	Purchased truck insurance to cover a one-year period.														

**General Ledger**  
**Prepaid Insurance**

<i>(Dr)</i>	Acct. No. 108	<i>(Cr)</i>
2010	<b>2,400</b>	
<b>Dec. 1</b>		
	<b>Cash</b>	

<i>(Dr)</i>	Acct. No. 100	<i>(Cr)</i>
2010	50,000	2010 40,000
Dec. 1 Beg. Bal		Dec. 1 <b>Dec. 1 2,40</b>

**Effects of transaction**

An asset, prepaid insurance, increases (debited); and an asset, cash, decreases (credited) by USD 2,400. The debit is to Prepaid Insurance rather than Insurance Expense because the policy covers more than the current accounting period of December (insurance policies are usually paid one year in advance). As you will see in Chapter 3, prepaid items are expensed as they are used. If this insurance policy was only written for December, the entire USD 2,400 debit would have been to Insurance Expense.

**Transaction 4: Dec. 1 Rented a building and paid \$1,200 to cover a three-month period from this date.**  
**General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Dec. 1	Prepaid Rent (+A)	112		1	2	0	0						
	Cash (-A)	100							1	2	0	0	
	Paid three months' rent on a building.												

**General Ledger**  
**Prepaid Rent**

<i>(Dr)</i>	Acct. No. 112	<i>(Cr)</i>
2010		
<b>Dec. 1</b>	<b>1,200</b>	

<i>(Dr)</i>	Acct. No. 100	<i>(Cr)</i>
2010		2010
Dec. 1 Beg. Bal.	50,000	Dec. 1 40,000
		Dec. 1 2,400
		<b>Dec. 1 1,200</b>

**Effects of transaction**

An asset, prepaid rent, increases (debited); and another asset, cash, decreases (credited) by USD 1,200. The debit is to Prepaid Rent rather than Rent Expense because the payment covers more than the current month. If the payment had just been for December, the debit would have been to Rent Expense.

**Transaction 5: Dec. 4 Purchased \$1,400 of training supplies on account to be used over the next several months.**  
**General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Dec. 4	Supplies on Hand (+A)	107		1	4	0	0						
	Accounts Payable (+L)	200							1	4	0	0	
	To record the purchases of training supplies for future use.												

**General Ledger**

## 2. Recording business transactions

<b>Supplies on Hand</b>			
<i>(Dr.)</i>	Acct. No. 107	<i>(Cr.)</i>	
2010			
<b>Dec. 4</b>	<b>1,400</b>		
<b>Accounts Payable</b>			
<i>(Dr.)</i>	Acct. No. 200	<i>(Cr.)</i>	
		2010	
		<b>Dec. 4</b>	<b>1,400</b>

### Effects of transaction

An asset, supplies on hand, increases (debited); and a liability, accounts payable, increases (credited) by USD 1,400. The debit is to Supplies on Hand rather than Supplies Expense because the supplies are to be used over several accounting periods.

In each of the three preceding entries, we debited an asset rather than an expense. The reason is that the expenditure applies to (or benefits) more than just the current accounting period. Whenever a company will not fully use up an item such as insurance, rent, or supplies in the period when purchased, it usually debits an asset. In practice, however, sometimes the expense is initially debited in these situations.

Companies sometimes buy items that they fully use up within the current accounting period. For example, during the first part of the month a company may buy supplies that it intends to consume fully during that month. If the company fully consumes the supplies during the period of purchase, the best practice is to debit Supplies Expense at the time of purchase rather than Supplies on Hand. This same advice applies to insurance and rent. If a company purchases insurance that it fully consumes during the current period, the company should debit Insurance Expense at the time of purchase rather than Prepaid Insurance. Also, if a company pays rent that applies only to the current period, Rent Expense should be debited at the time of purchase rather than Prepaid Rent. As illustrated in Chapter 3, following this advice simplifies the procedures at the end of the accounting period.

#### Transaction 6: Dec. 7 Received \$4,500 from a customer in payment for future training services.

##### General Journal

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Dec. 7	Cash (+A)	100		4	5	0	0						
	Unearned Service Fees (+L)	216								4	5	0	0
	To record the receipt of cash from a customer in payment												
	for future training services.												

##### General Ledger

##### Cash

<i>(Dr.)</i>	Acct. No. 100	<i>(Cr.)</i>	
2010		2010	
Dec. 1	Beg Bal 50,000	Dec. 1	40,000
<b>Dec. 7</b>	<b>4,500</b>	Dec. 1	2,400
		Dec. 1	1,200

##### Unearned Service Fees

<i>(Dr.)</i>	Acct. No. 216	<i>(Cr.)</i>	
		2010	
		<b>Dec. 7</b>	<b>4,500</b>

### Effects of transaction

An asset, cash, increases (debited); and a liability, unearned service revenue, increases (credited) by USD 4,500. The credit is to Unearned Service Fees rather than Service Revenue because the USD 4,500 applies to more than just the current accounting period. Unearned Service Fees is a liability because, if the services are never performed, the USD 4,500 will have to be refunded. If the payment had been for services to be provided in December, the credit would have been to Service Revenue.

**Transaction 7: Dec. 15 Performed training services for a customer for cash, \$5,000.**

**General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Dec. 15	Cash (+A)	100		5	0	0	0						
	Service Revenue (+SE)	400							5	0	0	0	
	To record the receipt of cash for performing training services for a customer.												

**General Ledger**

**Cash**

(Dr.)	Acct. No. 100	(Cr.)
2010		2010
Dec. 1 Beg Bal. 50,000		Dec. 1 40,000
Dec. 7 4,500		Dec. 1 2,400
<b>Dec. 15 5,000</b>		Dec. 1 1,200
<b>Service Revenue</b>		

(Dr.)	Acct. No. 400	(Cr.)
		2010
		<b>Dec. 15 5,000</b>

**Effects of transaction**

An asset, cash, increases (debited); and a revenue, service revenue, increases (credited) by USD 5,000.

**Transaction 8: Dec. 17 Paid the \$1,400 account payable resulting from the transaction of December 4.**

**General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Dec. 17	Accounts Payable (-L)	200		1	4	0	0						
	Cash (-A)	100							1	4	0	0	
	Paid the account payable arising from the purchase of Supplies on December 4.												

**General Ledger**

**Accounts Payable**

(Dr.)	Acct. No. 200	(Cr.)
2010		2010
<b>Dec. 17 1,400</b>		Dec. 4 1,400
<b>Cash</b>		

(Dr.)	Acct. No. 100	(Cr.)
2010		2010
Dec. 1 Beg Bal. 50,000		Dec. 1 40,000
Dec. 7 4,500		Dec. 1 2,400
Dec. 15 5,000		Dec. 1 1,200
		<b>Dec 17 1,400</b>

**Effects of transaction**



## 2. Recording business transactions

A liability, accounts payable, decreases (debited); and an asset, cash, decreases (credited) by USD 1,400.

**Transaction 9: Dec. 20 Billed a customer for training services performed, \$5,700.**

### General Journal

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Dec. 20	Accounts Receivable (+A)	103		5	7	0	0						
	Service Revenue (+SE)	400							5	7	0	0	
	To record the performance of training services on account												
	for which a customer was billed.												

### General Ledger

#### Accounts Receivable

<i>(Dr.)</i>	Acct. No. 103	<i>(Cr)</i>
2010		
<b>Dec. 20</b>	<b>5,700</b>	
	<b>Service Revenue</b>	
<i>(Dr.)</i>	Acct. No. 400	<i>(Cr.)</i>
	2010	
	Dec. 15	5,000
	<b>Dec. 20</b>	<b>5,700</b>

### Effects of transaction

An asset, accounts receivable, increases (debited); and a revenue, service revenue, increases (credited) by USD 5,700.

**Transaction 10: Dec. 24 Received a bill for advertising in a local newspaper in December, \$50.**

### General Journal

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 Dec. 24	Advertising Expense (-SE)	505				5	0						
	Accounts Payable (+L)	200								5	0		
	Received a bill for advertising for the month of December.												

### General Ledger

#### Advertising Expense

<i>(Dr.)</i>	Acct. No. 505	<i>(Cr)</i>
2010		
<b>Dec. 24</b>	<b>50</b>	
<i>(Dr.)</i>	<b>Accounts Payable</b>	<i>(Cr.)</i>
	Acct. No. 200	
2010	2010	
Dec. 17	1,400	Dec. 4 1,400
		<b>Dec. 24 50</b>

### Effects of transaction

An expense, advertising expense, increases (debited); and a liability, accounts payable, increases (credited) by USD 50. The reason for debiting an expense rather than an asset is because all the cost pertains to the current accounting period, the month of December. Otherwise, Prepaid Advertising (an asset) would have been debited.

**Transaction 11: Dec. 26 Received \$500 on accounts receivable from a customer.**

### General Journal

Date	Account Titles and Explanation	Post. Ref.	Debit				Credit			
2010 Dec. 26	Cash (+A)	100		5	0	0				
	Accounts Receivable (-A)	103						5	0	0
	Received \$500 from a customer on accounts receivable									

**General Ledger Cash**

(Dr.)		Acct. No. 100	(Cr.)	
2010			2010	
Dec. 1	Beg Bal.	50,000	Dec. 1	40,000
Dec. 7		4,500	Dec. 1	2,400
Dec. 15		5,000	Dec. 1	1,200
<b>Dec. 26</b>		<b>500</b>	Dec. 17	1,400
<b>Accounts Receivable</b>			<b>Receivable</b>	
(Dr.)		Acct. N	(Cr.)	
2010			2010	
Dec. 20		5,700	<b>Dec. 26</b>	<b>500</b>

**Effects of transaction**

One asset, cash, increases (debited); and another asset, accounts receivable, decreases (credited) by USD 500.

**Transaction 12: Dec. 28 Paid salaries of \$3,600 to training personnel for the first four weeks of December. (Payroll and other deductions are to be ignored since they have not yet been discussed.)**

**General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit				Credit			
2010 Dec. 28	Salaries Expense (-SE)	507		3	6	0	0			
	Cash (-A)	100						3	6	0
	Paid training personnel salaries for the first four weeks of									
	December.									

**General Ledger**

**Salaries Expense**

(Dr.)		Acct. No. 507	(Cr.)	
2010				
<b>Dec. 28</b>		<b>3,600</b>		

**Cash**

(Dr.)		Acct. No. 100	(Cr.)	
2010			2010	
Dec. 1		50,000	Dec. 1	40,000
Dec. 7		4,500	Dec. 1	2,400
Dec. 15		5,000	Dec. 1	1,200
Dec. 26		500	Dec. 17	1,400
			<b>Dec. 28</b>	<b>3,600</b>

**Effects of transaction**

An expense, salaries expense, increases (debited); and an asset, cash, decreases (credited) by USD 3,600.

**Transaction 13: Dec. 29 Received and paid the utilities bill for December, \$150.**

**General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit				Credit			
2010 Dec. 29	Utilities Expense (-SE)	511		1	5	0				
	Cash (+A)	100						1	5	0

## 2. Recording business transactions

		Paid the utilities bill for December.																			
--	--	---------------------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

### General Ledger

#### Utilities Expense

(Dr.) Acct. No. 511 (Cr)

2010

**Dec. 29 150**

#### Cash

(Dr.) Acct. No. 100 (Cr)

2010

Dec. 1	50,000	Dec. 1	40,000
Dec. 7	4,500	Dec. 1	2,400
Dec. 15	5,000	Dec. 1	1,200
Dec. 26	500	Dec. 17	1,400
		Dec. 28	3,600
		<b>Dec. 29</b>	<b>150</b>

### Effects of transaction

An expense, utilities expense, increases (debited); and an asset, cash, decreases (credited) by USD 150.

**Transaction 14: Dec. 30 Received a bill for gas and oil used in the trucks for December, \$680.**

#### General Journal

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit						
2010 Dec. 30	Gas and Oil Expense (-SE)	506			6	8	0							
	Accounts Payable (+L)	200								6	8	0		
	Received a bill for gas and oil used in the trucks for													
	December.													

### General Ledger

#### Gas and Oil Expense

(Dr.) Acct. No. 506 (Cr)

2010

**Dec. 30 680**

#### Accounts Payable

(Dr.) Acct. No. 200 (Cr)

2010

Dec. 17	1,400	Dec. 4	1,400
		Dec.24	50
		<b>Dec. 30</b>	<b>680</b>

### Effects of transaction

An expense, gas and oil expense, increases (debited); and a liability, accounts payable, increases (credited) by USD 680.

**Transaction 15: Dec. 31 A dividend of \$3,000 was paid to stockholders.**

**General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit				Credit					
2010 Dec. 31	Dividends (-SE)	320		3	0	0	0					
	Cash (-A)	100							3	0	0	0
	Dividends were paid to stockholders.											

**General Ledger**

**Dividends**

<i>(Dr.)</i>	Acct. No. 320	<i>(Cr.)</i>
2010		
<b>Dec. 31</b>	<b>3,000</b>	

**Cash**

<i>(Dr.)</i>	Acct. No. 100	<i>(Cr.)</i>	
2010		2010	
Dec. 1 Beg Bal.	50,000	Dec. 1	40,000
Dec. 7	4,500	Dec. 1	2,400
Dec. 15	5,000	Dec. 1	1,200
Dec. 26	500	Dec. 17	1,400
		Dec. 28	3,600
		Dec. 29	150
		<b>Dec. 31</b>	<b>3,000</b>

**Effects of transaction**

The Dividends account increases (debited); and an asset, cash, decreases (credited) by USD 3,000.

Transaction 15 concludes the analysis of the MicroTrain Company transactions. The next section discusses and illustrates posting to ledger accounts and cross-indexing.

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**An accounting perspective:**

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**Uses of technology**

The concept of the Internet dates to the 1960s when the military tied together several computers forming a "network" that allowed users to communicate with each other instantaneously on their computers over many miles.

Then universities and scientific institutions connected to the network to meet their research and communication needs. More and more organizations hooked up to the network over time. Today many companies seek customers and employees over the Internet. Students and faculty use the Internet to perform research, communicate with their colleagues (using e-mail), and search distant libraries. Accountants in practice are heavy users of the Internet to locate company data, tax regulations, and almost any other information they need. You will find that learning to use the Internet effectively is essential to your future success.

## 2. Recording business transactions

### The use of ledger accounts

A journal entry is like a set of instructions. The carrying out of these instructions is known as **posting**. As stated earlier, posting is recording in the ledger accounts the information contained in the journal. A journal entry directs the entry of a certain dollar amount as a debit in a specific ledger account and directs the entry of a certain dollar amount as a credit in a specific ledger account. Earlier, we posted the journal entries for MicroTrain Company to T-accounts. In practice, however, companies post these journal entries to ledger accounts.

Using a new example, Jenks Company, we illustrate posting to ledger accounts. Later, we show you how to post the MicroTrain Company journal entries to ledger accounts.

In Exhibit 10, the first journal entry for the Jenks Company directs that USD 10,000 be posted in the ledger as a debit to the Cash account and as a credit to the Capital Stock account. We post the debit in the general ledger Cash account by using the following procedure: Enter in the Cash account the date, a short explanation, the journal designation ("G" for general journal) and the journal page number from which the debit is posted, and the USD 10,000 in the Debit column. Then, enter the number of the account to which the debit is posted in the Posting Reference column of the general journal. Post the credit in a similar manner but as a credit to Account No. 300. The arrows in Exhibit 10 show how these amounts were posted to the correct accounts.

Exhibit 10 shows the ledger account. In contrast to the two-sided T-account format shown so far, the three-column format has columns for debit, credit, and balance. The three-column form has the advantage of showing the balance of the account after each item has been posted. In addition, in this chapter, we indicate whether each balance is a debit or a credit. In later chapters and in practice, the nature of the balance is usually not indicated since it is understood. Also, notice that we give an explanation for each item in the ledger accounts. Often accountants omit these explanations because each item can be traced back to the general journal for the explanation.

Posting is always from the journal to the ledger accounts. Postings can be made (1) at the time the transaction is journalized; (2) at the end of the day, week, or month; or (3) as each journal page is filled. The choice is a matter of personal taste. When posting the general journal, the date used in the ledger accounts is the date the transaction was recorded in the journal, not the date the journal entry was posted to the ledger accounts.

Frequently, accountants must check and trace the origin of their transactions, so they provide cross-indexing. **Cross-indexing** is the placing of (1) the account number of the ledger account in the general journal and (2) the general journal page number in the ledger account. As shown in Exhibit 10, the account number of the ledger account to which the posting was made is in the Posting Reference column of the general journal. Note the arrow from Account No. 100 in the ledger to the 100 in the Posting Reference column beside the first debit in the general journal. Accountants place the number of the general journal page from which the entry was posted in the Posting Reference column of the ledger account. Note the arrow from page 1 in Exhibit 10 the general journal to G1 in the Posting Reference column of the Cash account in the general ledger. The notation "G1" means general journal, page 1. The date of the transaction also appears in the general ledger. Note the arrows from the date in the general journal to the dates in the general ledger.

**JENKS COMPANY  
General Journal**

Date		Account Titles and Explanation	Post. Ref.	Debit	Credit	
2010 Jan.	1(B)	Cash (+A)	(C)100	1 0 0 0 0 0 (A)		
		Capital Stock (+SE)	300		1 0 0 0 0 0 (D)	
		Stockholders invested \$10,000 cash in the business.				
	5	Cash (+A)	100	5 0 0 0 0		
		Notes Payable (+L)	201		5 0 0 0 0	
		Borrowed \$5,000 from the bank on a note.				

**:- General Ledger Cash** *Account No 100(C)*

		Explanation	Post Ref.	Debit	Credit	Balance
2010 -Jan.	(B)1	Stockholders investment	G1	(A) 1 0 0 0 0 0		1 0 0 0 0 0 Dr
	5	Bank loan	G1	5 0 0 0 0 0		1 5 0 0 0 0 Dr

**Notes Payable** *Account No. 201*

Date		Explanation	Post Ref.	Debit	Credit	Balance
2010 Jan.	5	Borrowed cash	G1		5 0 0 0 0 0	5 0 0 0 0 0 Cr

**Capital Stock** *Account No. 300*

		Explanation	Post Ref.	Debit	Credit	Balance
2010 " Jan.	(B)1	Cash from stockholders	G1		( 1 0 0 0 0 0 ) D )	1 0 0 0 0 0 Cr

**Exhibit 10: General journal and general ledger; posting and cross-indexing**

Cross-indexing aids the tracing of any recorded transaction, either from general journal to general ledger or from general ledger to general journal. Normally, they place cross-reference numbers in the Posting Reference column of the general journal when the entry is posted. If this practice is followed, the cross-reference numbers indicate that the entry has been posted.

**MICROTRAIN COMPANY  
General Journal**

Date		Account Titles and Explanation	Post. Ref.	Debit	Credit	
2010 Nov.	28	Cash (+A)	100*	5 0 0 0 0 0		
		Capital Stock (+SE)	300		5 0 0 0 0 0	
		Stockholders invested \$50,000 cash in the business.				

## 2. Recording business transactions

Dec	1	Truck (+A)	150	4	0	0	0	0											
		Cash (-A)	100							4	0	0	0	0					
		To record the purchase of four trucks.																	
	1	Prepaid Insurance (+A)	108	2	4	0	0												
		Cash (-A)	100							2	4	0	0						
		Purchased truck insurance to cover a one-year period.																	
	1	Prepaid Rent (+A)	112	1	2	0	0												
		Cash (-A)	100							1	2	0	0						
		Paid three months' rent on a building.																	
	4	Supplies on Hand (+A)	107	1	4	0	0												
		Accounts Payable (+L)	200							1	4	0	0						
		To record the purchase of training supplies for future use.																	
	7	Cash (+A)	100	4	5	0	0												
		Unearned Service Fees (+L)	216							4	5	0	0						
		To record the receipt of cash from a customer in payment for future training services.																	
	15	Cash (+A)	100	5	0	0	0												
		Service Revenue (+SE)	400							5	0	0	0						
		To record the receipt of cash for performing training services for a customer.																	
	17	Accounts Payable (-L)	200	1	4	0	0												
		Cash (-A)	100							1	4	0	0						
		Paid the account payable arising from the purchase of supplies on December 4.																	

General Journal

Date	Account Titles and Explanation	Post. Ref.	Debit				Credit				
2010 Dec. 20	Accounts Receivable (+A)	103		5	7	0	0				
	Service Revenue (+SE)	400						5	7	0	0
	To record the performance of training services on account for which a customer was billed.										
24	Advertising Expense (-SE)	505			5	0					
	Accounts Payable (+L)	200							5	0	
	Received a bill for advertising for the month of December.										
26	Cash (+A)	100			5	0	0				
	Accounts Receivable (-A)	103						5	0	0	
	Received \$500 from a customer on accounts receivable.										
28	Salaries Expense (-SE)	507		3	6	0	0				
	Cash (-A)	100						3	6	0	0
	Paid training personnel salaries for the first four weeks of December.										
29	Utilities Expense (-SE)	511			1	5	0				
	Cash (-A)	100						1	5	0	
	Paid the utilities bill for December.										
30	Gas and Oil Expense (-SE)	506			6	8	0				
	Accounts Payable (-A)	200							6	8	0
	Received a bill for gas and oil used in the trucks for December.										
31	Dividends (-SE)	320		3	0	0	0				
	Cash (-A)	100						3	0	0	0
	Dividends were paid to stockholders.										

Exhibit 11: General journal (after posting)

To understand the posting and cross-indexing process, trace the entries from the general journal to the general ledger. The ledger accounts need not contain explanations of all the entries, since any needed explanations can be obtained from the general journal.

Look at Exhibit 11 to see how all the November and December transactions of MicroTrain Company would be journalized. As shown in Exhibit 11, you skip a line between journal entries to show where one journal entry ends and another begins. This procedure is standard practice among accountants. Note that no dollar signs appear in journals or ledgers. When amounts are in even dollar amounts, accountants leave the cents column blank or use zeros or a dash. When they use lined accounting work papers, commas or decimal points are not needed to record an amount. When they use unlined paper, they add both commas and decimal points.



## 2. Recording business transactions

Next, observe Exhibit 12, the three-column general ledger accounts of MicroTrain Company after the journal entries have been posted. Each ledger account would appear on a separate page in the ledger. Trace the postings from the general journal to the general ledger to make sure you know how to post journal entries.

All the journal entries illustrated so far have involved one debit and one credit; these journal entries are called **simple journal entries**. Many business transactions, however, affect more than two accounts. The journal entry for these transactions involves more than one debit and/or credit. Such journal entries are called **compound journal entries**.

As an illustration of a compound journal entry, assume that on 2011 January 2, MicroTrain Company purchased USD 8,000 of training equipment from Wilson Company. See below.

**MICROTRAIN COMPANY**  
**General Ledger**  
**Cash**

*Account No. 100*

Date	Explanation	Post Ref.	Debit				Credit				Balance				
2010 Dec. 1	Beginning balance*										5	0	0	0	Dr
1	Trucks	G1					4	0	0	0	1	0	0	0	Dr
1	Prepaid insurance	G1					2	4	0	0	7	6	0	0	Dr
1	Prepaid rent	G1					1	2	0	0	6	4	0	0	Dr
7	Unearned service fees	G1	4	5	0	0					1	0	9	0	Dr
15	Service revenue	G1	5	0	0	0					1	5	9	0	Dr
17	Paid account payable	G1					1	4	0	0	1	4	5	0	Dr
26	Collected account receivable	G2		5	0	0					1	5	0	0	Dr
28	Salaries	G2					3	6	0	0	1	1	4	0	Dr
29	Utilities	G2					1	5	0	0	1	1	2	5	Dr
31	Dividends	G2					3	0	0	0	8	2	5	0	Dr

**Accounts Receivable**

*Account No. 103*

Date	Explanation	Post Ref.	Debit				Credit				Balance					
2010 Dec. 20	Service revenue	G2		5	7	0	0						5	7	0	Dr
26	Collections	G2					5	0	0	0	5	2	0	0	Dr	

**Supplies on Hand**

*Account No. 107*

Date	Explanation	Post Ref.	Debit				Credit				Balance					
2010 Dec. 4	Purchased on account	G1		1	4	0	0						1	4	0	Dr

**Prepaid Insurance**

*Account No. 108*

Date	Explanation	Post Ref.	Debit				Credit				Balance					
2010 Dec. 1	One-year policy on trucks	G1		2	4	0	0						2	4	0	Dr

**General Ledger**  
**Prepaid Rent**

Page 1

*Account No. 112*

Date	Explanation	Post Ref.	Debit				Credit				Balance					
2010 Dec. 1	Three-month payment	G1		1	2	0	0						1	2	0	Dr

**Trucks**

*Account No. 150*

Date	Explanation	Post Ref.	Debit						Credit						Balance								
2010 Dec. 1	Paid cash	G1		4	0	0	0	0										4	0	0	0	0	Dr

**Accounts Payable** *Account No. 200*

Date	Explanation	Post Ref.	Debit						Credit						Balance							
2010 Dec. 4	Supplies	G1									1	4	0	0				1	4	0	0	Cr
	17	Paid for supplies	G1		1	4	0	0											-	0	-	
	24	Advertising	G2										5	0					5	0		Cr
	30	Gas and oil	G2										6	8	)				7	3	0	Cr

**Unearned Service Fees** *Account No. 216*

Date	Explanation	Post Ref.	Debit						Credit						Balance							
2010 Dec. 7	Received cash	G1										4	5	0	0				4	5	0	Cr

**Capital Stock** *Account No. 300*

Date	Explanation	Post Ref.	Debit						Credit						Balance							
2010 Dec. 1	Beginning balance																	5	0	0	0	Cr

## 2. Recording business transactions

		<b>General Ledger</b>				Page 3	
		<b>Dividends</b>				<i>Account No. 320</i>	
Date	Explanation	Post Ref.	Debt	Credit	Balance		
2010 Dec. 31	Cash	G2	3 0 0 0			3 0 0 0	Dr
		<b>Service Revenue</b>				<i>Account No. 400</i>	
Date	Explanation	Post Ref.	Debt	Credit	Balance		
2010 Dec. 15	Cash	G1		5 0 0 0		5 0 0 0	Cr
20	On account	G2		5 7 0 0		1 0 7 0 0	Cr
		<b>Advertising Expense</b>				<i>Account No. 505</i>	
Date	Explanation	Post Ref.	Debt	Credit	Balance		
2010 Dec. 24	On account	G2		5 0		5 0	Dr
		<b>Gas and Oil Expense</b>				<i>Account No. 506</i>	
Date	Explanation	Post Ref.	Debt	Credit	Balance		
2010 Dec. 30	On account	G2		6 8 0		6 8 0	Dr
		<b>Salaries Expense</b>				<i>Account No. 507</i>	
Date	Explanation	Post Ref.	Debt	Credit	Balance		
2010 Dec. 28	Cash paid	G2	3 6 0 0			3 6 0 0	Dr
		<b>Utilities Expense</b>				<i>Account No. 511</i>	
Date	Explanation	Post Ref.	Debt	Credit	Balance		
2010 Dec. 29	Cash paid	G2	1 5 0			1 5 0	Dr

Exhibit 12: General ledger - Extended illustration

**MICROTRAIN COMPANY**  
**Trial Balance**  
**December 31, 2010**

Acct.			
No.	Account Title	Debits	Credits
100	Cash	\$ 8,250	
103	Accounts Receivable	5,200	
107	Supplies on Hand	1,400	
108	Prepaid Insurance	2,400	
112	Prepaid Rent	1,200	
150	Trucks	40,000	
200	Accounts Payable		\$ 730
216	Unearned Service Fees		4,500
300	Capital Stock		50,000
320	Dividends	3,000	
400	Service Revenue		10,700
505	Advertising Expense	50	
506	Gas and Oil Expense	680	
507	Salaries Expense	3,600	
511	Utilities Expense	150	

**Exhibit 13: Trail balance**

MicroTrain paid USD 2,000 cash with the balance due on 2011 March 3. The general journal entry for MicroTrain Company is:

			Debit	Credit
2011				
Jan.	2	Equipment (+A)	8,000	
		Cash (-A)		2,000
		Accounts Payable (+L)		6,000
		Training equipment purchased from Wilson Company.		

Note that the firm credits two accounts, Cash and Accounts Payable, in this one entry. However, the dollar totals of the debits and credits are equal.

Periodically, accountants use a trial balance to test the equality of their debits and credits. A **trial balance** is a listing of the ledger accounts and their debit or credit balances to determine that debits equal credits in the recording process. The accounts appear in this order: assets, liabilities, stockholders' equity, dividends, revenues, and expenses. Within the assets category, the most liquid (closest to becoming cash) asset appears first and the least liquid appears last. Within the liabilities, those liabilities with the shortest maturities appear first. Study Exhibit 13, the trial balance for MicroTrain Company. Note the listing of the account numbers and account titles on the left, the column for debit balances, the column for credit balances, and the equality of the two totals.

When the trial balance does not balance, try re-totaling the two columns. If this step does not locate the error, divide the difference in the totals by 2 and then by 9. If the difference is divisible by 2, you may have transferred a debit-balanced account to the trial balance as a credit, or a credit-balanced account as a debit. When the difference is divisible by 2, look for an amount in the trial balance that is equal to one-half of the difference. Thus, if the difference is USD 800, look for an account with a balance of USD 400 and see if it is in the wrong column.

If the difference is divisible by 9, you may have made a transposition error in transferring a balance to the trial balance or a slide error. A transposition error occurs when two digits are reversed in an amount (e.g. writing 753 as

## 2. Recording business transactions

573 or 110 as 101). A slide error occurs when you place a decimal point incorrectly (e.g. USD 1,500 recorded as USD 15.00). Thus, when a difference is divisible by 9, compare the trial balance amounts with the general ledger account balances to see if you made a transposition or slide error in transferring the amounts.

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### An ethical perspective: Financial Deals, Inc.

Larry Fisher was captain of the football team at Prestige University. Later, he earned a master's degree in business administration with a concentration in accounting.

Upon graduation, Larry accepted a position with Financial Deals, Inc., in the accounting and finance division. At first, things were going smoothly. He was tall, good looking, and had an outgoing personality. The president of the company took a liking to him. However, Larry was somewhat bothered when the president started asking him to do some things that were slightly unethical. When he protested mildly, the president said: "Come on, son, this is the way the business world works. You have great potential if you don't let things like this get in your way."

As time went on, Larry was asked to do things that were more unethical, and finally he was performing illegal acts. When he resisted, the president appealed to his loyalty and asked him to be a team player. The president also promised Larry great wealth sometime in the future. Finally, when he was told to falsify some financial statements by making improper entries and to sign some documents containing material errors, the president supported his request by stating: "You are in too deep now to refuse to cooperate. If I go down, you are going with me." Through various company schemes, Larry had convinced some friends and relatives to invest about USD 10 million. Most of this would be lost if the various company schemes were revealed.

Larry could not sleep at night and began each day with a pain in his stomach and by becoming physically ill. He was under great strain and believed that he could lose his mind. He also heard that the president had a shady past and could become violent in retaliating against his enemies. If Larry blows the whistle, he believes he will go to prison for his part in the schemes. (Note: This scenario is based on an actual situation with some facts changed to protect the guilty.)

If you still cannot find the error, it may be due to one of the following causes:

- Failing to post part of a journal entry.
- Posting a debit as a credit, or vice versa.
- Incorrectly determining the balance of an account.
- Recording the balance of an account incorrectly in the trial balance.
- Omitting an account from the trial balance.
- Making a transposition or slide error in the accounts or the journal.

Usually, you should work backward through the steps taken to prepare the trial balance. Assuming you have already re-totaled the columns and traced the amounts appearing in the trial balance back to the general ledger account balances, use the following steps: Verify the balance of each general ledger account, verify postings to the general ledger, verify general journal entries, and then review the transactions and possibly the source documents.

The equality of the two totals in the trial balance does not necessarily mean that the accounting process has been error-free. Serious errors may have been made, such as failure to record a transaction, or posting a debit or credit to the wrong account. For instance, if a transaction involving payment of a USD 100 account payable is never recorded, the trial balance totals still balance, but at an amount that is USD 100 too high. Both cash and accounts payable would be overstated by USD 100.

You can prepare a trial balance at any time—at the end of a day, a week, a month, a quarter, or a year. Typically, you would prepare a trial balance before preparing the financial statements.

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### An accounting perspective:

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#### Uses of technology

The computers of persons in a given department or building are frequently connected in a Local Area Network (LAN). These persons can then access simultaneously the programs and databases stored in the LAN and can communicate with all other persons in the LAN through email. A more advanced type of computer network is called Client/Server Computing. Under this structure, any computer in the network can be used to update the information stored elsewhere in the network. For example, accounting information stored in one computer could be updated by authorized persons from a number of other computers in the system. The use of networks is designed to improve efficiency and to reduce software and hardware costs.

#### Analyzing and using the financial results— Horizontal and vertical analyses

The calculation of dollar and/or percentage changes from one year to the next in an item on financial statements is **horizontal analysis**. For instance, in the following data taken from the 2000 annual report of Hewlett-Packard Company, the amount of inventory increased by USD 836 million from 1999 October 31, to 2000 October 31. This amount represented a 17 per cent increase. To find the amount of the increase or decrease, subtract the 1999 amount from the 2000 amount. To find the percentage change, divide the increase or decrease by the 1999 amount.

Knowing the dollar amount and percentage of change in an amount is much more meaningful than merely knowing the amount at one point in time. By analyzing the data, we can see that cash and cash equivalents declined in 2000. Their decline at least partially explains the increases in some of the other current assets. We can also see that the company invested in property, plant and equipment. Any terms in Hewlett-Packard's list of assets that you do not understand are explained in later chapters. At this point, all we want you to understand is the nature of horizontal and vertical analyses.

**Vertical analysis** shows the percentage that each item in a financial statement is of some significant total such as total assets or sales. For instance, in the Hewlett-Packard data we can see that cash and cash equivalents were 15.3 per cent of total assets as of 1999 October 31, and had declined to 10.0 per cent of total assets by 2000 October 31. Total current assets (cash plus other amounts that will become cash or be used up within one year) increased from 61.3 per cent of total assets to 68.3 per cent during 2000. Long-term investments and other non-current assets accounted for 18.4 per cent of total assets as of 2000 October 31.

**Increase or                      Percent of**

## 2. Recording business transactions

	2000	1999	(Decrease)		Total Assets	
			2000 over 1999		October 31	
			Dollars	Percent	2000	1999
<b>Assets (in millions)</b>						
<b>Current assets:</b>						
Cash and cash equivalents	\$ 3,415	\$ 5,411	\$ (1,996)	-37%	10.0%	15.3%
Short-term investments	592	179	413	231%	1.7%	0.5%
Accounts receivable	6,394	5,958	436	7%	18.8%	16.9%
Financing receivables	2,174	1,889	285	15%	6.4%	5.4%
Inventory	5,699	4,863	836	17%	16.8%	13.8%
Other current assets	4,970	3,342	1,628	49%	14.6%	9.5%
Total current assets	\$ 23,244	\$ 21,642	\$ 1,602	7%	68.3%	61.3%
<b>Property, plant and equipment:</b>						
Property, plant and equipment, net	4,500	4,333	167	4%	13.2%	12.3%
<b>Long-term investments and other non-current assets</b>						
	6,265	9,322	(3,057)	-33%	18.4%	26.4%
Total assets	\$ 34,009	\$ 35,297	\$ (1,288)	-4%	100.0%	100.0%

Management performs horizontal and vertical analyses along with other forms of analysis to help evaluate the wisdom of its past decisions and to plan for the future. Other data would have to be examined before decisions could be made regarding the assets shown. For instance, if you discovered the liabilities that would have to be paid within a short time by Hewlett-Packard were more than USD 30 billion, you might conclude that the company is short of cash even though current assets increased substantially during 2000. We illustrate horizontal and vertical analyses to a much greater extent later in the text.

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### An accounting perspective:

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### Business insight

Many companies have been restructuring their organizations and reducing the number of employees to cut expenses. General Motors, AT&T, IBM, and numerous other companies have taken this action. One could question whether companies place as much value on their employees as in the past. In previous years it was common to see the following statement in the annual reports of companies: "Our employees are our most valuable asset". Companies are not permitted to show employees as assets on their balance sheets. Do you think they should be allowed to do so?

What you have learned in this chapter is basic to your study of accounting. The entire process of accounting is based on the double-entry concept. Chapter 3 explains that adjustments bring the accounts to their proper balances before accurate financial statements are prepared.

#### Understanding the learning objectives

- An account is a storage unit used to classify and summarize money measurements of business activities of a similar nature.
- A firm sets up an account whenever it needs to provide useful information about a particular business item to some party having a valid interest in the business.
- A T-account resembles the letter T.
- Debits are entries on the left side of a T-account.
- Credits are entries on the right side of a T-account.

- Debits increase asset, expense, and Dividends accounts.
- Credits increase liability, stockholders' equity, and revenue accounts.
- Analyze transactions by examining source documents.
- Journalize transactions in the journal.
- Post journal entries to the accounts in the ledger.
- Prepare a trial balance of the accounts and complete the work sheet.
- Prepare financial statements.
- Journalize and post adjusting entries.
- Journalize and post closing entries. Prepare a post-closing trial balance.
- A journal contains a chronological record of the transactions of a business. An example of a general journal is shown in Exhibit 11. Journalizing is the process of entering a transaction in a journal.
- Posting is the process of transferring information recorded in the journal to the proper places in the ledger.
- Cross-indexing is the placing of (1) the account number of the ledger account in the general journal and (2) the general journal page number in the ledger account.
- An example of cross-indexing appears in Exhibit 10.
- A trial balance is a listing of the ledger accounts and their debit or credit balances.
- If the trial balance does not balance, an accountant works backward to discover the error.
- A trial balance is shown in Exhibit 13.
- Horizontal analysis involves calculating the dollar and/or percentage changes in an item from one year to the next.
- Vertical analysis shows the percentage that each item in a financial statement is of some significant total.

### Demonstration problem

Green Hills Riding Stable, Incorporated, had the following balance sheet on 2010 June 30:

<b>GREEN HILLS RIDING STABLE, INCORPORATED</b>	
<b>Balance Sheet</b>	
<b>2010 June 30</b>	
<b>Assets</b>	
Cash	\$ 7,500
Accounts receivable	5,400
Land	40,000
Total assets	\$ 52,900
<b>Liabilities and Stockholders' Equity</b>	
Liabilities:	
Accounts payable	\$ 800
Notes payable	40,000
Total liabilities	\$ 40,800
Stockholders' equity:	
Capital stock	\$ 10,000
Retained earnings	2,100
Total stockholders' equity	12,100
Total liabilities and stockholders' equity	\$52,900

- Prepare the journal entries to record the transactions for July 2010.
- Post the journal entries to the ledger accounts after entering the beginning balances in those accounts. Insert cross-indexing references in the journal and ledger. Use the following chart of accounts:



## 2. Recording business transactions

100	Cash	320	Dividends
103	Accounts Receivable	402	Horse Boarding Fees Revenue
130	Land	404	Riding and Lesson Fees Revenue
140	Buildings	507	Salaries Expense
200	Accounts Payable	513	Feed Expense
201	Notes Payable	540	Interest Expense
300	Capital Stock	568	Miscellaneous Expense
310	Retained Earnings		

c. Prepare a trial balance.

### Solution to demonstration problem

a.

#### GREEN HILLS RIDING STABLE, INCORPORATED General Journal

Page1

Date	Account Titles and Explanation	Post. Ref.	Debit					Credit					
2010 July 1	Cash (+A)	100	2	5	0	0	0						
	Capital Stock (+SE)	300						2	5	0	0	0	
	Additional capital stock issued.												
1	Buildings (+A)	140	2	4	0	0	0						
	Cash (-A)	100						2	4	0	0	0	
	Paid for building.												
8	Account Payable (-L)	200			8	0	0						
	Cash (-A)	100							8	0	0		
	Paid accounts payable.												
10	Cash (+A)	100		5	4	0	0						
	Accounts Receivable (-A)	103						5	4	0	0		
	Collected accounts receivable.												
12	Feed Expense (-SE)	513		1	1	0	0						
	Accounts Payable (+L)	200						1	1	0	0		
	Purchased feed on account												
15	Accounts Receivable (+A)	103		4	5	0	0						
	Horse Boarding Fee Revenue (+SE)	402						4	5	0	0		
	Billed boarding fees for July.												
24	Miscellaneous Expense (-SE)	568			8	0	0						
	Cash (-A)	100							8	0	0		
	Paid miscellaneous expenses for July.												
31	Interest Expense (-SE)	540			2	0	0						
	Cash (-A)	100							2	0	0		
	Paid interest												
31	Salaries Expense (-SE)	507		1	4	0	0						
	Cash (-A)	100						1	4	0	0		
	Paid salaries for July.												

	31	Accounts Receivable (+A)	103						3	6	0	0										
		Riding and Lesson Fee Revenue (+SE)	404															3	6	0	0	
		Billed riding and lesson fees for July.																				
	31	Dividends (-SE)	320						1	0	0	0										
		Cash (-A)	100															1	0	0	0	
		Paid a dividend to stockholders.																				

**b. GREEN HILLS RIDING STABLE, INCORPORATED**  
**General Ledger**

**Land** *Account No. 100*

Date		Explanation	Post Ref.	Debt				Credit				Balance											
2010 June	30	Balance														7	5	0	0	0	Dr		
July	1	Stockholders' investment	G1	2	5	0	0	0									3	2	5	0	0	Dr	
	1	Buildings	G1					2	4	0	0	0					8	5	0	0	0	Dr	
	8	Accounts payable	G1						8	0	0						7	7	0	0	0	Dr	
	10	Accounts receivable	G1		5	4	0	0										1	3	1	0	0	Dr
	24	Miscellaneous expense	G1						8	0	0						1	2	3	0	0	Dr	
	31	Interest expense	G1						2	0	0						1	2	1	0	0	Dr	
	31	Salaries expense	G1						1	4	0	0					1	0	7	0	0	Dr	
	31	Dividends	G1						1	0	0	0					9	7	0	0	0	Dr	
<b>Accounts Receivable</b>				<i>Account No. 103</i>																			

Date		Explanation	Post Ref.	Debt				Credit				Balance										
2010 June	30	Balance															5	4	0	0	Dr	
July	10	Cash	G1						5	4	0	0						-	0	-		
	15	Horse boarding fees	G1		4	5	0	0										4	5	0	0	Dr
	31	Riding and lessons fees	G1		3	6	0	0										8	1	0	0	Dr
<b>Land</b>				<i>Account No. 130</i>																		

Date		Explanation	Post Ref.	Debt				Credit				Balance									
2010 June	30	Balance														4	0	0	0	0	Dr
<b>Buildings</b>				<i>Account No. 140</i>																	

Date		Explanation	Post Ref.	Debt				Credit				Balance										
2010 July	1	Cash	G1	2	4	0	0	0									2	4	0	0	0	Dr
<b>Accounts Payable</b>				<i>Account No. 200</i>																		

Date		Explanation	Post Ref.	Debt				Credit				Balance										
2010 June	30	Balance																8	0	0	Cr	
July	8	Cash	G1		8	0	0											-	0	-		
	12	Feed expense	G1						1	1	0	0						1	1	0	0	Cr

**General Ledger (continued)**

**Notes Payable** *Account No. 201*

## 2. Recording business transactions

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 June 30	Balance				4 0 0 0 0 Cr

**Capital Stock** *Account No. 300*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 June 30	Balance				1 0 0 0 0 Cr
July 1	Cash	G1		2 5 0 0 0	3 5 0 0 0 Cr

**Retained Earnings** *Account No. 310*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 June 30	Balance				2 1 0 0 0 Cr

**Dividends** *Account No. 320*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 July 31	Cash	G1	1 0 0 0 0		1 0 0 0 0 Dr

**Horse Boarding Fee Revenue** *Account No. 402*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 July 15	Accounts receivable	G1		4 5 0 0 0	4 5 0 0 0 Cr

**Riding and Lesson Fee Revenue** *Account No. 404*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 July 31	Accounts receivable	G1		3 6 0 0 0	3 6 0 0 0 Cr

**General Ledger (concluded)**

**Salaries Expense** *Account No. 507*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 July 31	Cash	G1	1 4 0 0 0		1 4 0 0 0 Dr

**Feed Expense** *Account No. 513*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 July 12	Accounts payable	G1	1 1 0 0 0		1 1 0 0 0 Dr

**Interest Expense** *Account No. 540*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 July 31	Cash	G1	2 0 0 0 0		2 0 0 0 0 Dr

**Miscellaneous Expense** *Account No. 568*

Date	Explanation	Post Ref.	Debt	Credit	Balance
2010 July 24	Cash	G1	8 0 0 0 0		8 0 0 0 0 Dr

**c. GREEN HILLS RIDING STABLE, INCORPORATED**

**Trial Balance**

**2010 July 31**

**Acct.**

<b>No.</b>	<b>Account Title</b>	<b>Debits</b>	<b>Credits</b>
100	Cash	\$ 9,700	
103	Accounts Receivable	8,100	
130	Land	40,000	
140	Buildings	24,000	
200	Accounts Payable		\$ 1,100
201	Notes Payable		40,000
300	Capital Stock		35,000
310	Retained Earnings		2,100
320	Dividends	1,000	
402	Horse Boarding Fee Revenue		4,500
404	Riding and Lesson Fee Revenue		3,600
507	Salaries Expense	1,400	
513	Feed Expense	1,100	
540	Interest Expense	200	
568	Miscellaneous Expense	800	
		<u>\$86,300</u>	<u>\$86,300</u>

### Key terms

**Account** A part of the accounting system used to classify and summarize the increases, decreases, and balances of each asset, liability, stockholders' equity item, dividend, revenue, and expense. The three-column account is normally used. It contains columns for debit, credit, and balance.

**Accounting cycle** A series of steps performed during the accounting period (some throughout the period and some at the end) to analyze, record, classify, summarize, and report useful financial information for the purpose of preparing financial statements.

**Accrual basis of accounting** Recognizes revenues when sales are made or services are performed, regardless of when cash is received. Recognizes expenses as incurred, whether or not cash has been paid out.

**Business transactions** Measurable events that affect the financial condition of a business.

**Chart of accounts** The complete listing of the account titles and account numbers of all of the accounts in the ledger; somewhat comparable to a table of contents.

**Compound journal entry** A journal entry with more than one debit and/or credit.

**Credit** The right side of any account; when used as a verb, to enter a dollar amount on the right side of an account; credits increase liability, stockholders' equity, and revenue accounts and decrease asset, expense, and Dividends accounts.

**Credit balance** The balance in an account when the sum of the credits to the account exceeds the sum of the debits to that account.

**Cross-indexing** The placing of (1) the account number of the ledger account in the general journal and (2) the general journal page number in the ledger account.

**Debit** The left side of any account; when used as a verb, to enter a dollar amount on the left side of an account; debits increase asset, expense, and Dividends accounts and decrease liability, stockholders' equity, and revenue accounts.

**Debit balance** The balance in an account when the sum of the debits to the account exceeds the sum of the credits to that account.

**Double-entry procedure** The accounting requirement that each transaction must be recorded by an entry that has equal debits and credits.

**Horizontal analysis** The calculation of dollar and/or percentage changes in an item on the financial statements from one year to the next.

**Journal** A chronological (arranged in order of time) record of business transactions; the simplest form of journal is the two-column general journal.

## 2. Recording business transactions

**Journal entry** Shows all of the effects of a business transaction as expressed in debit(s) and credit(s) and may include an explanation of the transaction.

**Journalizing** A step in the accounting recording process that consists of entering the effects of a transaction in a journal.

**Ledger** The complete collection of all of the accounts of a company; often referred to as the general ledger.

**Nominal accounts** See temporary accounts.

**Note** An unconditional written promise to pay to another party the amount owed either when demanded or at a certain specified date.

**Permanent accounts (real accounts)** Balance sheet accounts; their balances are not transferred (or closed) to any other account at the end of the accounting period.

**Posting** Recording in the ledger accounts the information contained in the journal.

**Real accounts** See permanent accounts.

**Simple journal entry** An entry with one debit and one credit.

**T-account** An account resembling the letter T, which is used for illustrative purposes only. Debits are entered on the left side of the account, and credits are entered on the right side of the account.

**Temporary accounts (nominal accounts)** They temporarily contain the revenue, expense, and dividend information that is transferred (or closed) to a stockholders' equity account (Retained Earnings) at the end of the accounting period.

**Trial balance** A listing of the ledger accounts and their debit or credit balances to determine that debits equal credits in the recording process.

**Vertical analysis** Shows the percentage that each item in a financial statement is of some significant total such as total assets or sales.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

All of the steps in the accounting cycle are performed only at the end of the accounting period.

A transaction must be journalized in the journal before it can be posted to the ledger accounts.

The left side of any account is the credit side.

Revenues, liabilities, and capital stock accounts are increased by debits.

The dividends account is increased by debits.

If the trial balance has equal debit and credit totals, it cannot contain any errors.

#### Multiple-choice

Select the best answer for each of the following questions.

When the stockholders invest cash in the business:

- Capital Stock is debited and Cash is credited.
- Cash is debited and Dividends is credited.
- Cash is debited and Capital Stock is credited.
- None of the above.

Assume that cash is paid for insurance to cover a three-year period. The recommended debit and credit are:

- Debit Insurance Expense, credit Cash.
- Debit Prepaid Insurance, credit Cash.
- Debit Cash, credit Insurance Expense.
- Debit Cash, credit Prepaid Insurance.

A company received cash from a customer in payment for future delivery services. The correct debit and credit are:

- a. Debit Cash, credit Unearned Delivery Fees.
- b. Debit Cash, credit Delivery Fee Revenue.
- c. Debit Accounts Receivable, credit Delivery Fee Revenue.
- d. None of the above.

A company performed delivery services for a customer for cash. The correct debit and credit are:

- a. Debit Cash, credit Unearned Delivery Fees.
- b. Debit Cash, credit Delivery Fee Revenue.
- c. Debit Accounts Receivable, credit Delivery Fee Revenue.
- d. None of the above.

A cash dividend of USD 500 was declared and paid to stockholders. The correct journal entry is:

a. Capital stock	500	
Cash		500
b. Cash	500	
Dividends		500
c. Dividends	500	
Cash		500
d. Cash	500	
Capital stock		500

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- Describe the steps in recording and posting the effects of a business transaction.
- Give some examples of source documents.
- Define an account. What are the two basic forms (styles) of accounts illustrated in the chapter?
- What is meant by the term double-entry procedure, or duality?
- Describe how you would determine the balance of a T-account.
- Define debit and credit. Name the types of accounts that are:
  - Increased by a debit.
  - Decreased by a debit.
  - Increased by a credit.
  - Decreased by a credit.
- Do you think this system makes sense? Can you conceive of other possible methods for recording changes in accounts?
- Which of the steps in the accounting cycle are performed throughout the accounting period?
- Which of the steps in the accounting cycle are performed only at the end of the accounting period?
- Why are expense and revenue accounts used when all revenues and expenses could be shown directly in the Retained Earnings account?
- What is the purpose of the Dividends account and how is it increased?
- Are the following possibilities conceivable in an entry involving only one debit and one credit? Why?
  - Increase a liability and increase an expense.
  - Increase an asset and decrease a liability.
  - Increase a revenue and decrease an expense.
  - Decrease an asset and increase another asset.

## 2. Recording business transactions

- Decrease an asset and increase a liability.
- Decrease a revenue and decrease an asset.
- Decrease a liability and increase a revenue.
- Describe the nature and purposes of the general journal. What does journalizing mean? Give an example of a compound entry in the general journal.
- Describe a ledger and a chart of accounts. How do these two compare with a book and its table of contents?
- Describe the act of posting. What difficulties could arise if no cross-indexing existed between the general journal and the ledger accounts?
- Which of the following cash payments would involve the immediate recording of an expense? Why?
  - Paid vendors for office supplies previously purchased on account.
  - Paid an automobile dealer for a new company auto.
  - Paid the current month's rent.
  - Paid salaries for the last half of the current month.
- What types of accounts appear in the unadjusted trial balance? What are the purposes of this trial balance?
- You have found that the total of the Debits column of the trial balance of Burns Company is USD 200,000, while the total of the Credits column is USD 180,000. What are some possible causes of this difference? If the difference between the columns is divisible by 9, what types of errors are possible?
- Store equipment was purchased for USD 2,000. Instead of debiting the Store Equipment account, the debit was made to Delivery Equipment. Of what help will the trial balance be in locating this error? Why?
- A student remembered that the side toward the window in the classroom was the debit side of an account. The student took an examination in a room where the windows were on the other side of the room and became confused and consistently reversed debits and credits. Would the student's trial balance have equal debit and credit totals? If there were no existing balances in any of the accounts to begin with, would the error prevent the student from preparing correct financial statements? Why?

### Exercises

**Exercise A** A diagram of the various types of accounts follows. Show where pluses (+) or minuses (-) should be inserted to indicate the effect debits and credits have on each account.

<b>Asset</b>		<b>Accounts =</b>		<b>Liability Accounts</b>		<b>+ Stockholders' Equity Accounts</b>	
Debit	Credit	Debit	Credit	Debit	Credit	Credit	
				<b>Expense and Dividends Accounts Account</b>		<b>Revenue</b>	<b>Accounts</b>
				Debit*	Credit	Debit	Credit*

**Exercise B** Prepare the journal entry required for each of the following transactions:

- a. Cash was received for services performed for customers, USD 1,200.
- b. Services were performed for customers on account, USD 4,200.

**Exercise C** Prepare the journal entry required for each of the following transactions:

- Capital stock was issued for USD 100,000.
- Purchased machinery for cash, USD 30,000.

**Exercise D** Prepare the journal entry required for each of the following transactions:

- Capital stock was issued for USD 200,000 cash.
- A USD 30,000 loan was arranged with a bank. The bank increased the company's checking account by USD 30,000 after management of the company signed a written promise to return the USD 30,000 in 30 days.
- Cash was received for services performed for customers, USD 700.
- Services were performed for customers on account, USD 1,200.

**Exercise E** For each of the following unrelated transactions, give the journal entry to record the transaction. Then show how the journal entry would be posted to T-accounts. You need not include explanations or account numbers.

- Capital stock was issued for USD 100,000 cash.
- Salaries for a period were paid to employees, USD 24,000.
- Services were performed for customers on account, USD 40,000.

**Exercise F** Explain each of the sets of debits and credits in these accounts for Tuxedos, Inc., a company that rents wedding clothing and accessories. There are 10 transactions to be explained. Each set is designated by the small letters to the left of the amount. For example, the first transaction is the issuance of capital stock for cash and is denoted by the letter (a).

<b>Cash</b>		<b>Dividends</b>	
(a) 200,000	(b) 150,000	(e) 1,000	
(d) 1,800	(e) 1,000		
	(f) 600		
	(g) 2,000		
	(i) 30,000		
Bal. 18,200			
<b>Accounts Receivable</b>		<b>Service Revenue</b>	
(c) 1,800	(d) 1,800	(c) 1,800	
(j) 12,000		(j) 12,000	
Bal. 12,000		Bal. 13,800	
<b>Supplies on Hand</b>		<b>Rent Expense</b>	
(b) 150,000	(f) 600		
(i) 30,000			
Bal. 180,000			
<b>Accounts Payable</b>		<b>Delivery Expense</b>	
	(h) 800	(h) 800	
<b>Capital Stock</b>		<b>Salaries Expense</b>	
	(a) 200,000	(g) 2,000	

**Exercise G** Assume the ledger accounts given in the previous problem are those of Tuxedos, Inc., as they appear at 2010 December 31. Prepare the trial balance as of that date.

**Exercise H** Prepare journal entries to record each of the following transactions for Sanchez Company. Use the letter of the transaction in place of the date. Include an explanation for each entry.



## 2. Recording business transactions

- a. Capital stock was issued for cash, USD 300,000.
- b. Purchased trucks by signing a note bearing no interest, USD 210,000.
- c. Earned service revenue on account, USD 4,800.
- d. Collected the account receivable resulting from transaction (c), USD 4,800.
- e. Paid the note payable for the trucks purchased, USD 210,000.
- f. Paid utilities for the month in the amount of USD 1,800.
- g. Paid salaries for the month in the amount of USD 7,500.
- h. Incurred supplies expenses on account in the amount of USD 1,920.
- i. Purchased another truck for cash, USD 48,000.
- j. Performed delivery services on account, USD 24,000.

**Exercise I** Using the data in the previous problem, post the entries to T-accounts. Write the letter of the transaction in the account before the dollar amount. Determine a balance for each account.

**Exercise J** Using your answer for the previous exercise, prepare a trial balance. Assume the date of the trial balance is 2010 March 31.

**Exercise K** John Adams owns and manages a bowling center called Strike Lanes. He also maintains his own accounting records and was about to prepare financial statements for the year 2010. When he prepared the trial balance from the ledger accounts, the total of the debits column was USD 435,000, and the total of the credits column was USD 425,000. What are the possible reasons why the totals of the debits and credits are out of balance? How would you normally proceed to find an error if the two trial balance columns do not agree?

**Exercise L** Refer to the Consolidated Balance Sheets of The Limited in the Annual Report Appendix located in the back of this text. Perform both horizontal and vertical analysis on each of The Limited's asset accounts, treating total assets as a significant total for vertical analysis. comment on the results.

Note: While you can certainly do this exercise with a calculator, computer spreadsheets such as Excel are ideal for this type of analysis.

### Problems

**Problem A** The transactions of Lightning Package Delivery Company for March 2010 follow:

- Mar. 1 The company was organized and issued capital stock for USD 300,000 cash.
- 2 Paid USD 6,000 as the rent for March on a completely furnished building.
- 5 Paid cash for delivery trucks, USD 180,000.
- 6 Paid USD 4,000 as the rent for March on two forklift trucks.
- 9 Paid USD 2,200 for supplies received and used in March.
- 12 Performed delivery services for customers who promised to pay USD 27,000 at a later date.
- 20 Collected cash of USD 4,500 from customers on account (see March 12 entry).
- 21 Received a bill for USD 1,200 for advertising in the local newspaper in March.
- 27 Paid cash for gas and oil consumed in March, USD 450.
- 31 Paid USD 2,400 salaries to employees for March.
- 31 Received an order for services at USD 12,000. The services will be performed in April.
- 31 Paid cash dividend, USD 1,000.

Prepare the journal entries required to record these transactions in the general journal of the company.

**Problem B** Economy Laundry Company had the following transactions in August 2010:

- Aug. 1 Issued capital stock for cash, USD 150,000.
- 3 Borrowed USD 40,000 from the bank on a note.
- 4 Purchased cleaning equipment for USD 25,000 cash.
- 6 Performed services for customers who promised to pay later, USD 16,000.
- 7 Paid this month's rent on a building, USD 2,800.
- 10 Collections were made for the services performed on August 6, USD 3,200.
- 14 Supplies were purchased on account for use this month, USD 3,000.
- 17 A bill for USD 400 was received for utilities for this month.
- 25 Laundry services were performed for customers who paid immediately, USD 22,000.
- 31 Paid employee salaries, USD 6,000.
- 31 Paid cash dividend, USD 2,000.

- a. Prepare journal entries for these transactions.
- b. Post the journal entries to T-accounts. Enter the account number in the Posting Reference column of the journal as you post each amount. Use the following account numbers:

No.	Acct.	Account Title
100		Cash
103		Accounts receivable
170		Equipment
200		Accounts payable
201		Notes payable
300		Capital stock
320		Dividends
400		Service revenue
507		Salaries expense
511		Utilities expense
515		Rent expense
518		Supplies expense

- c. Prepare a trial balance as of 2010 August 31.

**Problem C** Clean-Sweep Janitorial, Inc., a company providing janitorial services, was organized 2010 July 1. The following account numbers and titles constitute the chart of accounts for the company:

No.	Acct.	Account Title
100		Cash
103		Accounts receivable
150		Trucks
160		Office equipment
170		Equipment
200		Accounts payable
201		Notes payable
300		Capital stock
310		Retained earnings
320		Dividends
400		Service revenue
506		Gas and oil expense
507		Salaries expense
511		Utilities expense
512		Insurance expense
515		Rent expense
518		Supplies expense

- July 1 The company issued USD 600,000 of capital stock for cash.
- 5 Office space was rented for July, and USD 5,000 was paid for the rental.
- 8 Desks and chairs were purchased for the office on account, USD 28,800.

## 2. Recording business transactions

10 Equipment was purchased for USD 50,000; a note was given, to be paid in 30 days.

15 Purchased trucks for USD 150,000, paying USD 120,000 cash and giving a 60-day note to the dealer for USD 30,000.

July 18 Paid for supplies received and already used, USD 2,880.

23 Received USD 17,280 cash as service revenue.

27 Insurance expense for July was paid, USD 4,500.

30 Paid for gasoline and oil used by the truck in July, USD 576.

31 Billed customers for janitorial services rendered, USD 40,320.

31 Paid salaries for July, USD 51,840.

31 Paid utilities bills for July, USD 5,280.

31 Paid cash dividends, USD 9,600.

a. Prepare general ledger accounts for all of these accounts except Retained Earnings. The Retained Earnings account has a beginning balance of zero and maintains this balance throughout the period.

b. Journalize the transactions given for July 2010 in the general journal.

c. Post the journal entries to ledger accounts.

d. Prepare a trial balance as of 2010 July 31.

**Problem D** Trim Lawn, Inc., is a lawn care company. Thus, the company earns its revenue from sending its trucks to customers' residences and certain commercial establishments to care for lawns and shrubbery. Trim Lawn's trial balance at the end of the first 11 months of the year follows:

### TRIM LAWN, INC.

#### Trial Balance

2010 November 30

#### Acct.

No.	Account Title	Debits	Credits
100	Cash	\$ 63,740	
103	Accounts Receivable	88,600	
150	Trucks	102,900	
160	Office Furniture	8,400	
200	Accounts Payable		\$ 33,600
300	Capital Stock		30,000
310	Retained Earnings, 2010 January 1		30,540
400	Service Revenue		371,010
505	Advertising Expense	18,300	
506	Gas and Oil Expense	21,900	
507	Salaries Expense	65,850	
511	Utilities Expense	2,310	
515	Rent Expense	15,000	
518	Supplies Expense	75,600	
531	Entertainment Expense	2,550	
		<u>\$465,150</u>	<u>\$465,150</u>

Dec. 2 Paid rent for December, USD 3,000.

5 Paid the accounts payable of USD 33,600.

8 Paid advertising for December, USD 1,500.

10 Purchased a new office desk on account, USD 1,050.

13 Purchased USD 240 of supplies on account for use in December.

15 Collected cash from customers on account, USD 75,000.

20 Paid for customer entertainment, USD 450.

24 Collected an additional USD 6,000 from customers on account.

26 Paid for gasoline used in the trucks in December, USD 270.

28 Billed customers for services rendered, USD 79,500.

30 Paid for more December supplies, USD 12,000.

31 Paid December salaries, USD 15,300.

31 Paid a USD 4,000 cash dividend. (The Dividends account is No. 320.)

a. Open three-column general ledger accounts for each of the accounts in the trial balance under the date of 2010 December 1. Place the word Balance in the explanation space of each account. Also open an account for Dividends, No. 320.

b. Prepare entries in the general journal for the preceding transactions for December 2010.

c. Post the journal entries to three-column general ledger accounts.

d. Prepare a trial balance as of 2010 December 31.

**Problem E** Marc Miller prepared the following trial balance from the ledger of the Quick-Fix TV Repair Company. The trial balance did not balance.

**QUICK-FIX REPAIR COMPANY**

**Trial Balance**

**2010 December 31**

**Acct.**

No.	Account Title	Debits	Credits
100	Cash	\$ 69,200	
103	Accounts Receivable	60,800	
160	Office Furniture	120,000	
172	Office Equipment	48,000	
200	Accounts Payable		\$ 32,400
300	Capital Stock		180,000
310	Retained Earnings		80,000
320	Dividends	28,800	
400	Service Revenue		360,000
507	Salaries Expense	280,000	
515	Rent Expense	40,000	
568	Miscellaneous Expense	7,200	
		<u>\$654,000</u>	<u>\$652,400</u>

The difference in totals in the trial balance caused Miller to carefully examine the company's accounting records. In searching back through the accounting records, Miller found that the following errors had been made:

- One entire entry that included a USD 10,000 debit to Cash and a USD 10,000 credit to Accounts Receivable was never posted.
- In computing the balance of the Accounts Payable account, a credit of USD 3,200 was omitted from the computation.
- In preparing the trial balance, the Retained Earnings account balance was shown as USD 80,000. The ledger account has the balance at its correct amount of USD 83,200.

## 2. Recording business transactions

- One debit of USD 2,400 to the Dividends account was posted as a credit to that account.
- Office equipment of USD 12,000 was debited to Office Furniture when purchased.

Prepare a corrected trial balance for the Quick-Fix TV Repair Company as of 2010 December 31. Also, write a description of the effect(s) of each error.

### Alternate problems

**Alternate problem A** Speedy Laundry Company, Inc., entered into the following transactions in August 2010:

Aug. 1 Received cash for capital stock issued to owners, USD 400,000.

3 Paid rent for August on a building and laundry equipment rented, USD 3,000.

6 Performed laundry services for USD 2,000 cash.

8 Secured an order from a customer for laundry services of USD 7,000. The services are to be performed next month.

13 Performed laundry services for USD 6,300 on account for various customers.

15 Received and paid a bill for USD 430 for supplies used in operations.

23 Cash collected from customers on account, USD 2,600.

31 Paid USD 2,400 salaries to employees for August.

31 Received the electric and gas bill for August, USD 385, but did not pay it at this time.

31 Paid cash dividend, USD 1,000.

Prepare journal entries for these transactions in the general journal.

**Alternate problem B** The transactions listed below are those of Reliable Computer Repair, Inc., for April 2010:

Apr. 1 Cash of USD 500,000 was received for capital stock issued to the owners.

3 Rent was paid for April, USD 3,500.

6 Trucks were purchased for USD 56,000 cash.

7 Office equipment was purchased on account from Wagner Company for USD 76,800.

14 Salaries for first two weeks were paid, USD 12,000.

15 USD 28,000 was received for services performed.

18 An invoice was received from Roger's Gas Station for USD 400 for gas and oil used during April.

23 A note was arranged with the bank for USD 80,000. The cash was received, and a note promising to return the USD 80,000 on 2010 May 30, was signed.

29 Purchased trucks for USD 73,600 by signing a note.

30 Salaries for the remainder of April were paid, USD 14,400.

a. Prepare journal entries for these transactions.

b. Post the journal entries to T-accounts. Enter the account number in the Posting Reference column of the journal as you post each amount. Use the following account numbers:

No.	Acct.	Account Title
100		Cash
150		Trucks
172		Office equipment
200		Accounts payable
201		Notes payable
300		Capital stock
400		Service revenue

506	Gas and oil expense
507	Salaries expense
515	Rent expense

c. Prepare a trial balance as of 2010 April 30.

**Alternate problem C** Rapid Pick Up & Delivery, Inc., was organized 2010 January 1. Its chart of accounts is as follows:

<b>Acct. No.</b>	<b>Account title</b>
100	Cash
103	Accounts receivable
150	Trucks
160	Office furniture
172	Office equipment
200	Accounts payable
201	Notes payable
300	Capital stock
310	Retained earnings
400	Service revenue
506	Gas and oil expense
507	Salaries expense
511	Utilities expense
512	Insurance expense
515	Rent expense
530	Repairs expense

Jan. 1 The company received USD 560,000 cash and USD 240,000 of office furniture in exchange for USD 800,000 of capital stock.

2 Paid garage rent for January, USD 6,000.

4 Purchased computers on account, USD 13,200.

6 Purchased delivery trucks for USD 280,000; payment was made by giving cash of USD 150,000 and a 30-day note for the remainder.

Jan 12 Purchased insurance for January on the delivery trucks. The cost of the policy, USD 800, was paid in cash.

15 Received and paid January utilities bills, USD 960.

15 Paid salaries for first half of January, USD 3,600.

17 Cash received for delivery services to date amounted to USD 1,800.

20 Received bill for gasoline purchased and used in January, USD 180.

23 Purchased delivery trucks for cash, USD 108,000.

25 Cash sales of delivery services were USD 2,880.

27 Purchased a copy machine on account, USD 3,600.

31 Paid salaries for last half of January, USD 4,800.

31 Sales of delivery services on account amounted to USD 11,400.

31 Paid for repairs to a delivery truck, USD 1,120.

a. Prepare general ledger accounts for all these accounts except Retained Earnings. The Retained Earnings account has a beginning balance of zero and maintains this balance throughout the period.

b. Journalize the transactions given for 2010 January in the general journal.

c. Post the journal entries to ledger accounts.

d. Prepare a trial balance as of 2010 January 31.

## 2. Recording business transactions

**Alternate problem 4** The trial balance of California Tennis Center, Inc., at the end of the first 11 months of its fiscal year follows:

<b>CALIFORNIA TENNIS CENTER, INC.</b>			
<b>Trial Balance</b>			
<b>2010 November 30</b>			
<b>Acct.</b>			
<b>No.</b>	<b>Account Title</b>	<b>Debits</b>	<b>Credits</b>
100	Cash	\$71,180	
103	Accounts Receivable	81,750	
130	Land	60,000	
200	Accounts Payable		\$18,750
201	Notes Payable		15,000
300	Capital Stock		50,000
310	Retained Earnings, 2010 January 1		53,700
413	Membership and Lesson Revenue		202,500
505	Advertising Expense	21,000	
507	Salaries Expense	66,000	
511	Utilities Expense	2,100	
515	Rent Expense	33,000	
518	Supplies Expense	2,250	
530	Repairs Expense	1,500	
531	Entertainment Expense	870	
540	Interest Expense	300	
		\$339,950	\$339,950

Dec. 1 Paid building rent for December, USD 4,000.

2 Paid vendors on account, USD 18,000.

5 Purchased land for cash, USD 10,000.

7 Sold memberships on account for December, USD 27,000.

10 Paid the note payable of USD 15,000, plus interest of USD 150.

13 Cash collections from customers on account, USD 36,000.

19 Received a bill for repairs, USD 225.

24 Paid the December utilities bill, USD 180.

28 Received a bill for December advertising, USD 1,650.

29 Paid the equipment repair bill received on the 19th, USD 225.

30 Gave tennis lessons for cash, USD 4,500.

30 Paid salaries, USD 6,000.

30 Sales of memberships on account since December 7, USD 18,000 (for the month of December).

30 Costs paid in entertaining customers in December, USD 350.

30 Paid dividends of USD 1,500. (The Dividends account is No. 320.)

a. Open three-column general ledger accounts for each of the accounts in the trial balance. Place the word Balance in the explanation space and enter the date 2010 December 1, on this same line. Also open an account for Dividends, No. 320.

b. Prepare entries in the general journal for the transactions during December 2010.

c. Post the journal entries to ledger accounts.

d. Prepare a trial balance as of 2010 December 31.

**Alternate problem E** Bill Baxter prepared a trial balance for Special Party Rentals, Inc., a company that rents tables, chairs, and other party supplies. The trial balance did not balance. The trial balance he prepared was as follows:

<b>SPECIAL PARTY RENTALS, INC.</b>				
<b>Trial Balance</b>				
<b>2010 December 31</b>				
<b>Acct. No.</b>	<b>Account Title</b>	<b>Debits</b>	<b>Credits</b>	
100	Cash	\$ 74,000		
103	Accounts Receivable	50,800		
170	Equipment	160,000		
200	Accounts Payable		\$ 34,000	
300	Capital Stock		130,000	
310	Retained Earnings		44,000	
320	Dividends	16,000		
400	Service Revenue		432,000	
505	Advertising Expense	1,200		
507	Salaries Expense	176,000		
511	Utilities Expense	44,800		
515	Rent Expense	64,000		
		\$ 586,800	\$ 640,000	

In trying to find out why the trial balance did not balance, Baxter discovered the following errors:

Equipment was understated (too low) by USD 12,000 because of an error in addition in determining the balance of that account in the ledger.

A credit of USD 4,800 to Accounts Receivable in the journal was not posted to the ledger account at all.

A debit of USD 16,000 for a semiannual dividend was posted as a credit to the Capital Stock account.

The balance of USD 12,000 in the Advertising Expense account was entered as USD 1,200 in the trial balance.

Miscellaneous Expense (Account No. 568), with a balance of USD 3,200, was omitted from the trial balance.

Prepare a corrected trial balance as of 2010 December 31. Also, write a description of the effect(s) of each error.

#### Beyond the numbers—Critical thinking

**Business decision case A** John Jacobs lost his job as a carpenter with a contractor when a recession hit the construction industry. Jacobs had been making USD 50,000 per year. He decided to form his own company, Jacobs Corporation, and do home repairs.

The following is a summary of the transactions of the business during the first three months of operations in 2010:

Jan. 15 Stockholders invested USD 40,000 in the business.

Feb. 25 Received payment of USD 4,400 for remodeling a basement into a recreation room. The homeowner purchased all of the building materials.

Mar. 5 Paid cash for an advertisement that appeared in the local newspaper, USD 150.

Apr. 10 Received USD 7,000 for converting a room over a garage into an office for a college professor. The professor purchased all of the materials for the job.

11 Paid gas and oil expenses for automobile, USD 900.



## 2. Recording business transactions

12 Miscellaneous business expenses were paid, USD 450.

15 Paid dividends of USD 2,000.

- a. Prepare journal entries for these transactions.
- b. Post the journal entries to T-accounts.
- c. How profitable is this new venture? Should Jacobs stay in this business?

**Annual report analysis B** Refer to the Annual Report of The Limited, Inc. in the Annual Report Appendix. Perform horizontal and vertical analyses of the liabilities and stockholder's equity sections of the balance sheets for the two most recent years shown. Horizontal analysis involves showing the dollar amount and percentage increase or decrease of the latest year over the preceding year amounts. Vertical analysis involves showing the percentage of total liabilities and stockholder's equity that each account represents as of the balance sheet dates. Write comments on any important changes between the two years that are evidence of decisions made by management.

**Annual report analysis C** In The Home Depot's recent Annual Report, the following passages appear:

The primary key to our success is our 39,000 employees who wear those orange aprons you see in our stores.

Few great achievements—in business or in any aspect of life—are reached and sustained without the support and involvement of large numbers of people committed to shared values and goals they deem worthy. Indeed, one need look no further than the business section of the morning newspaper to read of how yet another "blue chip" American business, entrenched in and isolated by its own bureaucracy, has lost the support of its employees and customers...

Frankly, the biggest difference between The Home Depot and our competitors is not the products on our shelves, it is our people and their ability to forge strong bonds of loyalty and trust with our customers...

...Contrary to conventional management wisdom, those at the top of organization charts are not the source of all wisdom. Many of our best ideas come from the people who work on the sales floor. We encourage our employees to challenge senior management directives if they feel strongly enough about their dissenting opinions...

...We want our people to be themselves and to be bold enough to apply their talents as individuals. Certainly, people can often perceive great risk acting this way. Thus, we go to great lengths to empower our employees to be mavericks, to express differences of opinion without fear of being fired or demoted...We do everything we can to make people feel challenged and inspired at work instead of being threatened and made to feel insecure. An organization can, after all, accomplish more when people work together instead of against each other.

Write answers to the following questions:

- a. Do you think The Home Depot management regards its employees more as expenses or assets? Explain.
- b. What does The Home Depot regard as its most valuable asset? Explain your answer.
- c. Is The Home Depot permitted to list its human resources as assets on its balance sheet? Why or why not?
- d. Could its philosophy regarding its employees be the major factor in its outstanding financial performance?

Explain.

**Ethics case – Writing experience D** Refer to "An ethical perspective: Financial deals, Inc.". Write out the answers to the following questions:

- a. What motivated Larry to go along with unethical and illegal actions? Explain.
- b. What are Larry's options now? List each possibility.

- c. What would you do if you were Larry? Describe in detail.
- d. What do you think the real Larry did? Describe in detail.

**Group project E** In teams of two or three students, interview in person or by speakerphone a new staff member who has worked for a CPA firm for only one or two years. Seek information on the advantages and disadvantages of working for a CPA firm. Also, inquire about the nature of the work and the training programs offered by the firm for new employees. As a team, write a memorandum to the instructor summarizing the results of the interview. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project F** With one or two other students and using library resources, write a report on the life of Luca Pacioli, sometimes referred to as the father of accounting. Pacioli was a Franciscan monk who wrote a book on double-entry accounting in 1494. Be careful to cite sources and treat direct quotes properly. (If you do not know how to do this, ask your instructor.)

#### Using the Internet—A view of the real world

Visit the following website:

<http://www.roberthalf.com>

Click on Job Seekers. Read the information and write a memo to your instructor about your search and what you learned about certain jobs in accounting.

Visit the following website:

<http://www.sec.gov>

Investigate this site for anything of interest. Write a memo to your instructor about your search.

#### Answers to self-test

##### True-false

**False.** Only the last five steps are performed at the end of the period. The first three steps are performed throughout the accounting period.

**True.** The journal is the book of original entry. Any amounts appearing in a ledger account must have been posted from the journal.

**False.** The left side of any account is the debit side.

**False.** These accounts are all increased by credits.

**True.** Since dividends reduce stockholders' equity, the Dividends account is increased by debits.

**False.** An entire journal entry may not have been posted, or a debit or credit might have been posted to the wrong account.

##### Multiple-choice

**c.** An asset, Cash, is increased by a debit, and the Capital Stock account is increased by a credit.

**b.** Since the insurance covers more than the current accounting period, an asset is debited instead of an expense. The credit is to Cash.

**a.** The receipt of cash before services are performed creates a liability, Unearned Delivery Fees. To increase a liability, it is credited. Cash is debited to increase its balance.

**b.** Cash is increased by the debit, and Delivery Service Revenue is increased by the credit.

**c.** Dividends is increased by the debit, and Cash is decreased by the credit.

# 3. Adjustments for financial reporting

## Learning objectives

- Describe the basic characteristics of the cash basis and the accrual basis of accounting.
- Identify the reasons why adjusting entries must be made.
- Identify the classes and types of adjusting entries.
- Prepare adjusting entries.
- Determine the effects of failing to prepare adjusting entries.
- Analyze and use the financial results and trend percentages.

## A career as a tax specialist

While most students are aware that accountants frequently assist their clients with tax returns and other tax issues, few are aware of the large number of diverse and challenging careers available in the field of taxation. Nearly all public accounting firms, ranging from the “Big 4” international firms to the sole practitioner, generate a significant portion of their fees through tax compliance, planning and consulting. With over 155 million individual tax returns filed in the US every year, it is not surprising that many individuals and most businesses need assistance in dealing with the incredibly complex US and international tax laws. This complexity also provides tremendous tax planning opportunities. As a tax specialist, you will show individual clients how to reduce their taxes while simultaneously helping them make decisions about investing, buying a house, funding their children’s education, and planning their retirement. For your business clients, careful planning and structuring of business investments and transactions can save millions of dollars in taxes. In fact, it is safe to say that very few significant business transactions take place without the careful guidance of a tax specialist.

A career in taxation is by no means limited to public accounting. Because there are so many types of taxes impacting so many aspects of our lives, tax specialists act as consultants in a large number of fields. For example, many companies offer deferred compensation or stock bonus plans to their executives. Nearly all companies provide some sort of pension or other retirement plan for their employees, as well as health care benefits. Significant tax savings can be generated for both the company and their employees if these benefits are structured correctly. In response to the amazing complexity of our tax laws, many schools offer masters degrees specializing in tax. Such a degree is not required to specialize in tax, but does offer students a significant advantage if they want to pursue a career in taxation. In a recent survey of 1,400 chief financial officers, the top two responses to the question “which one of the following areas of specialization would you recommend to someone just beginning his or her career in accounting?” were personal financial planning and tax accounting. These responses reflect the indisputable fact that as the US demographic includes more wealthy, and older, Americans than ever before, professional tax guidance will be in ever-increasing demand.

### 3. Adjustments for financial reporting

The career paths outlined above do not nearly cover all of the many professional options available to tax specialists. For example, are you concerned that a traditional tax accounting job may be too tame for you? Special agents of the IRS routinely participate in criminal investigations and arrests, working closely with other federal law enforcement agencies. Are you interested in law? Accounting offers an ideal undergraduate degree for aspiring business and tax attorneys. If you think you may be interested in a career as a tax specialist, be sure to consult with one of your school's tax professors about the many job opportunities this field provides.

Chapters 1 and 2 introduced the accounting process of analyzing, classifying, and summarizing business transactions into accounts. You learned how these transactions are entered into the journal and posted to the ledger accounts. You also know how to use the trial balance to test the equality of debits and credits in the journalizing and posting process. The purpose of the accounting process is to produce accurate financial statements so they may be used for making sound business decisions. At this point in your study of accounting, you are concentrating on three financial statements—the income statement, the statement of retained earnings, and the balance sheet. Detailed coverage of the statement of cash flows appears in Chapter 16.

When you began to analyze business transactions in Chapter 1, you saw that the evidence of the transaction is usually a source document. It is any written or printed evidence that describes the essential facts of a business transaction. Examples are receipts for cash paid or received, checks written or received, bills sent to customers, or bills received from suppliers. The giving, receiving, or creating of source documents triggered the journal entries made in Chapter 2.

The journal entries we discuss in this chapter are *adjusting entries*. The arrival of the end of the accounting period triggers adjusting entries. Accountants use adjusting entries to bring accounts to their proper balances before preparing financial statements. In this chapter, you learn the difference between the cash basis and accrual basis of accounting. Then you learn about the classes and types of adjusting entries and how to prepare them.

#### Cash versus accrual basis accounting

Professionals such as physicians and lawyers and some relatively small businesses may account for their revenues and expenses on a cash basis. The **cash basis of accounting** recognizes revenues when cash is received and recognizes expenses when cash is paid out. For example, under the cash basis, a company would treat services rendered to clients in 2010 for which the company collected cash in 2011 as 2011 revenues. Similarly, under the cash basis, a company would treat expenses incurred in 2010 for which the company disbursed cash in 2011 as 2011 expenses. Under the “pure” cash basis, even the purchase of a building would be debited to an expense. However, under the “modified” cash basis, the purchase of long-lived assets (such as a building) would be debited to an asset and depreciated (gradually charged to expense) over its useful life. Normally the “modified” cash basis is used by those few individuals and small businesses that use the cash basis.

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	<b>Cash Basis</b>	<b>Accrual Basis</b>
Revenues are recognized	As cash is received	As earned (goods are delivered or services are performed)
Expenses are recognized	As cash is paid	As incurred to produce revenues

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Exhibit 14: Cash basis and accrual basis of accounting compared

Because the cash basis of accounting does not match expenses incurred and revenues earned, it is generally considered theoretically unacceptable. The cash basis is acceptable in practice only under those circumstances when it approximates the results that a company could obtain under the accrual basis of accounting. Companies using the cash basis do not have to prepare any adjusting entries unless they discover they have made a mistake in preparing an entry during the accounting period. Under certain circumstances, companies may use the cash basis for income tax purposes.

Throughout the text we use the accrual basis of accounting, which matches expenses incurred and revenues earned, because most companies use the accrual basis. The **accrual basis of accounting** recognizes revenues when sales are made or services are performed, regardless of when cash is received. Expenses are recognized as incurred, whether or not cash has been paid out. For instance, assume a company performs services for a customer on account. Although the company has received no cash, the revenue is recorded at the time the company performs the service. Later, when the company receives the cash, no revenue is recorded because the company has already recorded the revenue. Under the accrual basis, adjusting entries are needed to bring the accounts up to date for unrecorded economic activity that has taken place. In Exhibit 14, shown below, we show when revenues and expenses are recognized under the cash basis and under the accrual basis.

### The need for adjusting entries

The income statement of a business reports all revenues earned and all expenses incurred to generate those revenues during a given period. An income statement that does not report all revenues and expenses is incomplete, inaccurate, and possibly misleading. Similarly, a balance sheet that does not report all of an entity's assets, liabilities, and stockholders' equity at a specific time may be misleading. Each adjusting entry has a dual purpose: (1) to make the income statement report the proper revenue or expense and (2) to make the balance sheet report the proper asset or liability. Thus, every adjusting entry affects at least one income statement account and one balance sheet account.

January	30
February	9
March	16
April	8
May	18
June	49
July	8
August	14
September	42
October	17
November	13
<b>Subtotal</b>	<b>224</b>
December	376
<b>Total Companies</b>	<b>600</b>

Source' American Institute of Certified Public Accountants

Accounting Trends & Techniques (New York' AICPA, 2004) p39

#### Exhibit 15: Summary-fiscal year ending by month

Since those interested in the activities of a business need timely information, companies must prepare financial statements periodically. To prepare such statements, the accountant divides an entity's life into time periods. These time periods are usually equal in length and are called *accounting periods*. An **accounting period** may be one month, one quarter, or one year. An **accounting year**, or fiscal year, is an accounting period of one year. A **fiscal year** is any 12 consecutive months. The fiscal year may or may not coincide with the **calendar year**, which ends on December 31. As we show in Exhibit 15, 63 per cent of the companies surveyed in 2004 had fiscal years that coincide with the calendar year. In 2008, the comparable figure for publicly-traded companies in the US was 65 per cent. Companies in certain industries often have a fiscal year that differs from the calendar year. For instance many

### 3. Adjustments for financial reporting

retail stores end their fiscal year on January 31 to avoid closing their books during their peak sales period. Other companies select a fiscal year ending at a time when inventories and business activity are lowest.

Periodic reporting and the matching principle necessitate the preparation of *adjusting entries*. **Adjusting entries** are journal entries made at the end of an accounting period or at any time financial statements are to be prepared to bring about a proper *matching* of revenues and expenses. The **matching principle** requires that expenses incurred in producing revenues be deducted from the revenues they generated during the accounting period. The matching principle is one of the underlying principles of accounting. This matching of expenses and revenues is necessary for the income statement to present an accurate picture of the profitability of a business. Adjusting entries reflect unrecorded economic activity that has taken place but has not yet been recorded. Why has the company not recorded this activity by the end of the period? One reason is that it is more convenient and economical to wait until the end of the period to record the activity. A second reason is that no source document concerning that activity has yet come to the accountant's attention.

Adjusting entries bring the amounts in the general ledger accounts to their proper balances before the company prepares its financial statements. That is, adjusting entries convert the amounts that are actually in the general ledger accounts to the amounts that should be in the general ledger accounts for proper financial reporting. To make this conversion, the accountants analyze the accounts to determine which need adjustment. For example, assume a company purchased a three-year insurance policy costing USD 600 at the beginning of the year and debited USD 600 to Prepaid Insurance. At year-end, the company should remove USD 200 of the cost from the asset and record it as an expense. Failure to do so misstates assets and net income on the financial statements.

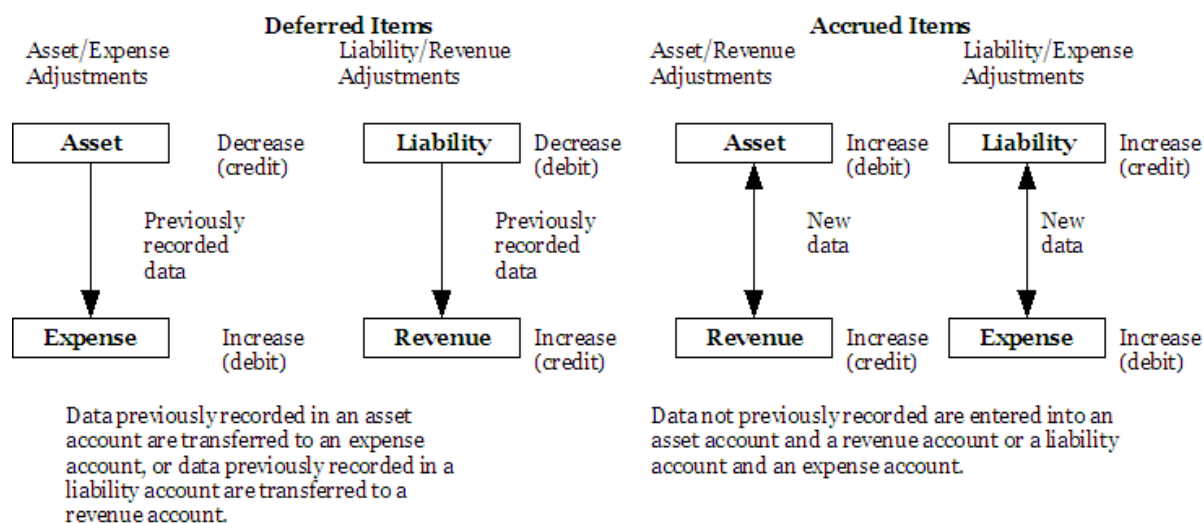


Exhibit 16: Two classes and four types of adjusting entries

Companies continuously receive benefits from many assets such as prepaid expenses (e.g. prepaid insurance and prepaid rent). Thus, an entry could be made daily to record the expense incurred. Typically, firms do not make the entry until financial statements are to be prepared. Therefore, if monthly financial statements are prepared, monthly adjusting entries are required. By custom, and in some instances by law, businesses report to their owners at least annually. Accordingly, adjusting entries are required at least once a year. Remember, however, that the entry transferring an amount from an asset account to an expense account should transfer only the asset cost that has expired.

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## An accounting perspective:

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### Uses of technology

Eventually, computers will probably enter adjusting entries continuously on a real-time basis so that up-to-date financial statements can be printed at any time without prior notice. Computers will be fed the facts concerning activities that would normally result in adjusting entries and instructed to seek any necessary information from their own databases or those of other computers to continually adjust the accounts.

### Classes and types of adjusting entries

Adjusting entries fall into two broad classes: deferred (meaning to postpone or delay) items and accrued (meaning to grow or accumulate) items. **Deferred items** consist of adjusting entries involving data previously recorded in accounts. These entries involve the transfer of data already recorded in asset and liability accounts to expense and revenue accounts, respectively. **Accrued items** consist of adjusting entries relating to activity on which no data have been previously recorded in the accounts. These entries involve the initial, or first, recording of assets and liabilities and the related revenues and expenses (see Exhibit 16).

Deferred items consist of two types of adjusting entries: asset/expense adjustments and liability/revenue adjustments. For example, prepaid insurance and prepaid rent are assets until they are used up; then they become expenses. Also, unearned revenue is a liability until the company renders the service; then the unearned revenue becomes earned revenue.

Accrued items consist of two types of adjusting entries: asset/revenue adjustments and liability/expense adjustments. For example, assume a company performs a service for a customer but has not yet billed the customer. The accountant records this transaction as an asset in the form of a receivable and as revenue because the company has earned a revenue. Also, assume a company owes its employees salaries not yet paid. The accountant records this transaction as a liability and an expense because the company has incurred an expense.

### 3. Adjustments for financial reporting

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**MICROTRAIN COMPANY**

**Trial Balance**

**2010 December 31**

**Acct.**

<b>No.</b>	<b>Account Title</b>	<b>Debits</b>	<b>Credits</b>
100	Cash	\$ 8,250	
103	Accounts Receivable	5,200	
107	Supplies on Hand	1,400	
108	Prepaid Insurance	2,400	
112	Prepaid Rent	1,200	
150	Trucks	40,000	
200	Accounts Payable		\$ 730
216	Unearned Service Fees		4,500
300	Capital Stock		50,000
320	Dividends	3,000	
400	Service Revenue		10,700
505	Advertising Expense	50	
506	Gas and Oil Expense	680	
507	Salaries Expense	3,600	
511	Utilities Expense	150	\$65,930
		<u>\$65,930</u>	

**Exhibit 17: Trial balance**

In this chapter, we illustrate each of the four types of adjusting entries: asset/expense, liability/revenue, asset/revenue, and liability/expense. Look at Exhibit 17, the trial balance of the MicroTrain Company at 2010 December 31. As you can see, MicroTrain must adjust several accounts before it can prepare accurate financial statements. The adjustments for these accounts involve data already recorded in the company's accounts.

In making adjustments for MicroTrain Company, we must add several accounts to the company's chart of accounts shown in Chapter 2. These new accounts are:

<b>Type of Account</b>	<b>Acct. No.</b>	<b>Account Title</b>	<b>Description</b>
Asset	121	Interest Receivable	The amount of interest earned but not yet received.
Contra asset*	206	Accumulated Depreciation—Trucks	The total depreciation expense taken on trucks since the acquisition date. The balance of this account is deducted from that of Trucks on the balance sheet.
Liability	206	Salaries Payable	The amount of salaries earned by employees but not yet paid by the company.
Revenue	418	Interest Revenue	The amount of interest earned in the current period.
Expenses	512	Insurance Expense	The cost of insurance incurred in the current period.
	515	Rent Expense	The cost of rent incurred in the current period.
	518	Supplies Expense	The cost of supplies used in the current period.
	521	Depreciation Expense—Trucks	The portion of the cost of the trucks assigned to expense during the current period.

\*Accountants deduct the balance of a contra asset from the balance of the related reasons for using a contra asset account later in the chapter.

asset account on the balance sheet. We explain the

Now you are ready to follow as MicroTrain Company makes its adjustments for deferred items. If you find the process confusing, review the beginning of this chapter so you clearly understand the purpose of adjusting entries.



## An accounting perspective:

### Uses of technology

It is difficult to name a publicly owned company that does not provide an extensive website. In fact, websites have become an important link between companies and their investors. Most websites will have a link titled investor relations or merely company information which provides a wealth of financial information ranging from audited financial statements to charts of the company's stock prices. As an example, check out the Gap, Inc's website at:

<http://www.gapinc.com>

Browse the Gap site and see for yourself the comprehensiveness of the financial information available there.

### Adjustments for deferred items

This section discusses the two types of adjustments for deferred items: asset/expense adjustments and liability/revenue adjustments. In the asset/expense group, you learn how to prepare adjusting entries for prepaid expenses and depreciation. In the liability/revenue group, you learn how to prepare adjusting entries for unearned revenues.

MicroTrain Company must make several asset/expense adjustments for prepaid expenses. A **prepaid expense** is an asset awaiting assignment to expense, such as prepaid insurance, prepaid rent, and supplies on hand. Note that the nature of these three adjustments is the same.

**Prepaid insurance** When a company pays an insurance policy premium in advance, the purchase creates the asset, *prepaid insurance*. This advance payment is an asset because the company will receive insurance coverage in the future. With the passage of time, however, the asset gradually expires. The portion that has expired becomes an expense. To illustrate this point, recall that in Chapter 2, MicroTrain Company purchased for cash an insurance policy on its trucks for the period 2010 December 1, to 2011 November 30. The journal entry made on 2010 December 1, to record the purchase of the policy was:

2010									
Dec.	1	Prepaid Insurance		2,400					
		Cash			2,400				
		Purchased truck insurance to cover a one-year period.							

The two accounts relating to insurance are Prepaid Insurance (an asset) and Insurance Expense (an expense). After posting this entry, the Prepaid Insurance account has a USD 2,400 debit balance on 2010 December 1. The Insurance Expense account has a zero balance on 2010 December 1, because no time has elapsed to use any of the policy's benefits.

<i>(Dr.)</i>	<b>Prepaid Insurance</b>	<i>(Cr)</i>	<i>(Dr.)</i>	<b>Insurance Expense</b>	<i>(Cr)</i>
2010			2010		
Dec. 1			Dec. 1		
Bal.	2,400		Bal.	-0-	

### 3. Adjustments for financial reporting

By 2010 December 31, one month of the year covered by the policy has expired. Therefore, part of the **service potential** (or benefit obtained from the asset) has expired. The asset now provides less future services or benefits than when the company acquired it. We recognize this reduction by treating the cost of the services received from the asset as an expense. For the MicroTrain Company example, the service received was one month of insurance coverage. Since the policy provides the same services for every month of its one-year life, we assign an equal amount (USD 200) of cost to each month. Thus, MicroTrain charges  $\frac{1}{12}$  of the annual premium to Insurance Expense on 2010 December 31. The adjusting journal entry is:

2010					
Dec.	31	Insurance Expense	200		Adjustment 1—Insurance
		Prepaid Insurance		200	
		To record insurance expense for December.			

After posting these two journal entries, the accounts in T-account format appear as follows:

<i>(Dr.)</i>		<b>Prepaid Insurance</b>	<i>(Cr)</i>	
2010			2010	
Dec. 1	Purchased on account 2,400		Dec. 31	Adjustment 1    200
				Decreased by \$200
	Bal. After adjustment	2,200		
<i>(Dr.)</i>		<b>Insurance Expense</b>	<i>(Cr)</i>	
Increased by \$200			2010	
			31	Adjustment 1    200

In practice, accountants do not use T-accounts. Instead, they use three-column ledger accounts that have the advantage of showing a balance after each transaction. After posting the preceding two entries, the three-column ledger accounts appear as follows:

#### Prepaid Insurance

Date		Explanation	Post Ref.	Debit	Credit	Balance
Dec. 2010	1	Purchased on Account	G1	2400		2400 Dr.
	31	Adjustment	G3*		200	2200 Dr.

#### Insurance Expense

Date		Explanation	Post Ref.	Debit	Credit	Balance
Dec. 2010	31	Adjustment	G3*	200		200 Dr.

\*Assumed page number

Before this adjusting entry was made, the entire USD 2,400 insurance payment made on 2010 December 1, was a prepaid expense for 12 months of protection. So on 2010 December 31, one month of protection had passed, and an adjusting entry transferred USD 200 of the USD 2,400 ( $\text{USD } 2,400 / 12 = \text{USD } 200$ ) to Insurance Expense. On the income statement for the year ended 2010 December 31, MicroTrain reports one month of insurance expense, USD 200, as one of the expenses it incurred in generating that year's revenues. It reports the remaining amount of the prepaid expense, USD 2,200, as an asset on the balance sheet. The USD 2,200 prepaid expense represents 11 months of insurance protection that remains as a future benefit.

**Prepaid rent** Prepaid rent is another example of the gradual consumption of a previously recorded asset. Assume a company pays rent in advance to cover more than one accounting period. On the date it pays the rent, the

company debits the prepayment to the Prepaid Rent account (an asset account). The company has not yet received benefits resulting from this expenditure. Thus, the expenditure creates an asset.

We measure rent expense similarly to insurance expense. Generally, the rental contract specifies the amount of rent per unit of time. If the prepayment covers a three-month rental, we charge one-third of this rental to each month. Notice that the amount charged is the same each month even though some months have more days than other months.

For example, MicroTrain Company paid USD 1,200 rent in advance on 2010 December 28, to cover a three-month period beginning on that date. The journal entry would be:

2010					
Dec.	1	Prepaid Rent	1,200		
		Cash		1,200	
		Paid three months' rent on a building.			

The two accounts relating to rent are Prepaid Rent (an asset) and Rent Expense. After this entry is posted, the Prepaid Rent account has a USD 1,200 balance and the Rent Expense account has a zero balance because no part of the rent period has yet elapsed.

(Dr.)	Prepaid Rent	(Cr)	(Dr.)	Rent Expense	(Cr)
2010			2010		
Dec. 1			Dec. 1		
Bal. Cash Paid	1,200		Bal.	-0-	

On 2010 December 31, MicroTrain must prepare an adjusting entry. Since one third of the period covered by the prepaid rent has elapsed, it charges one-third of the USD 1,200 of prepaid rent to expense. The required adjusting entry is:

Adjustment	2010 Dec.	31	Rent Expense	400	
2—Rent			Prepaid Rent To record rent expense for December		400

After posting this adjusting entry, the T-accounts appear as follows:

(Dr.)	Prepaid Rent	(Cr)
2010	1,200	2010 Dec. 31 Adjustment 2 400
Dec. 1 Cash Paid		
Bal. after adjustment	800	Decreased by \$400

(Dr.)	Rent Expense	(Cr)
Increased by \$400	2010 Dec. 31 Adjustment 2	400

The USD 400 rent expense appears in the income statement for the year ended 2010 December 31. MicroTrain reports the remaining USD 800 of prepaid rent as an asset in the balance sheet on 2010 December 31. Thus, the adjusting entries have accomplished their purpose of maintaining the accuracy of the financial statements.

**Supplies on hand** Almost every business uses supplies in its operations. It may classify supplies simply as supplies (to include all types of supplies), or more specifically as office supplies (paper, stationery, floppy diskettes, pencils), selling supplies (gummed tape, string, paper bags, cartons, wrapping paper), or training supplies (transparencies, training manuals). Frequently, companies buy supplies in bulk. These supplies are an asset until

### 3. Adjustments for financial reporting

the company uses them. This asset may be called *supplies on hand* or *supplies inventory*. Even though these terms indicate a prepaid expense, the firm does not use *prepaid* in the asset's title.

On 2010 December 4, MicroTrain Company purchased supplies for USD 1,400 and recorded the transaction as follows:

2010				
Dec.	4	Supplies on Hand	1,400	
		Cash		1,400
		To record the purchase of supplies for future use.		

MicroTrain's two accounts relating to supplies are Supplies on Hand (an asset) and Supplies Expense. After this entry is posted, the Supplies on Hand account shows a debit balance of USD 1,400 and the Supplies Expense account has a zero balance as shown in the following T-accounts:

(Dr.)	<b>Supplies On Hand</b>	(Cr.)	(Dr.)	<b>Supplies Expense</b>	(Cr.)
2010			2010		
Dec. 4			Dec. 4		
Bal. Cash Paid	1,400		Bal.	-0-	

An actual physical inventory (a count of the supplies on hand) at the end of the month showed only USD 900 of supplies on hand. Thus, the company must have used USD 500 of supplies in December. An adjusting journal entry brings the two accounts pertaining to supplies to their proper balances. The adjusting entry recognizes the reduction in the asset (Supplies on Hand) and the recording of an expense (Supplies Expense) by transferring USD 500 from the asset to the expense. According to the physical inventory, the asset balance should be USD 900 and the expense balance, USD 500. So MicroTrain makes the following adjusting entry:

2010					
Dec.	31	Supplies Expense	500		Adjustment
		Supplies on Hand		500	3—Supplies
		To record supplies used during December.			

After posting this adjusting entry, the T-accounts appear as follows:

(Dr.)	<b>Supplies on Hand</b>	(Cr.)	
2010		2010	Decreased by \$500
Dec. 4 Cash Paid	1,400	Dec. 31 Adjustment 3	500
Bal. after	900 adjustment		
(Dr.)	<b>Supplies Expense</b>	(Cr.)	
Increased by	2010	500	
\$500	Dec 31 Adjustment 3		

The entry to record the use of supplies could be made when the supplies are issued from the storeroom. However, such careful accounting for small items each time they are issued is usually too costly a procedure.

Accountants make adjusting entries for supplies on hand, like for any other prepaid expense, before preparing financial statements. Supplies expense appears in the income statement. Supplies on hand is an asset in the balance sheet.

Sometimes companies buy assets relating to insurance, rent, and supplies knowing that they will use them up before the end of the current accounting period (usually one month or one year). If so, an expense account is usually debited at the time of purchase rather than debiting an asset account. This procedure avoids having to make an adjusting entry at the end of the accounting period. Sometimes, too, a company debits an expense even though the asset will benefit more than the current period. Then, at the end of the accounting period, the firm's adjusting entry transfers some of the cost from the expense to the asset. For instance, assume that on January 1, a company paid USD 1,200 rent to cover a three-year period and debited the USD 1,200 to Rent Expense. At the end of the

year, it transfers USD 800 from Rent Expense to Prepaid Rent. To simplify our approach, we will consistently debit the asset when the asset will benefit more than the current accounting period.

**Depreciation** Just as prepaid insurance and prepaid rent indicate a gradual using up of a previously recorded asset, so does depreciation. However, the overall time involved in using up a depreciable asset (such as a building) is much longer and less definite than for prepaid expenses. Also, a prepaid expense generally involves a fairly small amount of money. Depreciable assets, however, usually involve larger sums of money.

A **depreciable asset** is a manufactured asset such as a building, machine, vehicle, or piece of equipment that provides service to a business. In time, these assets lose their utility because of (1) wear and tear from use or (2) obsolescence due to technological change. Since companies gradually use up these assets over time, they record depreciation expense on them. **Depreciation expense** is the amount of asset cost assigned as an expense to a particular period. The process of recording depreciation expense is called **depreciation accounting**. The three factors involved in computing depreciation expense are:

- **Asset cost.** The asset cost is the amount that a company paid to purchase the depreciable asset.
- **Estimated residual value.** The **estimated residual value (scrap value)** is the amount that the company can probably sell the asset for at the end of its estimated useful life.
- **Estimated useful life.** The **estimated useful life** of an asset is the estimated time that a company can use the asset. Useful life is an estimate, not an exact measurement, that a company must make in advance. However, sometimes the useful life is determined by company policy (e.g. keep a fleet of automobiles for three years).

Accountants use different methods for recording depreciation. The method illustrated here is the *straight-line method*. We discuss other depreciation methods in Chapter 10. Straight-line depreciation assigns the same amount of depreciation expense to each accounting period over the life of the asset. The **depreciation formula (straight-line)** to compute straight-line depreciation for a one-year period is:

$$\text{Annual depreciation} = \frac{\text{Asset cost} - \text{Estimated residual value}}{\text{Estimated years of useful life}}$$

To illustrate the use of this formula, recall that on December 1, MicroTrain Company purchased four small trucks at a cost of USD 40,000. The journal entry was:

2010				
Dec.	1	Trucks	40,000	
		Cash		40,000
		To record the purchase of four trucks.		

The estimated residual value for each truck was USD 1,000, so MicroTrain estimated the total residual value for all four trucks at USD 4,000. The company estimated the useful life of each truck to be four years. Using the straight-line depreciation formula, MicroTrain calculated the annual depreciation on the trucks as follows:

$$\text{Annual depreciation} = \frac{\text{USD } 40,000 - \text{USD } 4,000}{4 \text{ years}} = \text{USD } 9,000$$

The amount of depreciation expense for one month would be  $\frac{1}{12}$  of the annual amount. Thus, depreciation expense for December is  $\text{USD } 9,000 \div 12 = \text{USD } 750$ .

The difference between an asset's cost and its estimated residual value is an asset's **depreciable amount**. To satisfy the matching principle, the firm must allocate the depreciable amount as an expense to the various periods in the asset's useful life. It does this by debiting the amount of depreciation for a period to a depreciation expense

### 3. Adjustments for financial reporting

account and crediting the amount to an accumulated depreciation account. MicroTrain's depreciation on its delivery trucks for December is USD 750. The company records the depreciation as follows:

2010					
Dec.	31	Depreciation Expense – Trucks	750		
		Accumulated Depreciation - Trucks		750	Adjusted 4-Depreciation
		To record depreciation expense for December.			

After posting the adjusting entry, the T-accounts appear as follows:

<i>(Dr.)</i>		<b>Depreciation Expense—Trucks</b>		<i>(Cr)</i>	
Increased by \$750	2010 Dec 31	Adjustment 4	750		
<i>(Dr.)</i>		<b>Accumulated Depreciation—Trucks</b>		<i>(Cr.)</i>	
		2010 Dec. 31	Adjustment 4	750	Increased by \$750 (book value of asset decreased)

MicroTrain reports depreciation expense in its income statement. And it reports accumulated depreciation in the balance sheet as a deduction from the related asset.

The **accumulated depreciation account** is a contra asset account that shows the total of all depreciation recorded on the asset *from the date of acquisition up through the balance sheet date*. A **contra asset account** is a deduction from the asset to which it relates in the balance sheet. The purpose of a contra asset account is to reduce the original cost of the asset down to its remaining undepreciated cost or book value. The *accumulated depreciation account* does not represent cash that is being set aside to replace the worn out asset. The *undepreciated cost of the asset* is the debit balance in the asset account (original cost) minus the credit balance in the accumulated depreciation contra account. Accountants also refer to an asset's cost less accumulated depreciation as the **book value** (or net book value) of the asset. Thus, book value is the cost not yet allocated to an expense. In the previous example, the book value of the equipment after the first month is:

Cost	USD 40,000
Less: Accumulated depreciation	750
Book value (or cost not yet allocated to as an expense)	39,250

MicroTrain credits the depreciation amount to an accumulated depreciation account, which is a contra asset, rather than directly to the asset account. Companies use contra accounts when they want to show statement readers the original amount of the account to which the contra account relates. For instance, for the asset Trucks, it is useful to know both the original cost of the asset and the total accumulated depreciation amount recorded on the asset. Therefore, the asset account shows the original cost. The contra account, Accumulated Depreciation—Trucks, shows the total amount of recorded depreciation from the date of acquisition. By having both original cost and the accumulated depreciation amounts, a user can estimate the approximate percentage of the benefits embodied in the asset that the company has consumed. For instance, assume the accumulated depreciation amount is about three-fourths the cost of the asset. Then, the benefits would be approximately three-fourths consumed, and the company may have to replace the asset soon.

Thus, to provide more complete balance sheet information to users of financial statements, companies show both the original acquisition cost and accumulated depreciation. In the preceding example for adjustment 4, the balance sheet at 2010 December 31, would show the asset and contra asset as follows:

**Assets**

Trucks	USD 40,000
Less: Accumulated depreciation	750
	USD 39,250

As you may expect, the accumulated depreciation account balance increases each period by the amount of depreciation expense recorded until the remaining book value of the asset equals the estimated residual value.

A liability/revenue adjustment involving unearned revenues covers situations in which a customer has transferred assets, usually cash, to the selling company before the receipt of merchandise or services. Receiving assets before they are earned creates a liability called **unearned revenue**. The firm debits such receipts to the asset account Cash and credits a liability account. The liability account credited may be Unearned Fees, Revenue Received in Advance, Advances by Customers, or some similar title. The seller must either provide the services or return the customer's money. By performing the services, the company earns revenue and cancels the liability.

Companies receive advance payments for many items, such as training services, delivery services, tickets, and magazine or newspaper subscriptions. Although we illustrate and discuss only advanced receipt of training fees, firms treat the other items similarly.

**Unearned service fees** On December 7, MicroTrain Company received USD 4,500 from a customer in payment for future training services. The firm recorded the following journal entry:

2010				
Dec.	7	Cash	4,500	
		Unearned Service Fees		4,500
		To record the receipt of cash from a customer in payment for future training services.		

The two T-accounts relating to training fees are Unearned Service Fees (a liability) and Service Revenue. These accounts appear as follows on 2010 December 31 (before adjustment):

(Dr.)	<b>Unearned Service Fees</b>	(Cr.)
	2010	
	Dec. 7	Cash received in advance 4,500
(Dr.)	<b>Service Revenue</b>	(Cr.)
	2010	
*The \$10,700 balance came	Bal. before adjustment	10,700*
	from transactions discussed in Chapter 2.	

The balance in the Unearned Service Fees liability account established when MicroTrain received the cash will be converted into revenue as the company performs the training services. Before MicroTrain prepares its financial statements, it must make an adjusting entry to transfer the amount of the services performed by the company from a liability account to a revenue account. If we assume that MicroTrain earned one-third of the USD 4,500 in the Unearned Service Fees account by December 31, then the company transfers USD 1,500 to the Service Revenue account as follows:

Adjustment 5— Revenue earned	2010 Dec.	31	Unearned Service Fees Service Revenue To transfer a portion of training fees from the liability account to the revenue account.	1,500	1,500
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After posting the adjusting entry, the T-accounts would appear as follows:

Decreased by \$1,500	(Dr.)	<b>Unearned Service Fees</b>	(Cr.)
	2010		2010

### 3. Adjustments for financial reporting

2010 Dec. 31	Adjustment 5	1,500	Dec. 7 Cash received	
			in advance	4,500
			Bal. after adjustment	3,000
(Dr.)	<b>Service Revenue</b>		(Cr.)	
			2010	
			Bal. before adjustment Dec. 31	10,700
			Adjustment 5	1,500
			Bal. after adjustment	12,200
				Increased — by
				\$1,500

MicroTrain reports the service revenue in its income statement for 2010. The company reports the USD 3,000 balance in the Unearned Service Fees account as a liability in the balance sheet. In 2011, the company will likely earn the USD 3,000 and transfer it to a revenue account.

If MicroTrain does not perform the training services, the company would have to refund the money to the training service customers. For instance, assume that MicroTrain could not perform the remaining USD 3,000 of training services and would have to refund the money. Then, the company would make the following entry:

Unearned Service Fees	3,000	
Cash		3,000
To record the refund of unearned training fees.		

Thus, the company must either perform the training services or refund the fees. This fact should strengthen your understanding that unearned service fees and similar items are liabilities.

Accountants make the adjusting entries for deferred items for data already recorded in a company's asset and liability accounts. They also make adjusting entries for accrued items, which we discuss in the next section, for business data not yet recorded in the accounting records.

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### An accounting perspective:

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#### Business insight

According to the National Association of Colleges and Employers, the average offer to an accounting major in 2009 was USD 48,334 and tends to increase each year. According to recent surveys, the market for accounting graduates remains brisk. Often, one of the chief problems for graduates is how to handle multiple job offers. As a result of the low unemployment rate, employers—especially small accounting firms with limited recruiting budgets—are doing whatever they can to grab qualified candidates.

### Adjustments for accrued items

Accrued items require two types of adjusting entries: asset/revenue adjustments and liability/expense adjustments. The first group—asset/revenue adjustments—involves accrued assets; the second group—liability/expense adjustments—involves accrued liabilities.

**Accrued assets** are assets, such as interest receivable or accounts receivable, that have not been recorded by the end of an accounting period. These assets represent rights to receive future payments that are not due at the balance sheet date. To present an accurate picture of the affairs of the business on the balance sheet, firms



recognize these rights at the end of an accounting period by preparing an adjusting entry to correct the account balances. To indicate the dual nature of these adjustments, they record a related revenue in addition to the asset. We also call these adjustments **accrued revenues** because the revenues must be recorded.

**Interest revenue** Savings accounts literally earn interest moment by moment. Rarely is payment of the interest made on the last day of the accounting period. Thus, the accounting records normally do not show the interest revenue earned (but not yet received), which affects the total assets owned by the investor, unless the company makes an adjusting entry. The adjusting entry at the end of the accounting period debits a receivable account (an asset) and credits a revenue account to record the interest earned and the asset owned.

For example, assume MicroTrain Company has some money in a savings account. On 2010 December 31, the money on deposit has earned one month's interest of USD 600, although the company has not received the interest. An entry must show the amount of interest earned by 2010 December 31, as well as the amount of the asset, interest receivable (the right to receive this interest). The entry to record the accrual of revenue is:

Adjustment 6—Interest revenue accrued	2010				
	Dec.	31	Interest Receivable	600	
			Interest Revenue		600
			To record one month's interest revenue.		

The T-accounts relating to interest would appear as follows:

	(Dr.)	Interest Receivable	(Cr.)	
Increased by \$600	2010 Dec 31	Adjustment 6	600	
	(Dr.)	Interest	Revenue	(Cr.)
			2010 Dec. 31	Adjustment 6 600.
				Increased by \$600

MicroTrain reports the USD 600 debit balance in Interest Receivable as an asset in the 2010 December 31, balance sheet. This asset accumulates gradually with the passage of time. The USD 600 credit balance in Interest Revenue is the interest earned during the month. Recall that in recording revenue under accrual basis accounting, it does not matter whether the company collects the actual cash during the year or not. It reports the interest revenue earned during the accounting period in the income statement.

**Unbilled training fees** A company may perform services for customers in one accounting period while it bills for the services in a different accounting period.

MicroTrain Company performed USD 1,000 of training services on account for a client at the end of December. Since it takes time to do the paper work, MicroTrain will bill the client for the services in January. The necessary adjusting journal entry at 2010 December 31, is:

Adjustment 7—Unbilled	2010				
	Dec.	31	Accounts Receivable (or Service Fees Receivable)	1,000	
			Service Revenue		1,000
			To record unbilled training services performed in December.		

After posting the adjusting entry, the T-accounts appear as follows:

(Dr.)	Accounts Receivable	(Cr.)
2010		

### 3. Adjustments for financial reporting

Previous bal.	5,200*		
Dec. 31 Adjustment 7	1,000*_		
Bal. after adjustment	6,200		
*This previous balance came from transactions discussed in Chapter 2.			
(Dr.)	<b>Service</b>	<b>Revenue</b>	(Cr.)
		2010	
		Bal. before adjustment	10,700
		Dec. 31 Adjustment	
		5—previously unearned revenue.	1,500
		Dec. 31 Adjustment 7	1,000
		Bal. after both adjustments	13200

The service revenue appears in the income statement; the asset, accounts receivable, appears in the balance sheet.

**Accrued liabilities** are liabilities not yet recorded at the end of an accounting period. They represent obligations to make payments not legally due at the balance sheet date, such as employee salaries. At the end of the accounting period, the company recognizes these obligations by preparing an adjusting entry including both a liability and an expense. For this reason, we also call these obligations **accrued expenses**.

**Salaries** The recording of the payment of employee salaries usually involves a debit to an expense account and a credit to Cash. Unless a company pays salaries on the last day of the accounting period for a pay period ending on that date, it must make an adjusting entry to record any salaries incurred but not yet paid.

MicroTrain Company paid USD 3,600 of salaries on Friday, 2010 December 28, to cover the first four weeks of December. The entry made at that time was:

2010					
Dec.	28	Salaries Expense	3,600		
		Cash		3,600	
		Paid training employee salaries for the first four weeks of December.			

Assuming that the last day of December 2010 falls on a Monday, this expense account does not show salaries earned by employees for the last day of the month. Nor does any account show the employer's obligation to pay these salaries. The T-accounts pertaining to salaries appear as follows before adjustment:

(Dr.)	<b>Salaries Expense</b>	(Cr)	(Dr.)	<b>Salaries Payable</b>	(Cr)
2010 Dec. 28	3,600			2010 Dec. 28 Bal.	-0-

If salaries are USD 3,600 for four weeks, they are USD 900 per week. For a five-day workweek, daily salaries are USD 180. MicroTrain makes the following adjusting entry on December 31 to accrue salaries for one day:

2010					
Dec.	31	Salaries Expense	180		
		Salaries Payable		180	
		To accrue one day's salaries that were earned but not paid.			

After adjustment, the two T-accounts involved appear as follows:

(Dr.)	<b>Salaries Expense</b>	(Cr)
2010		
Dec. 28 Bal.	3,600	
Dec. 31 Adjustment 8	180	

Bal. after adjustment		3,780		
(Dr.)	<b>Salaries Payable</b>		(Cr.)	
	2010	180	Increased by	
	Dec. 31 Adjustment 8		\$180	
	<b>Failure to Recognize</b>	<b>Effect on Net Income</b>	<b>Effect on Balance Sheet Items</b>	
1.	Consumption of the benefits of an asset (prepaid expense)	Overstates net income	Overstates assets Overstates retained earnings	
2.	Earning of previously unearned revenues	Understates net income	Overstates liabilities Understates retained earnings	
3.	Accrual of assets	Understates net income	Understates assets Understates retained earnings	
4.	Accrual of liabilities	Overstates net income	Understates liabilities Overstates retained earnings	

### Exhibit 18: Effects of failure to recognize adjustments

The debit in the adjusting journal entry brings the month's salaries expense up to its correct USD 3,780 amount for income statement purposes. The credit to Salaries Payable records the USD 180 salary liability to employees. The balance sheet shows salaries payable as a liability.

Another example of a liability/expense adjustment is when a company incurs interest on a note payable. The debit would be to Interest Expense, and the credit would be to Interest Payable. We discuss this adjustment in Chapter 9.

#### Effects of failing to prepare adjusting entries

Failure to prepare proper adjusting entries causes net income and the balance sheet to be in error. You can see the effect of failing to record each of the major types of adjusting entries on net income and balance sheet items in Exhibit 18.

Using MicroTrain Company as an example, this chapter has discussed and illustrated many of the typical entries that companies must make at the end of an accounting period. Later chapters explain other examples of adjusting entries.

#### Analyzing and using the financial results—trend percentages

It is sometimes more informative to express all the dollar amounts as a percentage of one of the amounts in the base year rather than to look only at the dollar amount of the item in the financial statements. You can calculate **trend percentages** by dividing the amount for each year for an item, such as net income or net sales, by the amount of that item for the base year:

$$\text{Trend percentage} = \frac{\text{Current year amount}}{\text{Base year amount}}$$

To illustrate, assume that ShopaLot, a large retailer, and its subsidiaries reported the following net income for the years ended 2001 January 31, through 2010. The last column expresses these dollar amounts as a percentage of the 2001 amount. For instance, we would calculate the 125 per cent for 2002 as:

$$[(\text{USD } 1,609,000 / \text{USD } 1,291,000) \times 100]$$

	<b>Dollar Amount of Net Income (millions)</b>	<b>Percentage of 1991 Net Income</b>
1991	\$1,291	100 %
1992	1,609	125
1993	1,995	155
1994	2,333	181
1995	2,681	208
1996	2,740	212
1997	3,056	237

### 3. Adjustments for financial reporting

1998	3,526	273
1999	4,430	343
2000	5,377	416
2001	6,295	488

Examining the trend percentages, we can see that ShopaLot's net income has increased steadily over the 10-year period. The 2010 net income is over 4 times as much as the 2001 amount. This is the kind of performance that management and stockholders seek, but do not always get.

In the first three chapters of this text, you have learned most of the steps of the accounting process. Chapter 4 shows the final steps in the accounting cycle.

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#### An accounting perspective:

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#### Uses of technology

The Internet sites of the Big-4 accounting firms are as follows:

Ernst & Young	<a href="http://www.ey.com">http://www.ey.com</a>
Deloitte Touche Tohmatsu	<a href="http://www.deloitte.com">http://www.deloitte.com</a>
KPMG	<a href="http://www.kpmg.com">http://www.kpmg.com</a>
PricewaterhouseCoopers	<a href="http://www.pwcglobal.com">http://www.pwcglobal.com</a>

You might want to visit these sites to learn more about a possible career in accounting.

#### Understanding the learning objectives

- The cash basis of accounting recognizes revenues when cash is received and recognizes expenses when cash is paid out.
- The accrual basis of accounting recognizes revenues when sales are made or services are performed, regardless of when cash is received; expenses are recognized as incurred, whether or not cash has been paid out.
- The accrual basis is more generally accepted than the cash basis because it provides a better matching of revenues and expenses.
- Adjusting entries convert the amounts that are actually in the accounts to the amounts that should be in the accounts for proper periodic financial reporting.
- Adjusting entries reflect unrecorded economic activity that has taken place but has not yet been recorded.
- Deferred items consist of adjusting entries involving data previously recorded in accounts. Adjusting entries in this class normally involve moving data from asset and liability accounts to expense and revenue accounts. The two types of adjustments within this deferred items class are asset/expense adjustments and liability/revenue adjustments.
- Accrued items consist of adjusting entries relating to activity on which no data have been previously recorded in the accounts. These entries involve the initial recording of assets and liabilities and the related revenues and expenses. The two types of adjustments within this accrued items class are asset/revenue adjustments and liability/expense adjustments.
- This chapter illustrates entries for deferred items and accrued items.
- Failure to prepare adjusting entries causes net income and the balance sheet to be in error.

- For a particular item such as sales or net income, select a base year and express all dollar amounts in other years as a percentage of the base year dollar amount.

**Demonstration problem**

Among other items, the trial balance of Korman Company for 2010 December 31, includes the following account balances:

	Debits	Credits
Supplies on Hand	\$ 6,000	
Prepaid Rent	25,200	
Buildings	200,000	
Accumulated Depreciation—Buildings		\$33,250
Salaries Expense	124,000	
Unearned Delivery Fees		4,000

Some of the supplies represented by the USD 6,000 balance of the Supplies on Hand account have been consumed. An inventory count of the supplies actually on hand at December 31 totaled USD 2,400.

On May 1 of the current year, a rental payment of USD 25,200 was made for 12 months’ rent; it was debited to Prepaid Rent.

The annual depreciation for the buildings is based on the cost shown in the Buildings account less an estimated residual value of USD 10,000. The estimated useful lives of the buildings are 40 years each.

The salaries expense of USD 124,000 does not include USD 6,000 of unpaid salaries earned since the last payday.

The company has earned one-fourth of the unearned delivery fees by December 31.

Delivery services of USD 600 were performed for a customer, but a bill has not yet been sent.

- Prepare the adjusting journal entries for December 31, assuming adjusting entries are prepared only at year-end.
- Based on the adjusted balance shown in the Accumulated Depreciation—Buildings account, how many years has Korman Company owned the building?

**Solution to demonstration problems**

**KORMAN COMPANY General Journal**

Date	Account Titles and Explanation	Post. Ref.	Debit				Credit				
2010 Dec. 31	Supplies Expense			3	6	0	0				
	Supplies on Hand							3	6	0	0
	To record supplies expense (\$6,000 - \$2,400).										
31	Rent Expense		1	6	8	0	0				
	Prepaid Rent							1	6	8	0
	To record rent expense (\$25,200 X 8/12).										
31	Depreciation Expense—Buildings			4	7	5	0				
	Accumulated Depreciation—Buildings							4	7	5	0
	To record depreciation (\$200,000 - \$10,000 / 40 years).										
31	Salaries Expense			6	0	0	0				
	Salaries Payable							6	0	0	0

### 3. Adjustments for financial reporting

		To record accrued salaries.																		
	31	Unearned Delivery Fees				1	0	0	0											
		Service Revenue													1	0	0	0		
		To record delivery fees earned.																		
	31	Accounts Receivable				6	0	0												
		Service Revenue													6	0	0			
		To record delivery fees earned.																		

Eight years; computed as:

$$\frac{\text{Total accumulated depreciation}}{\text{Annual depreciation expense}} = \frac{\text{USD } 33,250 + \text{USD } 4,750}{\text{USD } 4,750}$$

#### Key terms

**Accounting period** A time period normally of one month, one quarter, or one year into which an entity's life is arbitrarily divided for financial reporting purposes.

**Accounting year** An accounting period of one year. The accounting year may or may not coincide with the calendar year.

**Accrual basis of accounting** Recognizes revenues when sales are made or services are performed, regardless of when cash is received. Recognizes expenses as incurred, whether or not cash has been paid out.

**Accrued assets and liabilities** Assets and liabilities that exist at the end of an accounting period but have not yet been recorded; they represent rights to receive, or obligations to make, payments that are not legally due at the balance sheet date. Examples are accrued fees receivable and salaries payable.

**Accrued items** Adjusting entries relating to activity on which no data have been previously recorded in the accounts. Also, see *accrued assets and liabilities*.

**Accrued revenues and expenses** Other names for accrued assets and liabilities.

**Accumulated depreciation account** A contra asset account that shows the total of all depreciation recorded on the asset up through the balance sheet date.

**Adjusting entries** Journal entries made at the end of an accounting period to bring about a proper matching of revenues and expenses; they reflect economic activity that has taken place but has not yet been recorded. Adjusting entries are made to bring the accounts to their proper balances before financial statements are prepared.

**Book value** For depreciable assets, book value equals cost less accumulated depreciation.

**Calendar year** The normal year, which ends on December 31.

**Cash basis of accounting** Recognizes revenues when cash is received and recognizes expenses when cash is paid out.

**Contra asset account** An account shown as a deduction from the asset to which it relates in the balance sheet; used to reduce the original cost of the asset down to its remaining undepreciated cost or book value.

**Deferred items** Adjusting entries involving data previously recorded in the accounts. Data are transferred from asset and liability accounts to expense and revenue accounts. Examples are prepaid expenses, depreciation, and unearned revenues.

**Depreciable amount** The difference between an asset's cost and its estimated residual value.

**Depreciable asset** A manufactured asset such as a building, machine, vehicle, or equipment on which depreciation expense is recorded.

**Depreciation accounting** The process of recording depreciation expense.

**Depreciation expense** The amount of asset cost assigned as an expense to a particular time period.

**Depreciation formula (straight-line):**

**Estimated residual value (scrap value)** The amount that the company can probably sell the asset for at the end of its estimated useful life.

**Estimated useful life** The estimated time periods that a company can make use of the asset.

**Fiscal year** An accounting year of any 12 consecutive months that may or may not coincide with the calendar year. For example, a company may have an accounting, or fiscal, year that runs from April 1 of one year to March 31 of the next.

**Matching principle** An accounting principle requiring that expenses incurred in producing revenues be deducted from the revenues they generated during the accounting period.

**Prepaid expense** An asset awaiting assignment to expense. An example is prepaid insurance. Assets such as cash and accounts receivable are not prepaid expenses.

**Service potential** The benefits that can be obtained from assets. The future services that assets can render make assets “things of value” to a business.

**Trend percentages** Calculated by dividing the amount of an item for each year by the amount of that item for the base year.

**Unearned revenue** Assets received from customers before services are performed for them. Since the revenue has not been earned, it is a liability, often called *revenue received in advance* or *advances by customers*.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false:

Every adjusting entry affects at least one income statement account and one balance sheet account.

All calendar years are also fiscal years, but not all fiscal years are calendar years.

The accumulated depreciation account is an asset account that shows the amount of depreciation for the current year only.

The Unearned Delivery Fees account is a revenue account.

If all of the adjusting entries are not made, the financial statements are incorrect.

#### Multiple-choice

Select the best answer for each of the following questions.

An insurance policy premium of USD 1,200 was paid on 2010 September 1, to cover a one-year period from that date. An asset was debited on that date. Adjusting entries are prepared once a year, at year-end. The necessary adjusting entry at the company’s year-end, 2010 December 31, is:

- |                      |     |     |
|----------------------|-----|-----|
| a. Prepaid insurance | 400 |     |
| Insurance expense    |     | 400 |
| b. Insurance expense | 800 |     |
| Prepaid insurance    |     | 800 |
| c. Prepaid insurance | 800 |     |
| Insurance expense    |     | 800 |
| d. Insurance expense | 400 |     |
| Prepaid insurance    |     | 400 |

The Supplies on Hand account has a balance of USD 1,500 at year-end. The actual amount of supplies on hand at the end of the period was USD 400. The necessary adjusting entry is:

- |                     |       |       |
|---------------------|-------|-------|
| a. Supplies expense | 1,100 |       |
| Supplies on hand    |       | 1,100 |
| b. Supplies expense | 400   |       |
| Supplies on hand    |       | 400   |
| c. Supplies on hand | 1,100 |       |
| Supplies expense    |       | 1,100 |
| d. Supplies on hand | 400   |       |
| Supplies expense    |       | 400   |

A company purchased a truck for USD 20,000 on 2010 January 1. The truck has an estimated residual value of USD 5,000 and is expected to last five years. Adjusting entries are prepared only at year-end. The necessary adjusting entry at 2010 December 31, the company’s year-end, is:

### 3. Adjustments for financial reporting

a. Depreciation expense – Trucks      4,000



Accumulated		4,000
b. Deprecation expense – Trucks	3,000	
Trucks		3,000
c. Deprecation expense – Trucks	3,000	
Accumulated depreciation – Trucks		3,000
d. Accumulated depreciation trucks	3,000	
Deprecation expense – Trucks		3,000

A company received cash of USD 24,000 on 2010 October 1, as subscriptions for a one-year period from that date. A liability account was credited when the cash was received. The magazine is to be published by the company and delivered to subscribers each month. The company prepares adjusting entries at the end of each month because it prepares financial statements each month. The adjusting entry the company would make at the end of each of the next 12 months would be:

a. Unearned subscription fees	6,000	
Subscription fee revenue		6,000
b. Unearned subscription fees	2,000	
Subscription fee revenue		2,000
c. Unearned subscription feeds	18,000	
Subscription fee revenue		18,000
d. Subscription fee revenue	2,000	
Unearned subscription fees		2,000

When a company earns interest on a note receivable or on a bank account, the debit and credit are as follows:

	<b>Debit</b>	<b>Credit</b>
a.	Accounts receivable	Interest revenue
b.	Interest receivable	Interest revenue
c.	Interest revenue	Accounts receivable
d.	Interest revenue	Interest receivable

If USD 3,000 has been earned by a company's workers since the last payday in an accounting period, the necessary adjusting entry would be:

- Debit an expense and credit a liability.
- Debit an expense and credit an asset.
- Debit a liability and credit an asset.
- Debit a liability and credit an expense.

Now turn to "Answers to self test" at the back of the book to check your answers.

## Questions

- Which events during an accounting period trigger the recording of normal journal entries? Which event triggers the making of adjusting entries?
- Describe the difference between the cash basis and accrual basis of accounting.
- Why are adjusting entries necessary? Why not treat every cash disbursement as an expense and every cash receipt as a revenue when the cash changes hands?
- "Adjusting entries would not be necessary if the 'pure' cash basis of accounting were followed (assuming no mistakes were made in recording cash transactions as they occurred). Under the cash basis, receipts that are of a revenue nature are considered revenue when received, and expenditures that are of an expense nature are considered expenses when paid. It is the use of the accrual basis of

### 3. Adjustments for financial reporting

accounting, where an effort is made to match expenses incurred against the revenues they create, that makes adjusting entries necessary.” Do you agree with this statement? Why?

- Why do accountants not keep all the accounts at their proper balances continuously throughout the period so that adjusting entries would not have to be made before financial statements are prepared?
- What is the fundamental difference between deferred items and accrued items?
- Identify the types of adjusting entries included in each of the two major classes of adjusting entries.
- Give an example of a journal entry for each of the following:
  - Equal growth of an expense and a liability.
  - Earning of revenue that was previously recorded as unearned revenue.
  - Equal growth of an asset and a revenue.
  - Increase in an expense and decrease in an asset.
- A fellow student makes the following statement: “You can easily tell whether a company is using the cash or accrual basis of accounting. When an amount is paid for future rent or insurance services, a firm that is using the cash basis debits an expense account while a firm that is using the accrual basis debits an asset account.” Is the student correct?
- You notice that the Supplies on Hand account has a debit balance of USD 2,700 at the end of the accounting period. How would you determine the extent to which this account needs adjustment?
- Some assets are converted into expenses as they expire and some liabilities become revenues as they are earned. Give examples of asset and liability accounts for which this statement is true. Give examples of asset and liability accounts to which the statement does not apply.
- Give the depreciation formula to compute straight-line depreciation for a one-year period.
- What does the term accrued liability mean?
- What is meant by the term service potential?
- When assets are received before they are earned, what type of an account is credited? As the amounts are earned, what type of account is credited?
- What does the word accrued mean? Is there a conceptual difference between interest payable and accrued interest payable?
- Matching expenses incurred with revenues earned is more difficult than matching expenses paid with revenues received. Do you think the effort is worthwhile?
- **Real world question** Refer to the financial statements of The Limited, Inc., in the Annual report appendix. Approximately what percentage of the depreciable assets under property, plant, and equipment has been depreciated as of the end of the most recent year shown?

#### Exercises

**Exercise A** Select the correct response for each of the following multiple-choice questions:

The cash basis of accounting:

- (a) Recognizes revenues when sales are made or services are rendered.
- (b) Recognizes expenses as incurred.
- (c) Is typically used by some relatively small businesses and professional persons.
- (d) Recognizes revenues when cash is received and recognizes expenses when incurred.

The accrual basis of accounting:

- (a) Recognizes revenues only when cash is received.
- (b) Is used by almost all companies.
- (c) Recognizes expenses only when cash is paid out.
- (d) Recognizes revenues when sales are made or services are performed and recognizes expenses only when cash is paid out.

**Exercise B** Select the correct response for each of the following multiple-choice questions:

The least common accounting period among the following is:

- (a) One month.
- (b) Two months.
- (c) Three months.
- (d) Twelve months.

The need for adjusting entries is based on:

- (a) The matching principle.
- (b) Source documents.
- (c) The cash basis of accounting.
- (d) Activity that has already been recorded in the proper accounts.

**Exercise C** Select the correct response for each of the following multiple-choice questions:

Which of the following types of adjustments belongs to the deferred items class?

- (a) Asset/revenue adjustments.
- (b) Liability/expense adjustments.
- (c) Asset/expense adjustments.
- (d) Asset/liability adjustments.

Which of the following types of adjustments belongs to the accrued items class?

- (a) Asset/expense adjustments.
- (b) Liability/revenue adjustments.
- (c) Asset/liability adjustments.
- (d) Liability/expense adjustments.

**Exercise D** A one-year insurance policy was purchased on August 1 for USD 2,400, and the following entry was made at that time:

Prepaid Insurance	2,400	
Cash		2,400

What adjusting entry is necessary at December 31, the end of the accounting year?

Show how the T-accounts for Prepaid Insurance and Insurance Expense would appear after the entries are posted.

**Exercise E** Assume that rent of USD 12,000 was paid on 2010 September 1, to cover a one-year period from that date. Prepaid Rent was debited. If financial statements are prepared only on December 31 of each year, what adjusting entry is necessary on 2010 December 31, to bring the accounts involved to their proper balances?

**Exercise F** At 2010 December 31, an adjusting entry was made as follows:

Rent Expense	1,500	
--------------	-------	--

### 3. Adjustments for financial reporting

Prepaid Rent		1,500	
--------------	--	-------	--

You know that the gross amount of rent paid was USD 4,500, which was to cover a one-year period. Determine:

- The opening date of the year to which the USD 4,500 of rent applies.
- The entry that was made on the date the rent was paid.

**Exercise G** Supplies were purchased for cash on 2010 May 2, for USD 8,000. Show how this purchase would be recorded. Then show the adjusting entry that would be necessary, assuming that USD 2,500 of the supplies remained at the end of the year.

**Exercise H** Assume that a company acquired a building on 2010 January 1, at a cost of USD 1,000,000. The building has an estimated useful life of 40 years and an estimated residual value of USD 200,000. What adjusting entry is needed on 2010 December 31, to record the depreciation for the entire year 2010?

**Exercise I** On 2010 September 1, Professional Golfer Journal, Inc., received a total of USD 120,000 as payment in advance for one-year subscriptions to a monthly magazine. A liability account was credited to record this cash receipt. By the end of the year, one-third of the magazines paid for in advance had been delivered. Give the entries to record the receipt of the subscription fees and to adjust the accounts at December 31, assuming annual financial statements are prepared at year-end.

**Exercise J** On 2010 April 15, Rialto Theater sold USD 90,000 in tickets for the summer musicals to be performed (one per month) during June, July, and August. On 2010 July 15, Rialto Theater discovered that the group that was to perform the July and August musicals could not do so. It was too late to find another group qualified to perform the musicals. A decision was made to refund the remaining unearned ticket revenue to its ticket holders, and this was done on July 20. Show the appropriate journal entries to be made on April 15, June 30, and July 20. Rialto has a June 30th year-end.

**Exercise K** Guilty & Innocent, a law firm, performed legal services in late December 2010 for clients. The USD 30,000 of services would be billed to the clients in January 2011. Give the adjusting entry that is necessary on 2010 December 31, if financial statements are prepared at the end of each month.

**Exercise L** A firm borrowed USD 30,000 on November 1. By December 31, USD 300 of interest had been incurred. Prepare the adjusting entry required on December 31.

**Exercise M** Convenient Mailing Services, Inc., incurs salaries at the rate of USD 3,000 per day. The last payday in January is Friday, January 27. Salaries for Monday and Tuesday of the next week have not been recorded or paid as of January 31. Financial statements are prepared monthly. Give the necessary adjusting entry on January 31.

**Exercise N** State the effect that each of the following independent situations would have on the amount of annual net income reported for 2010 and 2011.

- No adjustment was made for accrued salaries of USD 8,000 as of 2010 December 31.
- The collection of USD 5,000 for services yet unperformed as of 2010 December 31, was credited to a revenue account and not adjusted. The services are performed in 2011.

**Exercise O** In the following table, indicate the effects of failing to recognize each of the indicated adjustments by writing “O” for overstated and “U” for understated.

	Effect on Net Income	Effect on Balance Sheet Items		
		Stockholders'		
Failure to Recognize		Assets	Liabilities	Equity
1. Depreciation on a building				

2. Consumption of supplies on hand
3. The earning of ticket revenue received in advance
4. The earning of interest on a bank account
5. Salaries incurred by unpaid

**Exercise P** The following data regarding net income (loss) are for Perkins Parts, a medium-sized automotive supplier, for the period 2004–2009.

Net Income (Earnings) (\$ millions)		Net Income (Earnings) (\$ millions)	
1989 .....	\$ 860	1995 .....	\$ 4,139
1990 .....	3,835	1996 .....	4,446
1991 .....	(2,258)	1997 .....	6,920
1992 .....	(7,385)	1998 .....	22,071
1993 .....	2,529	1999 .....	7,237
1994 .....	5,308	2000 .....	3,467

Using 1989 as the base year, calculate the trend percentages, and comment on the results.

### Problems

**Problem A** Among other items, the trial balance of Filmblaster, Inc., a movie rental company, at December 31 of the current year includes the following account balances:

	Debits
Prepaid Insurance	USD 10,000
Prepaid Rent	USD 14,400
Supplies on Hand	USD 2,800

Examination of the records shows that adjustments should be made for the following items:

- a. Of the prepaid insurance in the trial balance, USD 4,000 is for coverage during the months after December 31 of the current year.
- b. The balance in the Prepaid Rent account is for a 12-month period that started October 1 of the current year.
- c. USD 300 of interest has been earned but not received.
- d. Supplies used during the year amount to USD 1,800.

Prepare the annual year-end adjusting journal entries at December 31.

**Problem B** Marathon Magazine, Inc., has the following account balances, among others, in its trial balance at December 31 of the current year:

	Debits	Credits
Supplies on Hand.....	\$3,720	
Prepaid Rent .....	7,200	
Unearned Subscription Fees ...		\$15,000
Subscriptions Revenue.....		261,000
Salaries Expense .....	123,000	

- The inventory of supplies on hand at December 31 amounts to USD 720.
- The balance in the Prepaid Rent account is for a one-year period starting October 1 of the current year.
- One-third of the USD 15,000 balance in Unearned Subscription Fees has been earned.

### 3. Adjustments for financial reporting

- Since the last payday, the employees of the company have earned additional salaries in the amount of USD 5,430.

a. Prepare the year-end adjusting journal entries at December 31.

b. Open ledger accounts for each of the accounts involved, enter the balances as shown in the trial balance, post the adjusting journal entries, and calculate year-end balances.

**Problem C** Hillside Apartments, Inc., adjusts and closes its books each December 31. Assume the accounts for all prior years have been properly adjusted and closed. Following are some of the company's account balances prior to adjustment on 2010 December 31:

#### HILLSIDE APARTMENTS, INC.

##### Partial Trial Balance

2010 December 31

	Debits	Credits
Prepaid insurance	\$ 7,500	
Supplies on hand	7,000	
Buildings	255,000	
Accumulated depreciation – Buildings		\$ 96,000
Unearned rent		2,700
Salaries expense	69,000	
Rent revenue		277,500

The Prepaid Insurance account balance represents the remaining cost of a four-year insurance policy dated 2011 June 30, having a total premium of USD 12,000.

The physical inventory of the office supply stockroom indicates that the supplies on hand cost USD 3,000.

The building was originally acquired on 1994 January 1, at which time management estimated that the building would last 40 years and have a residual value of USD 15,000.

Salaries earned since the last payday but unpaid at December 31 amount to USD 5,000.

Interest earned but not collected on a savings account during the year amounts to USD 400.

The Unearned Rent account arose through the prepayment of rent by a tenant in the building for 12 months beginning 2010 October 1.

Prepare the annual year-end adjusting entries indicated by the additional data.

**Problem D** The reported net income amounts for Gulf Coast Magazine, Inc., for calendar years 2010 and 2011 were USD 200,000 and USD 222,000, respectively. No annual adjusting entries were made at either year-end for any of the following transactions:

A fire insurance policy to cover a three-year period from the date of payment was purchased on 2010 March 1 for USD 3,600. The Prepaid Insurance account was debited at the date of purchase.

Subscriptions for magazines in the amount of USD 72,000 to cover an 18-month period from 2010 May 1, were received on 2010 April 15. The Unearned Subscription Fees account was credited when the payments were received.

A building costing USD 180,000 and having an estimated useful life of 50 years and a residual value of USD 30,000 was purchased and put into service on 2010 January 1.

On 2011 January 12, salaries of USD 9,600 were paid to employees. The account debited was Salaries Expense. One-third of the amount paid was earned by employees in December of 2010.

Calculate the correct net income for 2010 and 2011. In your answer, start with the reported net income. Then show the effects of each correction (adjustment), using a plus or a minus to indicate whether reported income should be increased or decreased as a result of the correction. When the corrections are added to or deducted from

the reported net income amounts, the result should be the correct net income amounts. The answer format should appear as follows:

Explanation of corrections	2010	2011
Reported net income	\$200,000	\$222,000
To correct error in accounting for:		
Fire insurance policy premium:		
Correct expense in 2010	-1,000	
Correct expense in 2011		-1,200

**Problem E** Jupiter Publishing Company began operations on 2010 December 1. The company's bookkeeper intended to use the cash basis of accounting. Consequently, the bookkeeper recorded all cash receipts and disbursements for items relating to operations in revenue and expense accounts. No adjusting entries were made prior to preparing the financial statements for December.

Dec. 1 Issued capital stock for USD 300,000 cash.

3 Received USD 144,000 for magazine subscriptions to run for two years from this date. The magazine is published monthly on the 23rd.

4 Paid for advertising to be run in a national periodical for six months (starting this month). The cost was USD 36,000.

7 Purchased for cash an insurance policy to cover a two-year period beginning December 15, USD 24,000.

12 Paid the annual rent on the building, USD 36,000, effective through 2011 November 30.

15 Received USD 216,000 cash for two-year subscriptions starting with the December issue.

15 Salaries for the period December 1–15 amounted to USD 48,000. Beginning as of this date, salaries will be paid on the 5th and 20th of each month for the preceding two-week period.

20 Salaries for the period December 1–15 were paid.

23 Supplies purchased for cash, USD 21,600. (Only USD 1,800 of these were subsequently used in 2010.)

27 Printing costs applicable equally to the next six issues beginning with the December issue were paid in cash, USD 144,000.

31 Cash sales of the December issue, USD 84,000.

31 Unpaid salaries for the period December 16–31 amounted to USD 22,000.

31 Sales on account of December issue, USD 14,000.

a. Prepare journal entries for the transactions as the bookkeeper prepared them.

b. Prepare journal entries as they would have been prepared under the accrual basis. Where the entry is the same as under the cash basis, merely indicate "same". Where possible, record the original transaction so that no adjusting entry would be necessary at the end of the month. Ignore explanations.

### Alternate problems

**Alternate problem A** The trial balance of Caribbean Vacation Tours, Inc., at December 31 of the current year includes, among other items, the following account balances:

	Debits	Credits
Prepaid Insurance .....	\$24,000	
Prepaid Rent .....	24,000	
Buildings.....	188,000	
Accumulated Depreciation—Buildings.....		\$31,600
Salaries Expense .....	200,000	

### 3. Adjustments for financial reporting

The balance in the Prepaid Insurance account is the advance premium for one year from September 1 of the current year.

The buildings are expected to last 25 years, with an expected residual value of USD 30,000.

Salaries incurred but not paid as of December 31 amount to USD 8,400.

The balance in Prepaid Rent is for a one-year period that started March 1 of the current year.

Prepare the annual year-end adjusting journal entries at December 31.

**Alternate problem B** Among the account balances shown in the trial balance of Dunwoody Mail Station, Inc., at December 31 of the current year are the following:

	<b>Debits</b>	<b>Credits</b>
Supplies on hand	\$10,000	
Prepaid insurance	6,000	
Buildings	168,000	
Accumulated depreciation and buildings		\$ 39,000

The inventory of supplies on hand at December 31 amounts to USD 3,000.

The balance in the Prepaid Insurance account is for a two-year policy taken out June 1 of the current year.

Depreciation for the buildings is based on the cost shown in the Buildings account, less residual value estimated at USD18,000. When acquired, the lives of the buildings were estimated at 50 years each.

a. Prepare the year-end adjusting journal entries at December 31.

b. Open ledger accounts for each of the accounts involved, enter the balances as shown in the trial balance, post the adjusting journal entries, and calculate year-end balances.

**Alternate problem C** Nevada Camping Equipment Rental Company occupies rented quarters on the main street of Las Vegas. To get this location, the company rented a store larger than needed and subleased (rented) a portion of the area to Max's Restaurant. The partial trial balance of Nevada Camping Equipment Rental Company as of 2010 December 31, is as follows:

**NEVEDA CAMPING EQUIPMENT RENTAL COMPANY**

**Trial Balance**

**2010 December 31**

	<b>Debits</b>	<b>Credits</b>
Cash	\$100,000	
Prepaid Insurance	11,400	
Supplies on Hand	20,000	
Camping Equipment	176,000	
Accumulated Depreciation—Camping Equipment		\$ 19,200
Notes Payable		40,000
Equipment Rental Revenue		1,500,000
Sublease Rental Revenue		8,800
Building Rent Expense	14,400	
Salaries Expense	196,000	

a. Salaries of employees amount to USD 300 per day and were last paid through Wednesday, December 27. December 31 is a Sunday. The store is closed Sundays.

b. An analysis of the Camping Equipment account disclosed:

Balance, 2010 January 1	\$128,000
Addition, 2010 July 1	48,000
Balance, 2010 December 31, per trial balance	<u>\$176,000</u>



The company estimates that all equipment will last 20 years from the date they were acquired and that the residual value will be zero.

c. The store carries one combined insurance policy, which is taken out once a year effective August 1. The premium on the policy now in force amounts to USD 7,200 per year.

d. Unused supplies on hand at 2010 December 31, have a cost of USD 9,200.

e. December's rent from Max's Restaurant has not yet been received, USD 800.

f. Interest accrued on the note payable is USD 700.

Prepare the annual year-end entries required by the preceding statement of facts.

**Alternate problem D** The reported net income amounts for Safety Waste Control Company were 2010, USD 200,000; and 2011, USD 230,000. No annual adjusting entries were made at either year-end for any of these transactions:

a. A building was rented on 2010 April 1. Cash of USD 14,400 was paid on that date to cover a two-year period. Prepaid Rent was debited.

b. The balance in the Office Supplies on Hand account on 2010 December 31, was USD 6,000. An inventory of the supplies on 2010 December 31, revealed that only USD 3,500 were actually on hand at that date. No new supplies were purchased during 2011. At 2011 December 31, an inventory of the supplies revealed that USD 800 were on hand.

c. A building costing USD 1,200,000 and having an estimated useful life of 40 years and a residual value of USD 240,000 was put into service on 2010 January 1.

d. Services were performed for customers in December 2010. The USD 24,000 bill for these services was not sent until January 2011. The only transaction that was recorded was a debit to Cash and a credit to Service Revenue when payment was received in January.

Calculate the correct net income for 2010 and 2011. In your answer, start with the reported net income amounts. Then show the effects of each correction (adjustment) using a plus or a minus to indicate whether reported income should be increased or decreased as a result of the correction. When the corrections are added to or deducted from the reported net income amounts, the result should be the correct net income amounts. The answer format should be as follows:

<b>Explanation of Corrections</b>	<b>2010</b>	<b>2011</b>
Reported net income	\$200,000	\$230,000
To correct error in accounting for:		
Prepaid rent:		
Correct expense in 2010	-5,400	
Correct expense in 2011		-7,200

**Alternate problem E** On 2010 June 1, Richard Cross opened a swimming pool cleaning and maintenance service, Cross Pool Company. He vaguely recalled the process of making journal entries and establishing ledger accounts from a high school bookkeeping course he had taken some years ago. At the end of June, he prepared an income statement for the month of June, but he had the feeling that he had not proceeded correctly. He contacted his brother, John, a recent college graduate with a major in accounting, for assistance. John immediately noted that his brother had kept his records on a cash basis.

June 1 Received cash of USD 28,000 from various customers in exchange for service agreements to clean and maintain their pools for June, July, August, and September.

### 3. Adjustments for financial reporting

5 Paid rent for automotive and cleaning equipment to be used during the period June through September, USD 8,000. The payment covered the entire period.

8 Purchased a two-year liability insurance policy effective June 1 for USD 12,000 cash.

10 Received an advance of USD 9,000 from a Florida building contractor in exchange for an agreement to help service pools in his housing development during October through May.

16 Paid salaries for the first half of June, USD 8,400.

17 Paid USD 900 for advertising to be run in a local newspaper for two weeks in June and four weeks in July.

19 Paid the rent of USD 24,000 under a four-month lease on a building rented and occupied on June 1.

26 Purchased USD 5,400 of supplies for cash. (Only USD 900 of these supplies were used in June.)

29 Billed various customers for services rendered, USD 16,000.

30 Unpaid employee services received in the last half of June amounted to USD 12,600.

30 Received a bill for USD 600 for gas and oil used in June.

a. Prepare the entries for the transactions as Richard must have recorded them under the cash basis of accounting.

b. Prepare journal entries as they would have been prepared under the accrual basis. Where the entry is the same as under the cash basis, merely indicate “same”. Where possible, record the original transaction so that no adjusting entry would be necessary at the end of the month. Ignore explanations.

#### Beyond the numbers—Critical thinking

**Business decision case A** You have just been hired by Top Executive Employment Agency, Inc., to help prepare adjusting entries at the end of an accounting period. It becomes obvious to you that management does not seem to have much of an understanding about the necessity or adjusting entries or which accounts might possibly need adjustment. The first step you take is to prepare the following unadjusted trial balance from the general ledger. Only those ledger accounts that had end-of-year balances are included in the trial balance.

	Debits	Credits
Cash	\$ 80,000	
Accounts Receivable	28,000	
Supplies on Hand	3,000	
Prepaid Insurance	2,700	
Office Equipment	120,000	
Accumulated Depreciation—Office Equipment		\$ 45,000
Buildings	360,000	
Accumulated Depreciation—Buildings		105,000
Accounts Payable		9,000
Loan Payable (Bank)		15,000
Unearned Commission Fees		30,000
Capital Stock		160,000
Retained Earnings		89,300
Commissions Revenue		270,000
Advertising Expense	6,000	
Salaries Expense	112,500	
Utilities Expense	7,500	
Miscellaneous Expense	3,600	
	\$723,300	\$723,300

- a. Explain to management why adjusting entries in general are made.
- b. Explain to management why some of the specific accounts appearing in the trial balance may need adjustment and what the nature of each adjustment might be (do not worry about specific dollar amounts).

**Business decision case B** A friend of yours, Jack Andrews, is quite excited over the opportunity he has to purchase the land and several miscellaneous assets of Drake Bowling Lanes Company for USD 400,000. Andrews tells you that Mr and Mrs Drake (the sole stockholders in the company) are moving due to Mr Drake's ill health. The annual rent on the building and equipment is USD 54,000.

Drake reports that the business earned a profit of USD 100,000 in 2010 (last year). Andrews believes an annual profit of USD 100,000 on an investment of USD 400,000 is a really good deal. But, before completing the deal, he asks you to look it over. You agree and discover the following:

Drake has computed his annual profit for 2010 as the sum of his cash dividends plus the increase in the Cash account: Dividends of USD 60,000 + Increase in Cash account of USD 40,000 = USD 100,000 profit.

As buyer of the business, Andrews will take over responsibility for repayment of a USD 300,000 loan (plus interest) on the land. The land was acquired at a cost of USD 624,000 seven years ago.

An analysis of the Cash account shows the following for 2010:

Rental revenues received		\$465,000
Cash paid out in 2010 for—		
Salaries paid to employees	\$260,000	
Utilities paid	18,000	
Advertising expenses paid	15,000	
Supplies purchased and used	24,000	
Interest paid on loan	18,000	
Loan principal paid	30,000	
Cash dividends	60,000	425,000
In crease in cash balance for the year		<u>\$ 40,000</u>

You also find that the annual rent of USD 54,000, a December utility bill of USD 4,000, and an advertising bill of USD 6,000 have not been paid.

- a. Prepare a written report for Andrews giving your appraisal of Drake Bowling Lanes Company as an investment. Comment on Drake's method of computing the annual profit of the business.
- b. Include in your report an approximate income statement for 2010.

**Group project C** In teams of two or three students, go to the library to locate one company's annual report for the most recent year. Identify the name of the company and the major products or services offered, as well as gross revenues, major expenses, and the trend of profits over the last three years. Calculate trend percentages for revenues, expenses, and profits using the oldest year as the base year. Each team should write a memorandum to management summarizing the data and commenting on the trend percentages. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project D** With one or two other students and using library and internet sources, write a paper on *Statement of Accounting Standards No. 106*, "Accounting for Postretirement Benefits Other Than Pensions". This standard resulted in some of the largest adjusting entries ever made. Companies had to record an expense and a liability to account for these costs on an accrual basis. In the past they typically had recorded this expense on a cash basis, recognizing the expense only when cash was paid to retirees. Be sure to cite your sources and treat direct quotes properly.

### 3. Adjustments for financial reporting

**Group project E** With one or two other students and using library sources, write a paper on human resource accounting. Generally accepted accounting principles do not allow “human assets” to be included among assets on the balance sheet. Why is this? Be sure to cite your sources and to treat direct quotes properly.

#### Using the Internet—A view of the real world

Visit the website:

<http://www.pwcglobal.com>

Click on the Sarbanes-Oxley Act. Write a brief report to your instructor summarizing your findings.

#### Answers to self-test

##### True-false

**True.** Every adjusting entry involves either moving previously recorded data from an asset account to an expense account or from a liability account to a revenue account (or in the opposite direction) or simultaneously entering new data in an asset account and a revenue account or in a liability account and an expense account.

**True.** A fiscal year is any 12 consecutive months, so all calendar years are also fiscal years. A calendar year, however, must end on December 31, so it does not include fiscal years that end on any date other than December 31 (such as June 30).

**False.** The accumulated depreciation account is a *contra asset* that shows the total of all depreciation recorded on an asset from its acquisition date up through the balance sheet date.

**False.** The Unearned Delivery Fees account is a liability. As the fees are earned, the amount in that account is transferred to a revenue account.

**True.** If an adjusting entry is overlooked and not made, at least one income statement account and one balance sheet account will be incorrect.

##### Multiple-choice

**d.** One-third of the benefits have expired. Therefore, USD 400 must be moved from the asset (credit) to an expense (debit).

**a.** USD 1,100 of the supplies have been used, so that amount must be moved from the asset (credit) to an expense (debit).

**c.** The amount of annual depreciation is determined as  $(\text{USD } 20,000 - \text{USD } 5,000) \text{ divided by } 5 = \text{USD } 3,000$ . The debit is to Depreciation Expense—Trucks, and the credit is to Accumulated Depreciation—Trucks, a contra asset account.

**b.** Each month USD 2,000 would be transferred from the liability account (debit), Unearned Subscription Fees, to a revenue account (credit).

**b.** An asset, Interest Receivable, is debited, and Interest Revenue is credited.

**a.** The debit would be to Salaries Expense, and the credit would be to Salaries Payable.

# 4. Completing the accounting cycle

## Learning objectives

After studying this chapter, you should be able to:

- Summarize the steps in the accounting cycle.
- Prepare a work sheet for a service company.
- Prepare an income statement, statement of retained earnings, and balance sheet using information contained in the work sheet.
- Prepare adjusting and closing entries using information contained in the work sheet.
- Prepare a post-closing trial balance.
- Describe the evolution of accounting systems.
- Prepare a classified balance sheet.
- Analyze and use the financial results—the current ratio.

## A career in information systems

Have you ever heard the sayings "knowledge is power" or "information is money"? When people talk about accounting, what they are really talking about is information. The information used by businesses, as well as the technology that supports that information, represents some of the most valuable assets for organizations around the world. Very often, the success of a business depends on effective creation, management, and use of information.

As companies become ever more reliant on technology, the need for well-educated Management Information Systems (MIS) auditors and control professionals increases. Improved technology has the potential to dramatically improve business organizations and practices, reduce costs and exploit new business and investment opportunities. At the same time, companies face constant challenges in selecting and implementing these new technologies. Because of their high value and inherent complexity, the development, support, and auditing of information systems has become one of the fastest growing specialties in accounting.

Graduates with special interests and skills in computing and technology have expansive opportunities. In addition to traditional accounting and auditing functions, MIS professionals perform evaluations of technologies and communications protocols involving electronic data interchange, client servers, local and wide area networks, data communications, telecommunications, and integrated voice/data/video systems. In public accounting, technology has impacted the auditing profession by extending the knowledge required to draw conclusions and the skills required to audit advanced accounting and information systems.

With management consulting practices growing and information systems becoming a larger percentage of public accounting revenue, MIS professionals are in high demand. If you are considering a degree in computer or information systems, you should consider the advantages that an accounting major or minor can give you in

## 4. Completing the accounting cycle

working closely with businesses and consulting firms. A dual major in accounting and MIS is one of the most desirable undergraduate degree combinations in the workforce.

This chapter explains two new steps in the **accounting cycle**—the preparation of the work sheet and closing entries. In addition, we briefly discuss the evolution of accounting systems and present a classified balance sheet. This balance sheet format more closely resembles actual company balance sheets. After completing this chapter, you will understand how accounting begins with source documents that are evidence of a business entity's transactions and ends with financial statements that show the solvency and profitability of the entity.

### The accounting cycle summarized

In Chapter 1, you learned that when an event is a measurable business transaction, you need adequate proof of this transaction. Then, you analyze the transaction's effects on the accounting equation,  $\text{Assets} = \text{Liabilities} + \text{Stockholders' equity}$ . In Chapters 2 and 3, you performed other steps in the accounting cycle. Chapter 2 presented the eight steps in the accounting cycle as a preview of the content of Chapters 2 through 4. As a review, study the diagram of the eight steps in the accounting cycle in Exhibit 19. Remember that the first three steps occur during the accounting period and the last five occur at the end. The next section explains how to use the work sheet to facilitate the completion of the accounting cycle.

### The work sheet

The **work sheet** is a columnar sheet of paper or a computer spreadsheet on which accountants summarize information needed to make the adjusting and closing entries and to prepare the financial statements. Usually, they save these work sheets to document the end-of-period entries. A work sheet is only an accounting tool and not part of the formal accounting records. Therefore, work sheets may vary in format; some are prepared in pencil so that errors can be corrected easily. Other work sheets are prepared on personal computers with spreadsheet software. Accountants prepare work sheets each time financial statements are needed—monthly, quarterly, or at the end of the accounting year.

This chapter illustrates a 12-column work sheet that includes sets of columns for an unadjusted trial balance, adjustments, adjusted trial balance, income statement, statement of retained earnings, and balance sheet. Each set has a debit and a credit column. (See Exhibit 20.)

Accountants use these initial steps in preparing the work sheet. The following sections describe the detailed steps for completing the work sheet.

- Enter the titles and balances of ledger accounts in the Trial Balance columns.
- Enter adjustments in the Adjustments columns.
- Enter adjusted account balances in the Adjusted Trial Balance columns.
- Extend adjusted balances of revenue and expense accounts from the Adjusted Trial Balance columns to the Income Statement columns.
- Extend any balances in the Retained Earnings and Dividends accounts to the Statement of Retained Earnings columns.
- Extend adjusted balances of asset, liability, and capital stock accounts from the Adjusted Trial Balance columns to the Balance Sheet columns.

Instead of preparing a separate trial balance as we did in Chapter 2, accountants use the Trial Balance columns on a work sheet. Look at Exhibit 20 and note that the numbers and titles of the ledger accounts of MicroTrain

Company are on the left portion of the work sheet. Usually, only those accounts with balances as of the end of the accounting period are listed. (Some accountants do list the entire chart of accounts, even those with zero balances.) Assume you are MicroTrain's accountant. You list the Retained Earnings account in the trial balance even though it has a zero balance to (1) show its relative position among the accounts and (2) indicate that December 2010 is the first month of operations for this company. Next, you enter the balances of the ledger accounts in the Trial Balance columns. The accounts are in the order in which they appear in the general ledger: assets, liabilities, stockholders' equity, dividends, revenues, and expenses. Then, total the columns. If the debit and credit column totals are not equal, an error exists that must be corrected before you proceed with the work sheet.

As you learned in Chapter 3, adjustments bring the accounts to their proper balances before accountants prepare the income statement, statement of retained earnings, and balance sheet. You enter these adjustments in the Adjustments columns of the work sheet. Also, you cross-reference the debits and credits of the entries by placing a key number or letter to the left of the amounts. This key number facilitates the actual journalizing of the adjusting entries later because you do not have to rethink the adjustments to record them. For example, the number (1) identifies the adjustment debiting Insurance Expense and crediting Prepaid Insurance. Note in the Account Titles column that the Insurance Expense account title is below the trial balance totals because the Insurance Expense account did not have a balance before the adjustment and, therefore, did not appear in the trial balance.

Work sheet preparers often provide brief explanations at the bottom for the keyed entries as in Exhibit 20. Although these explanations are optional, they provide valuable information for those who review the work sheet later.

The adjustments (which were discussed and illustrated in Chapter 3) for MicroTrain Company are:

## 4. Completing the accounting cycle

**Illustration 4.1** Steps in the Accounting Cycle

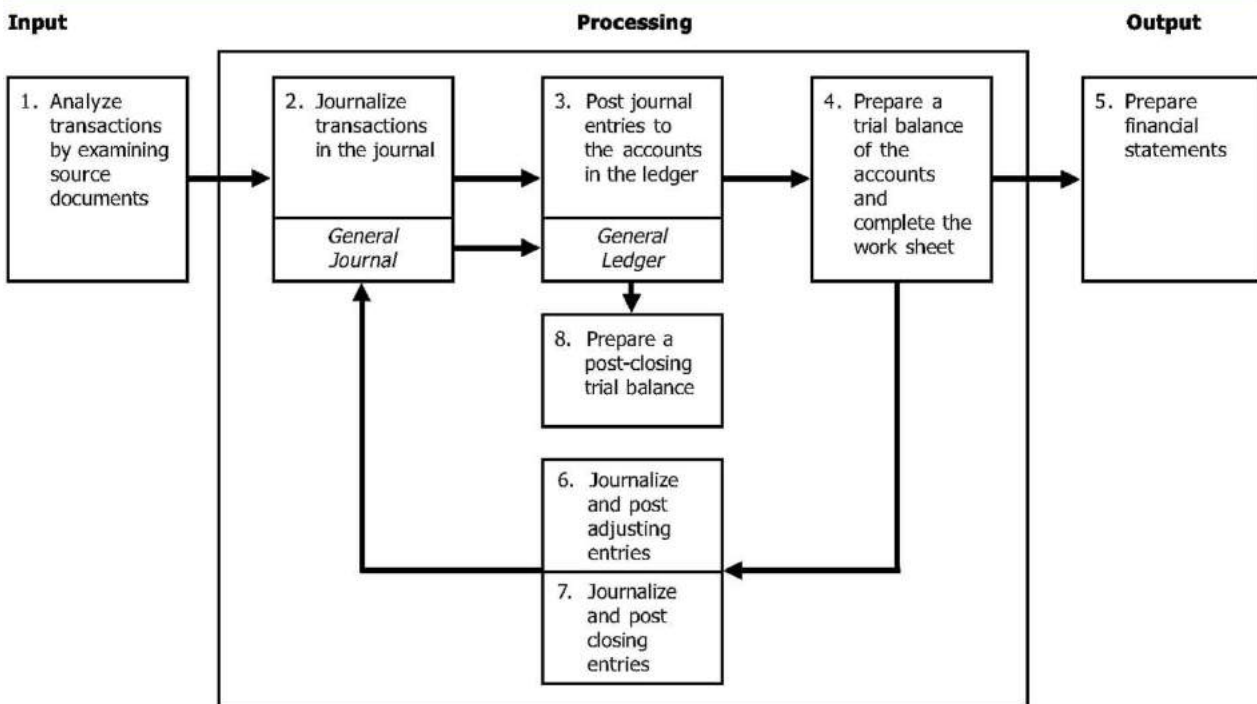


Exhibit 19: Steps in the accounting cycle

- Entry (1) records the expiration of USD 200 of prepaid insurance in December.
- Entry (2) records the expiration of USD 400 of prepaid rent in December.
- Entry (3) records the using up of USD 500 of supplies during the month.
- Entry (4) records USD 750 depreciation expense on the trucks for the month. MicroTrain acquired the trucks at the beginning of December.

MicroTrain acquired the trucks at the beginning of December

- Entry (5) records the earning of USD 1,500 of the USD 4,500 in the Unearned Service Fees account.
- Entry (6) records USD 600 of interest earned in December.
- Entry (7) records USD 1,000 of unbilled training services performed in December.
- Entry (8) records the USD 180 accrual of salaries expense at the end of the month.

Often it is difficult to discover all the adjusting entries that should be made. The following steps are helpful:

- Examine adjusting entries made at the end of the preceding accounting period. The same types of entries often are necessary period after period.
- Examine the account titles in the trial balance. For example, if the company has an account titled Trucks, an entry must be made for depreciation.
- Examine various business documents (such as bills for services received or rendered) to discover other assets, liabilities, revenues, and expenses that have not yet been recorded.
- Ask the manager or other personnel specific questions regarding adjustments that may be necessary. For example: "Were any services performed during the month that have not yet been billed?"



**MICROTRAIN COMPANY Work Sheet For the Month Ended 2010 December 31**

Acc t.	Account Titles		Trial Balance		Adjustments		Adjusted Trail Balance		Income Statement		Statement of Retained Earnings		Balance Sheet
	No.		Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
100	Cash		8,250				8,250						8,250
103	Accounts Receivable		5,200		(7) 1,000		6,200						6,200
107	Supplies on Hand		1,400			(3) 500	900						900
108	Prepaid Insurance		2,400			n) 200	2,200						2,200
112	Prepaid Rent		1,200			(2) 400	800						800
150	Trucks		40,000				40,000						40,000
200	Accounts Payable			730			730						
216	Unearned Service Fees			4,500	(5) 1,500		3,000						
300	Capital Stock			50,000			50,000						
310	Retained Earnings 2010 December 31			-0-			-0-					-0-	
320	Dividends		3,000				3,000				3,000		
400	Service Revenue			10,700		(5) 1,500 (7) 1,000	13,200		13,200				
505	Advertising Expense		50				50	50					
506	Gas and Oil Expense		690				660	680					
507	Salaries Expense		3,600		(3) 130		3,750	3,780					
511	Utilities Expense		150				150	150					
			65,930	65,930									
512	Insurance Expense				(1) 200		200	200					
SIS	Rent Expense				(Z) 400		400	400					
518	Supplies Expense				(3) 500		500	500					
521	Depreciation Expense-Trucks				(t) 750		750	750					
151	Accumulated Depreciation-Trucks					(t) 750	750						
121	Interest Receivable				m 600		600		600				600
418	Interest Revenue					(6) 500	600		600				
206	Salaries Payable					(S) 180	150		150				
					5,130	5,130	53,400	65,400	6,510	13,800			
	<b>Net Income</b>								7,290			7,290	
									13,800	13,800	3,000	7,290	
									0	0		4,290	
	<b>Retained Earnings, 2010 December 31</b>												53,950

Exhibit 20: Completed worksheet

- (1) To record insurance expenses for December.
- (2) To record rent expenses for December.
- (3) To record supplies expenses for December.
- (4) To record depreciation expenses for December.
- (5) To transfer fees for service provided in December from the liability account to the revenue account.
- (6) To record one month's interest revenue.

#### 4. Completing the accounting cycle

(7) To record unbilled training services performed in December.

(8) To accrue one day's salaries that were earned but are unpaid.

After all the adjusting entries are entered in the Adjustments columns, total the two columns. The totals of these two columns should be equal when all debits and credits are entered properly.

After MicroTrain's adjustments, compute the adjusted balance of each account and enter these in the Adjusted Trial Balance columns. For example, Supplies on Hand (Account No. 107) had an unadjusted balance of USD 1,400. Adjusting entry (3) credited the account for USD 500, leaving a debit balance of USD 900. This amount is a debit in the Adjusted Trial Balance columns.

Next, extend all accounts having balances to the Adjusted Trial Balance columns. Note carefully how the rules of debit and credit apply in determining whether an adjustment increases or decreases the account balance. For example, Salaries Expense (Account No. 507) has a USD 3,600 debit balance in the Trial Balance columns. A USD 180 debit adjustment increases this account, which has a USD 3,780 debit balance in the Adjusted Trial Balance columns.

Some account balances remain the same because no adjustments have affected them. For example, the balance in Accounts Payable (Account No. 200) does not change and is simply extended to the Adjusted Trial Balance columns.

Now, total the Adjusted Trial Balance debit and credit columns. The totals must be equal before taking the next step in completing the work sheet. When the Trial Balance and Adjustments columns both balance but the Adjusted Trial Balance columns do not, the most probable cause is a math error or an error in extension. The Adjusted Trial Balance columns make the next step of sorting the amounts to the Income Statement, the Statement of Retained Earnings, and the Balance Sheet columns much easier.

Begin by extending all of MicroTrain's revenue and expense account balances in the Adjusted Trial Balance columns to the Income Statement columns. Since revenues carry credit balances, extend them to the credit column. After extending expenses to the debit column, subtotal each column. MicroTrain's total expenses are USD 6,510 and total revenues are USD 13,800. Thus, net income for the period is USD 7,290 (USD 13,800—USD 6,510). Enter this USD 7,290 income in the debit column to make the two column totals balance. You would record a net loss in the opposite manner; expenses (debits) would have been larger than revenues (credits) so a net loss would be entered in the credit column to make the columns balance.

Next, complete the Statement of Retained Earnings columns. Enter the USD 7,290 net income amount for December in the credit Statement of Retained Earnings column. Thus, this net income amount is the balancing figure for the Income Statement columns and is also in the credit Statement of Retained Earnings column. Net income appears in the Statement of Retained Earnings credit column because it causes an increase in retained earnings. Add the USD 7,290 net income to the beginning retained earnings balance of USD 0, and deduct the dividends of USD 3,000. As a result, the ending balance of the Retained Earnings account is USD 4,290.

Now extend the assets, liabilities, and capital stock accounts in the Adjusted Trial Balance columns to the Balance Sheet columns. Extend asset amounts as debits and liability and capital stock amounts as credits.

Note that the ending retained earnings amount determined in the Statement of Retained Earnings columns appears again as a credit in the Balance Sheet columns. The ending retained earnings amount is a debit in the Statement of Retained Earnings columns to balance the Statement of Retained Earnings columns. The ending retained earnings is a credit in the Balance Sheet columns because it increases stockholders' equity, and increases

in stockholders' equity are credits. (Retained earnings would have a debit ending balance only if cumulative losses and dividends exceed cumulative earnings.) With the inclusion of the ending retained earnings amount, the Balance Sheet columns balance.

When the Balance Sheet column totals do not agree on the first attempt, work backward through the process used in preparing the work sheet. Specifically, take the following steps until you discover the error:

**MICROTRAIN COMPANY**  
**Income Statement**  
**For the Month Ended 2010 December 31**

<i>Revenues:</i>		
<i>Service Revenue</i>		<i>\$13,200</i>
<i>Interest Revenue</i>		<i>600</i>
<i>Total Revenue</i>		<i>\$13,800</i>
<i>Expenses:</i>		
<i>Advertising Expense</i>	<i>\$ 50</i>	
<i>Gas and Oil Expense</i>	<i>680</i>	
<i>Salaries Expense</i>	<i>3,780</i>	
<i>Utilities Expense</i>	<i>150</i>	
<i>Insurance Expense</i>	<i>200</i>	
<i>Rent Expense</i>	<i>400</i>	
<i>Supplies Expense</i>	<i>500</i>	
<i>Depreciation Expense—Trucks</i>	<i>750</i>	
<i>Total Expense</i>		<i>6,510</i>
<i>Net Income</i>		<i>\$ 7,290</i>

Exhibit 21: Income statement

- Re-total the two Balance Sheet columns to see if you made an error in addition. If the column totals do not agree, check to see if you did not extend a balance sheet item or if you made an incorrect extension from the Adjusted Trial Balance columns.
- Re-total the Statement of Retained Earnings columns and determine whether you entered the correct amount of retained earnings in the appropriate Statement of Retained Earnings and Balance Sheet columns.
- Re-total the Income Statement columns and determine whether you entered the correct amount of net income or net loss for the period in the appropriate Income Statement and Statement of Retained Earnings columns.

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**An accounting perspective:**

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**Uses of technology**

Electronic spreadsheets have numerous applications in accounting. An electronic spreadsheet is simply a large blank page that contains rows and columns on the computer screen. The blocks created by the intersection of the rows and columns are cells; each cell can hold one or more words, a number, or the product of a mathematical formula. Spreadsheets are ideal for creating large work sheets, trial balances, and other schedules, and for performing large volumes of calculations such

#### 4. Completing the accounting cycle

as depreciation calculations. The most popular spreadsheet program is Microsoft Excel®. Free spreadsheet programs are also available from companies such as Google and Zoho.

#### Preparing financial statements from the work sheet

When the work sheet is completed, all the necessary information to prepare the income statement, statement of retained earnings, and balance sheet is readily available. Now, you need only recast the information into the appropriate financial statement format.

The information you need to prepare the income statement in Exhibit 21 is in the work sheet's Income Statement columns in Exhibit 20.

The information you need to prepare the statement of retained earnings is taken from the Statement of Retained Earnings columns in the work sheet. Look at Exhibit 22, MicroTrain Company's statement of retained earnings for the month ended 2010 December 31. To prepare this statement, use the beginning Retained Earnings account balance (Account No. 310), add the net income (or deduct the net loss), and then subtract the Dividends (Account No. 320). Carry the ending Retained Earnings balance forward to the balance sheet. Remember that the statement of retained earnings helps to relate income statement information to balance sheet information. It does this by indicating how net income on the income statement relates to retained earnings on the balance sheet.

##### MICROTRAIN COMPANY

##### Statement of Retained Earnings

For the Month Ended 2010 December 31,

Retained earnings, 2010 December 1	\$ —0—
Net income for the December	7,290
Total	\$ 7,290
Less: Dividends	3,000
Retained earnings, 2010 December 31	\$ 4,290

Exhibit 22: Statement of retained earnings

##### MICROTRAIN COMPANY

##### Balance Sheet

2010 December 31

##### Assets

Cash	\$ 8,250
Accounts receivable	6,200
Supplies on hand	900
Prepaid insurance	2,200
Prepaid rent	800
Interest receivable	600
Trucks	\$ 40,000
Less: Accumulated depreciation 750	39,250
Total assets	\$ 58,200

##### Liabilities and Stockholders' Equity

##### Liabilities:

Accounts payable	\$ 730
Unearned service fees	3,000
Salaries payable	180
Total liabilities	\$ 3,910

##### Stockholders' equity:

Capital stock	\$ 50,000
Retained earnings 4,290	
Total stockholders' equity	54,290
Total liabilities and stockholders' equity	\$ 58,200

Exhibit 23: Balance sheet

The information needed to prepare a balance sheet comes from the Balance Sheet columns of MicroTrain's work sheet (Exhibit 20). As stated earlier, the correct amount for the ending retained earnings appears on the statement of retained earnings. See the completed balance sheet for MicroTrain in Exhibit 23.

### Journalizing adjusting entries

After completing MicroTrain's financial statements from the work sheet, you should enter the adjusting entries in the general journal and post them to the appropriate ledger accounts. You would prepare these adjusting entries as you learned in Chapter 3, except that the work sheet is now your source for making the entries. The preparation of a work sheet does not eliminate the need to prepare and post adjusting entries because the work sheet is only an informal accounting tool and is not part of the formal accounting records.

The numerical notations in the Adjustments columns and the adjustments explanations at the bottom of the work sheet identify each adjusting entry. The Adjustments columns show each entry with its appropriate debit and credit. MicroTrain's adjusting entries as they would appear in the general journal after posting are:

		<b>MICROTRAIN COMPANY</b>		
		<b>General Journal</b>		<b>page3</b>
<b>Date</b>	<b>Account Titles and Explanation</b>	<b>Post. Ref.</b>	<b>Debit</b>	<b>Credit</b>
2010	<b>Adjusting Entries</b>			
Dec.	31 Insurance Expense (-SE)	512	2 0 0	
	Prepaid Insurance (-A)	108		2 0 0
	<i>To record insurance expense for December.</i>			
	31 Rent Expense (-SE)	515	4 0 0	
	Prepaid Rent (-A)	112		4 0 0
	<i>To record rent expense for December.</i>			
	31 Supplies Expense (-SE)	518	5 0 0	
	Supplies on Hand (-A)	107		5 0 0
	<i>To record supplies used during December.</i>			
	31 Depreciation Expense—Trucks (-SE)	521	7 5 0	
	Accumulated Depredation—Trucks (-A)	151		7 5 0
	<i>To record depreciation expense for December.</i>			
	31 Unearned Service Fees (-L)	216	1 5 0 0	
	Service Revenue (+SE)	400		1 5 0 0
	<i>To transfer a potion of training fees from the liability account to the revenue account.</i>			
	31 Interest Receivable (+A)	121	6 0 0	
	Interest Revenue (+SE)	418		6 0 0
	<i>To record one month's interest revenue.</i>			
	31 Accounts Receivable (+A)	103	1 0 0 0	
	Service Revenue (+SE)	400		1 0 0 0
	<i>To record unbilled training services performed in December.</i>			

#### 4. Completing the accounting cycle

<p>31 Salaries Expense (-SE)          Salaries Payable (+L)  <i>To accrue one day's salaries that were earned by are unpaid.</i></p>	<p>507          206</p>	<p>1 8 0          1 8 0</p>
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### The closing process

In Chapter 2, you learned that revenue, expense, and dividends accounts are nominal (temporary) accounts that are merely subclassifications of a real (permanent) account, Retained Earnings. You also learned that we prepare financial statements for certain accounting periods. The **closing process** transfers (1) the balances in the revenue and expense accounts to a clearing account called Income Summary and then to Retained Earnings and (2) the balance in the Dividends account to the Retained Earnings account. The closing process reduces revenue, expense, and Dividends account balances to zero so they are ready to receive data for the next accounting period. Accountants may perform the closing process monthly or annually.

The **Income Summary account** is a clearing account used only at the end of an accounting period to summarize revenues and expenses for the period. After transferring all revenue and expense account balances to Income Summary, the balance in the Income Summary account represents the net income or net loss for the period. Closing or transferring the balance in the Income Summary account to the Retained Earnings account results in a zero balance in Income Summary.

Also closed at the end of the accounting period is the Dividends account containing the dividends declared by the board of directors to the stockholders. We close the Dividends account directly to the Retained Earnings account and not to Income Summary because dividends have no effect on income or loss for the period.

In accounting, we often refer to the process of closing as closing the books. Remember that only revenue, expense, and Dividend accounts are closed—not asset, liability, Capital Stock, or Retained Earnings accounts. The four basic steps in the closing process are:

- **Closing the revenue accounts**—transferring the balances in the revenue accounts to a clearing account called Income Summary.
- **Closing the expense accounts**—transferring the balances in the expense accounts to a clearing account called Income Summary.
- **Closing the Income Summary account**—transferring the balance of the Income Summary account to the Retained Earnings account.
- **Closing the Dividends account**—transferring the balance of the Dividends account to the Retained Earnings account.

Revenues appear in the Income Statement credit column of the work sheet. The two revenue accounts in the Income Statement credit column for MicroTrain Company are service revenue of USD 13,200 and interest revenue of USD 600 (Exhibit 20). Because revenue accounts have credit balances, you must debit them for an amount equal to their balance to bring them to a zero balance. When you debit Service Revenue and Interest Revenue, credit Income Summary (Account No. 600). Enter the account numbers in the Posting Reference column when the journal entry has been posted to the ledger. Do this for all other closing journal entries.

		MICROTRAIN COMPANY General Journal			Page 4
Date	Account Titles and Explanation	Post. Ref.	Debit	Credit	
<b>Closing Entries</b>					
Dec. 31	Service Revenue	400	1 3 2 0 0		

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<i>Interest Revenue</i>	418	6 0 0	
<i>Income Summary</i>	600		1 3 8 0 0
<i>To close the revenue accounts in the Income Statement credit column to Income Summary.</i>			

After the closing entries have been posted, the Service Revenue and Interest Revenue accounts (in T-account format) of MicroTrain appear as follows. Note that the accounts now have zero balances.

		<b>Service Revenue</b>		
(Dr)	Account No. 400	Bal. before	(Cr.)	
	2010	13,200	13,200	
		<i>closing</i>		
<i>Decreased by \$13,200</i>	Dec. 31	<i>To close to Income Summary</i>	13,200	
		0		
		<i>Bal. after closing</i>	—0—	
		<b>Interest Revenue</b>		
(Dr)	Account No. 418	Bal. before	(Cr.)	
	2010	600	600	
		<i>closing</i>		
<i>Decreased by \$600</i>	Dec. 31	<i>To close to Income Summary</i>	600	
		600		
		<i>Bal. after closing</i>	—0—	

As a result of the previous entry, you would credit the Income Summary account for USD 13,800. We show the Income Summary account in Step 3.

Expenses appear in the Income Statement debit column of the work sheet. MicroTrain Company has eight expenses in the Income Statement debit column. As shown by the column subtotal, these expenses add up to USD 6,510. Since expense accounts have debit balances, credit each account to bring it to a zero balance. Then, make the debit in the closing entry to the Income Summary account for USD 6,510. Thus, to close the expense accounts, MicroTrain makes the following entry:

<b>MICROTRAIN COMPANY</b>				
<b>General Journal</b>				
<b>Page 4</b>				
Date	Account Titles and Explanation	Post. Ref.	Debit	Credit
2010 Dec. 31	<i>Income Summary</i>	600	6 5 1 0	
	<i>Advertising Expense</i>	505		5 0
	<i>Gas and Oil Expense</i>	506		6 8 0
	<i>Salaries Expense</i>	507		3 7 8 0
	<i>Utilities Expense</i>	511		1 5 0
	<i>Insurance Expense</i>	512		2 0 0
	<i>Rent Expense</i>	515		4 0 0
	<i>Supplies Expense</i>	518		5 0 0
	<i>Depreciation Expense—Trucks</i>	521		7 5 0
	<i>To close the expense accounts appearing in the Income</i>			

The debit of USD 6,510 to the Income Summary account agrees with the Income Statement debit column subtotal in the work sheet. This comparison with the work sheet serves as a check that all revenue and expense items have been listed and closed. If the debit in the preceding entry was made for a different amount than the column subtotal, the company would have an error in the closing entry for expenses.

#### 4. Completing the accounting cycle

After they have been closed, MicroTrain's expense accounts appear as follows. Note that each account has a zero balance after closing.

	<b>Advertising Expense</b>			
	<i>Account No. 505</i>			
<i>(Dr.)</i>			<i>(Cr.)</i>	
<b>Bal. before closing</b>	<b>50</b>	<b>2010</b>		
		<b>Dec. 31 To close to Income</b>		
		<b>Summary</b>	<b>50</b>	<b>Decreased by \$50</b>
<b>Bal. after closing</b>	<b>—0—</b>			
	<b>Gas and Oil Expense</b>			
	<i>Account No. 506</i>			
<i>(Dr.)</i>			<i>(Cr.)</i>	
<b>Bal. before closing</b>	<b>680</b>	<b>2010</b>		
		<b>Dec. 31 To close to Income</b>		
		<b>Summary</b>	<b>680</b>	<b>Decreased by \$680</b>
<b>Bal. after closing</b>	<b>—0—</b>			
	<b>Salaries Expense</b>			
	<i>Account No. 507</i>			
<i>(Dr.)</i>			<i>(Cr.)</i>	
<b>Bal. before closing</b>	<b>3,780</b>	<b>2010</b>		
		<b>Dec. 31 To close to Income</b>		
		<b>Summary</b>	<b>3,780</b>	<b>Decreased by \$3,780</b>
<b>Bal. after closing</b>	<b>—0—</b>			
	<b>Utilities Expense</b>			
	<i>Account No. 511</i>			
<i>(Dr.)</i>			<i>(Cr.)</i>	
<b>Bal. before closing</b>	<b>150</b>	<b>2010</b>		
		<b>Dec. 31 To close to Income</b>		
		<b>Summary</b>	<b>150</b>	<b>Decreased by \$150</b>
<b>Bal. after closing</b>	<b>—0—</b>			
	<b>Insurance Expense</b>			
	<i>Account No. 512</i>			
<i>(Dr.)</i>			<i>(Cr.)</i>	
<b>Bal. before closing</b>	<b>200</b>	<b>2010</b>		
		<b>Dec. 31 To close to Income</b>		
		<b>Summary</b>	<b>200</b>	<b>Decreased by \$200</b>
<b>Bal. after closing</b>	<b>—0—</b>			
	<b>Rent Expense</b>			
	<i>Account No. 515</i>			
<i>(Dr.)</i>			<i>(Cr.)</i>	
<b>Bal. before closing</b>	<b>400</b>	<b>2010</b>		
<b>Bal. after closing</b>	<b>—0—</b>			



		<b>Dec. 31 To close to Income Summary</b>	<b>400</b>	<b>Decreased by \$400</b>
<b>Bal. after closing</b>	<b>—0—</b>			
<i>(Dr.)</i>	<b>Supplies Expense</b>			
	<i>Account No. 518</i>	<i>(Cr.)</i>		
<b>Bal. before closing</b>	<b>500    2010</b>			
		<b>Dec. 31 To close to Income Summary</b>	<b>500</b>	<b>Decreased by \$500</b>
<b>Bal. after closing</b>	<b>—0—</b>			
	<b>Depreciation Expense-Trucks</b>			
<i>(Dr.)</i>	<i>Account No. 521</i>	<i>(Cr.)</i>		
<b>Bal. before closing</b>	<b>750'    2010 "</b>			
		<b>Dec. 31 To close to Income Summary</b>	<b>750</b>	<b>Decreased by \$750</b>
<b>Bal. after closing</b>	<b>—0—</b>			

The expense accounts could be closed before the revenue accounts; the end result is the same.

As the result of closing the revenues and expenses of MicroTrain, the total revenues and expenses have been transferred to the Income Summary account.

	<b>Income Summary</b>		
<i>If total expenses exceed total revenues, the account has a debit balance, which is the net loss for the period</i>	<b>Total expenses</b>	<b>Total revenues</b>	<i>If total revenues exceed total expenses, the account has a credit balance, which is the net income for the period.</i>
	<i>w</i>		

MicroTrain's Income Summary account now has a credit balance of USD 7,290, the company's net income for December.

	<b>Income Summary</b>				
<i>(Dr.)</i>				<i>(Cr.)</i>	
2010	<i>From closing</i>	<i>6,510</i>	<i>2010</i>	<i>13,800</i>	
Dec. 31	<i>the expense accounts</i>		<i>Dec. 31 From closing the revenue accounts</i>		
			<i>Bal. before closing this account (net income)</i>	<i>7,290</i>	

Next, close MicroTrain's Income Summary account to its Retained Earnings account. The journal entry to do this is:

<b>MICROTRAIN COMPANY</b>				
<b>General Journal</b>				
<i>Page 4</i>				
<i>Date</i>	<i>Account Titles and Explanation</i>	<i>Post. Ref.</i>	<i>Debit</i>	<i>Credit</i>
2010 Dec. 31	Income Summary	600	7 2 9 0	
	Retained Earnings	310		7 2 9 0
	<i>To close the Income Summary account to the Retained Earnings account.</i>			

After its Income Summary account is closed, the company's Income Summary and Retained Earnings accounts appear as follows:

#### 4. Completing the accounting cycle

<b>Income Summary</b>			
(Dr.)	Account No. 600		(Cr.)
		"2010 Dec. 31 From closing	
2010		The revenue	
Dec. 31 From closing the expense accounts	6,510	accounts	13,800
		Bal. before closing this account (net income)	7,290
Dec. 31 To close this account to Retained Earnings	7,290	Bal. after closing	—0—

<b>Retained Earnings</b>			
(Dr.)	Account No. 310		(Cr.)
		Bal. before closing	-0-
		Process	
		2010	
		Dec. 31 From Income Summary	7,290
			Decreased by \$7,290

The last closing entry closes MicroTrain's Dividends account. This account has a debit balance before closing. To close the account, credit the Dividends account and debit the Retained Earnings account. The Dividends account is not closed to the Income Summary because it is not an expense and does not enter into income determination. The journal entry to close MicroTrain's Dividends account is:

**MICROTRAIN COMPANY  
General Journal**

Page 4

Date	Account Titles and Explanation	Post. Ref.	Debit	Credit
2010 Dec. 31	Retained Earnings (-SE)	310	3 0 0 0	
	Dividends (+SE)	320		3 0 0 0
	To close the Dividends account to the Retained Earnings account.			

After this closing entry is posted, the company's Dividends and Retained Earnings accounts appear as follows:

<b>Dividends</b>			
(Dr.)	Account No. 320 (Cr.)		(Cr.)
Bal. before closing	3,000		
2010		Dec. 31 To close to Retained Earnings	3000
			Decreased by \$3,000

Bal. after closing —0—

<b>Retained Earnings</b>			
(Dr.)	Account No. 310 (Cr.)		(Cr.)
2010		Bal. before closing	
		process -0-	
		2010	
Dec. 31 From dividends	3,000	Dec. 31 From Income Summary	7,290
		Bal. after closing process is complete	4,290

After you have completed the closing process, the only accounts in the general ledger that have not been closed are the permanent balance sheet accounts. Because these accounts contain the opening balances for the coming accounting period, debit balance totals must equal credit balance totals. The preparation of a post-closing trial balance serves as a check on the accuracy of the closing process and ensures that the books are in balance at the start of the new accounting period. The post-closing trial balance differs from the adjusted trial balance in only two

important respects: (1) it excludes all temporary accounts since they have been closed; and (2) it updates the Retained Earnings account to its proper ending balance.

A **post-closing trial balance** is a trial balance taken after the closing entries have been posted. The only accounts that should be open are assets, liabilities, capital stock, and Retained Earnings accounts. List all the account balances in the debit and credit columns and total them to make sure debits and credits are equal.

Look at Exhibit 24, a post-closing trial balance for MicroTrain Company as of 2010 December 31. The amounts in the post-closing trial balance are from the ledger after the closing entries have been posted.

The next section briefly describes the evolution of accounting systems from the one-journal, one-ledger manual system you have been studying to computerized systems. Then, we discuss the role of an accounting system.

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### An accounting perspective:

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#### Uses of technology

If you are studying in the US, you may want to visit the American Institute of Certified Public Accountants website at:

<http://www.aicpa.org>

You will find information about the CPA exam, about becoming a CPA, hot accounting topics, and various other topics, such as the US states that have passed a 150-hour requirement to sit for the CPA exam. You can also learn such things as the states that have approved limited liability companies (LLCs) and limited liability partnerships (LLPs). These forms of organization serve to place limits on accountants' liability. You can also find the phone numbers and mailing addresses of State Boards of accountancy and State Societies of CPAs. Browse around this site to investigate anything else that is of interest. Similar sites are available in other countries as well.

#### Accounting systems: From manual to computerized

The manual accounting system with only one general journal and one general ledger has been in use for hundreds of years and is still used by some very small companies. Gradually, some manual systems evolved to include multiple journals and ledgers for increased efficiency. For instance, a manual system with multiple journals and ledgers often includes: a sales journal to record all credit sales, a purchases journal to record all credit purchases, a cash receipts journal to record all cash receipts, and a cash disbursements journal to record all cash payments. Still recorded in the general journal are adjusting and closing entries and any other entries that do not fit in one of the special journals. Besides the general ledger, such a system normally has subsidiary ledgers for accounts receivable and accounts payable showing how much each customer owes and how much is owed to each supplier. The general ledger shows the total amount of accounts receivable and accounts payable, but the details in the subsidiary ledgers allow companies to send bills to customers and pay bills to suppliers.

Another innovation in manual systems was the "one write" or pegboard system. By creating one document and aligning other records under it on a pegboard, companies could record transactions more efficiently. These systems permit the writing of a check and the simultaneous recording of the check in the cash disbursements journal. Even though some of these systems are still in use today, computers make them obsolete.

#### 4. Completing the accounting cycle

During the 1950s, companies also used bookkeeping machines to supplement manual systems. These machines recorded recurring transactions such as sales on account. They posted transactions to the general ledger and subsidiary ledger accounts and computed new balances. With the development of computers, bookkeeping machines became obsolete. They were quite expensive, and computers easily outperformed them. In the mid-1950s, large companies began using mainframe computers. Early accounting applications were in payroll, accounts receivable, accounts payable, and inventory. Within a few years, programs existed for all phases of accounting, including manufacturing operations and the total integration of other accounting programs with the general ledger. Until the 1980s, small and medium-sized companies either continued with a manual system, rented time on another company's computer, or hired a service bureau to perform at least some accounting functions.

**MICROTRAIN COMPANY**

**Trial Balance**

**2010 December 31**

**Acct.**

No.	Account Title	Debits	Credits
100	Cash	\$ 8,250	
103	Accounts Receivable	6,200	
107	Supplies on Hand	900	
108	Prepaid Insurance	2,200	
112	Prepaid Rent	800	
121	Interest Receivable	600	
150	Trucks	40,000	
151	Accumulated Depreciation—Trucks		\$ 750
200	Accounts Payable		730
206	Salaries Payable		180
216	Unearned Service Fees		3,000
300	Capital Stock		50,000
310	Retained Earnings		4,290
		\$ 58,950	\$ 58,950

Exhibit 24: Post closing trial balance

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**An accounting perspective:**

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**Business insight**

Imagine a company with an Accounts Receivable account and an Accounts Payable account in its general ledger and no Accounts Receivable Subsidiary Ledger or Accounts Payable Subsidiary Ledger. How would this company know to whom to send bills and in what amounts? Also, how would employees know for which suppliers to write checks and in what amounts? Such subsidiary records are necessary either on paper or in a computer file.

Here is how the general ledger and subsidiary ledgers might look:

*Subsidiary  
Accounts  
Receivable  
Ledger  
JOHN JONES*

*General Ledger  
  
ACCOUNTS RECEIVABLE*

*Subsidiary Accounts  
Payable Ledger  
  
BELL CORPORATION*

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200 1	900	100
SYLVIA SMITH		GRANGER CORPORATION
300 1	ACCOUNTS PAYABLE	600
	1,000	
JAMES WELLS		WONG CORPORATION
400 1		300

When a sale on account is made to John Jones, the debit is posted to both the control account, Accounts Receivable, in the General Ledger and the subsidiary account, John Jones, in the Subsidiary Accounts Receivable Ledger. Likewise, when a purchase on account is made from Bell Corporation, the credit is posted to both the control account, Accounts Payable, in the General Ledger and to the subsidiary account, Bell Corporation, in the Subsidiary Accounts Payable Ledger. At the end of the accounting period, the balances in each of the control accounts in the General Ledger must agree with the totals of the accounts in their respective subsidiary ledgers as shown above. A given company could have hundreds or even thousands of accounts in their subsidiary ledgers that show the detail not supplied by the totals in the control accounts.

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### A broader perspective:

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### Skills for the long haul

The decision has been made: You [Tracy] have opted to start your career by joining an international accounting firm. But you can not help wondering if you have the right skills both for short and long-term success in public accounting.

Most students understand that accounting knowledge, organizational ability and interpersonal skills are critical to success in public accounting. But it is important for the beginner to realize that different skills are emphasized at different points in a public accountant's career.

Let us examine the duties and skills needed at each level—Staff Accountant (years 1-2), Senior Accountant (years 3-4), Manager/ Senior Manager (years 5-11) and Partner (years 11+).

#### **Staff accountant—Enthusiastic learner**

Let us travel with Tracy as she begins her career at the staff level. At the outset, she works directly under a senior accountant on each of her audits and is responsible for completing audits and administrative tasks assigned to her. Her duties include documenting work papers, interacting with client accounting staff, clerical tasks and discussing questions that arise with her senior. Tracy will work on different audit engagements during her first year and learn the firm's audit approach. She will be introduced to various industries and accounting systems.

The two most important traits to be demonstrated at the staff level are (1) a positive attitude and (2) the ability to learn quickly while adapting to unfamiliar situations.

#### **Senior accountant—Organizer and teacher**

#### 4. Completing the accounting cycle

As a senior accountant, Tracy will be responsible for the day-to-day management of several audit engagements during the year. She will plan the audits, oversee the performance of interim audit testing and direct year-end field work. She will also perform much of the final wrap-up work, such as preparing checklists, writing the management letter and reviewing or drafting the financial statements. Throughout this process, Tracy will spend a substantial amount of time instructing and supervising staff accountants.

The two most critical skills needed at the senior level are (1) the ability to organize and control an audit and (2) the ability to teach staff accountants how to audit.

##### **Manager/senior manager—General manager and salesperson**

Upon promotion to manager, Tracy will begin the transformation from auditor to executive. She will manage several audits at one time and become active in billing clients as well as negotiating audit fees. She will handle many important client meetings and closing conferences. Tracy will also become more involved in the firm's administrative tasks. Finally, outside of her client service and administrative duties, Tracy will be evaluated to a large extent on her community involvement and ability to assist the partners in generating new business for the firm.

The two skills most emphasized at the manager level are (1) general management ability and (2) sales and communication skills.

##### **Partner—Leader and expert**

As a partner in the firm, Tracy will have many broad responsibilities. She will engage in high-level client service activities, business development, recruiting, strategic planning, office administration and counseling. Besides serving as the engagement partner on several audits, she will have ultimate responsibility for the quality of service provided to each of her clients. Although a certain industry or administrative function will become her specialty, she will often be called upon to perform a wide variety of audit and administrative duties when other partners have scheduling conflicts. She will be expected to serve as a positive example to those who work for her and will train others in her areas of expertise.

At the partnership level, what is looked for is leadership ability plus the ability to become an expert in a specific industry or administrative function.

##### **In the meantime**

Those planning on a public accounting career should do more than just learn accounting. To develop the needed skills, a broad education background in business and nonbusiness courses is required plus participation in extracurricular activities that promote leadership and communication skills. It is never too early to start building the skills for long-term success.

Source: Dana R. Hermanson and Heather M. Hermanson, *New Accountant*, January 1990, pp. 24-26, © 1990, New DuBois Corporation.

The development of the personal computer (PC) in 1976 and its widespread use a decade later drastically changed the accounting systems of small and medium-sized businesses. The number and quality of accounting software packages for PCs and the power of PCs quickly increased. Soon small and medium-sized businesses could

maintain all accounting functions on a PC. By the 1990s, the cost of PCs and accounting software packages had decreased significantly, accounting software packages had become more user-friendly, and computer literacy had increased so much that many very small businesses converted from manual to computerized systems. However, some small business owners still use manual systems because they are familiar and meet their needs, and the persons keeping the records may not be computer literate.

Your knowledge of the basic manual accounting system described in these first four chapters enables you to better understand a computerized accounting system. The computer automatically performs some of the steps in the accounting cycle, such as posting journal entries to the ledger accounts, closing the books, and preparing the financial statements. However, if you understand all of the steps in the accounting cycle, you will better understand how to use the resulting data in decision making.

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### An accounting perspective:

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#### The impact of technology

Results from a recent survey of 1,400 chief financial officers (CFOs) indicate that tomorrow's accounting professionals will be called upon to bridge the gap between technology and business. With the rise of integrated accounting and information systems, technical expertise will go hand in hand with general business knowledge.

As we show in Exhibit 25, an **accounting system** is a set of records and the procedures and equipment used to perform the accounting functions. Manual systems consist of journals and ledgers on paper. Computerized accounting systems consist of accounting software, computer files, computers, and related peripheral equipment such as printers.

Regardless of the system, the functions of accountants include: (1) observing, identifying, and measuring economic events; (2) recording, classifying, and summarizing measurements; and (3) reporting economic events and interpreting financial statements. Both internal and external users tell accountants their information needs. The accounting system enables a company's accounting staff to supply relevant accounting information to meet those needs. As internal and external users make decisions that become economic events, the cycle of information, decisions, and economic events begins again.

The primary focus of the first four chapters has been on how you can use an accounting system to prepare financial statements. However, we also discussed how to use that information in making decisions. Later chapters also show how to prepare information and how that information helps users to make informed decisions. We have not eliminated the preparation aspects because we believe that the most informed users are ones who also understand how the information was prepared. These users understand not only the limitations of the information but also its relevance for decision making.

The next section discusses and illustrates the classified balance sheet, which aids in the analysis of the financial position of companies. One example of this analysis is the current ratio and its use in analyzing the short-term debt-paying ability of a company.

#### 4. Completing the accounting cycle

**Illustration 4.7** The Role of an Accounting System

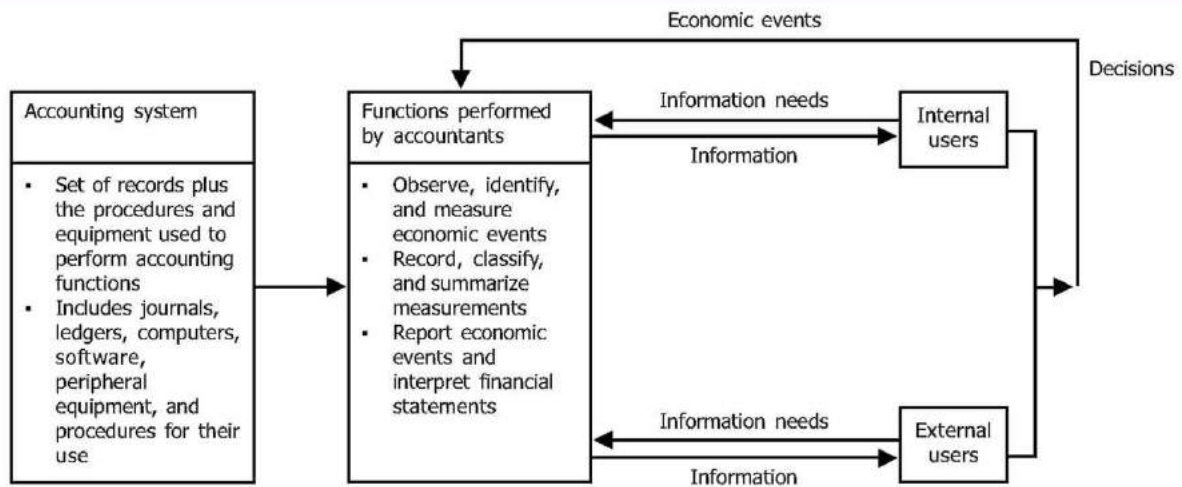


Exhibit 25: The role of an accounting system

### An accounting perspective

#### Uses of technology

Accounting software packages are typically menu driven and organized into modules such as general ledger, accounts payable, accounts receivable, invoicing, inventory, payroll, fixed assets, job cost, and purchase order. For instance, general journal entries are made in the general ledger module, and this module contains all of the company's accounts. The accounts payable module records all transactions involving credit purchases from suppliers and payments made to those suppliers. The accounts receivable module records all sales on credit to various customers and amounts received from customers.

#### A classified balance sheet

The balance sheets we presented so far have been unclassified balance sheets. As shown in Exhibit 23, an **unclassified balance sheet** has three major categories: assets, liabilities, and stockholders' equity. A **classified balance sheet** contains the same three major categories and subdivides them to provide useful information for interpretation and analysis by users of financial statements.

Exhibit 26, shows a slightly revised classified balance sheet for The Home Depot, Inc., and subsidiaries.<sup>11</sup> Note that The Home Depot classified balance sheet is in a vertical format (assets appearing above liabilities and stockholders' equity) rather than the horizontal format (assets on the left and liabilities and stockholders' equity on the right). The two formats are equally acceptable.

<sup>11</sup> Founded in 1978, The Home Depot is America's largest home improvement retailer and ranks among the nation's 30 largest retailers. The company has more than 1,000 full-service warehouse stores. Their primary customers are do-it-yourselfers.



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The Home Depot classified balance sheet subdivides two of its three major categories. The Home Depot subdivides its assets into current assets, property and equipment, long-term investments, long-term notes receivable, intangible assets (cost in excess of the fair value of net assets acquired), and other assets. The company subdivides its liabilities into current liabilities and long-term liabilities (including deferred income taxes). A later chapter describes minority interest. Stockholders' equity is the same in a classified balance sheet as in an unclassified balance sheet. Later chapters describe further subdivisions of the stockholders' equity section.

We discuss the individual items in the classified balance sheet later in the text. Our only purpose here is to briefly describe the items that can be listed under each category. Some of these items are not in The Home Depot's balance sheet.

#### 4. Completing the accounting cycle

##### THE HOME DEPOT, INC. AND SUBSIDIARIES

##### Consolidated Balance Sheet

2001 January 28

(amounts in millions, except share data)

	January 28, 2001	
Assets		
Current Assets:		
Cash and Cash Equivalents	\$ 167	
Short-Term Investments, including current maturities of long-term investments	10	
Receivables, net	835	
Merchandise Inventories	6,556	
Other Current Assets	209	
Total Current Assets		\$ 7,777
Property and Equipment, at cost:		
Land	\$ 4,230	
Buildings	6,167	
Furniture, Fixtures and Equipment	2,877	
Leasehold Improvements	665	
Construction in Progress	1,032	
Capital Leases	261	
	\$ 15,232	
Less: Accumulated Depreciation and Amortization	2,164	
Net Property and Equipment	\$ 13,068	
Long-Term Investments	15	
Notes Receivable	77	
Cost in Excess of Fair Value of Net Assets Acquired, net of accumulated amortization of \$41 at January 25, 2001 and \$33 at January 30, 2000	314	
Other	134	13,608
Total assets		\$ 21,385
Liabilities and Stockholders' Equity		
Current Liabilities:		
Accounts Payable	\$ 1,976	
Accrued Salaries and Related Expenses	627	
Sales Taxes Payable	298	
Other Accrued Expenses	1,402	
Income Taxes Payable	78	
Current Installments of Long-Term Debt	4	
Total Current Liabilities		\$4,385
Long-Term Debt, excluding current installments	\$ 1,545	
Other Long-Term Liabilities	245	
Deferred Income Taxes	195	1,985
Minority Interest		11
Stockholders' equity:		
Common Stock, par value \$0.05. Authorized: 10,000,000,000 shares; issued and outstanding- 2,323,747,000 shares at 2001 January 28 and 2,304,317,000 shares at 2000 January 30	116	
Paid-In Capital	4,810	
Retained Earnings	10,151	

<i>Accumulated Other Comprehensive Income</i>	(67)	
	15,010	
<i>Less: Shares Purchased for Compensation Plans</i>	6	
<i>Total Stockholders' Equity</i>		15,004
<i>Total Liabilities and Stockholders' Equity</i>		\$ 21,385

#### Exhibit 26: A classified balance sheet

**Current assets** are cash and other assets that a business can convert to cash or uses up in a relatively short period—one year or one operating cycle, whichever is longer. An **operating cycle** is the time it takes to start with cash, buy necessary items to produce revenues (such as materials, supplies, labor, and/or finished goods), sell services or goods, and receive cash by collecting the resulting receivables. Companies in service industries and merchandising industries generally have operating cycles shorter than one year. Companies in some manufacturing industries, such as distilling and lumber, have operating cycles longer than one year. However, since most operating cycles are shorter than one year, the one-year period is usually used in identifying current assets and current liabilities. Common current assets in a service business include cash, marketable securities, accounts receivable, notes receivable, interest receivable, and prepaid expenses. Note that on a balance sheet, current assets are in order of how easily they are convertible to cash, from most liquid to least liquid.

**Cash** includes deposits in banks available for current operations at the balance sheet date plus cash on hand consisting of currency, undeposited checks, drafts, and money orders. Cash is the first current asset to appear on a balance sheet. The term cash normally includes cash equivalents.

**Cash equivalents** are highly liquid, short-term investments acquired with temporarily idle cash and easily convertible into a known cash amount. Examples are Treasury bills, short-term notes maturing within 90 days, certificates of deposit, and money market funds.

**Marketable securities** are temporary investments such as short-term ownership of stocks and bonds of other companies. Such investments do not qualify as cash equivalents. These investments earn additional money on cash that the business does not need at present but will probably need within one year.

**Accounts receivable** (also called trade accounts receivable) are amounts owed to a business by customers. An account receivable arises when a company performs a service or sells merchandise on credit. Customers normally provide no written evidence of indebtedness on sales invoices or delivery tickets except their signatures. Notice the term net in the balance sheet of The Home Depot (Exhibit 26). This term indicates the possibility that the company may not collect some of its accounts receivable. In the balance sheet, the accounts receivable amount is the sum of the individual accounts receivable from customers shown in a subsidiary ledger or file.

**Merchandise inventories** are goods held for sale. Chapter 6 begins our discussion of merchandise inventories.

A **note** is an unconditional written promise to pay another party the amount owed either when demanded or at a certain specified date, usually with interest (a charge made for use of the money) at a specified rate. A note receivable appears on the balance sheet of the company to which the note is given. A note receivable arises (1) when a company makes a sale and receives a note from the customer, (2) when a customer gives a note for an amount due on an account receivable, or (3) when a company loans money and receives a note in return. Chapter 9 discusses notes at length.

#### 4. Completing the accounting cycle

Other current assets might include interest receivable and prepaid expenses. **Interest receivable** arises when a company has earned but not collected interest by the balance sheet date. Usually, the amount is not due until later. **Prepaid expenses** include rent, insurance, and supplies that have been paid for but all the benefits have not yet been realized (or consumed) from these expenses. If prepaid expenses had not been paid for in advance, they would require the future disbursement of cash. Furthermore, prepaid expenses are considered assets because they have service potential.

**Long-term assets** are assets that a business has on hand or uses for a relatively long time. Examples include property, plant, and equipment; long-term investments; and intangible assets.

**Property, plant, and equipment** are assets with useful lives of more than one year; a company acquires them for use in the business rather than for resale. (These assets are called property and equipment in The Home Depot's balance sheet.) The terms plant assets or fixed assets are also used for property, plant, and equipment. To agree with the order in the heading, balance sheets generally list property first, plant next, and equipment last. These items are fixed assets because the company uses them for long-term purposes. We describe several types of property, plant, and equipment next.

**Land** is ground the company uses for business operations; this includes ground on which the company locates its business buildings and that is used for outside storage space or parking. Land owned for investment is not a plant asset because it is a long-term investment.

**Buildings** are structures the company uses to carry on its business. Again, the buildings that a company owns as investments are not plant assets.

**Office furniture** includes file cabinets, desks, chairs, and shelves.

**Office equipment** includes computers, copiers, FAX machines, and phone answering machines.

**Leasehold improvements** are any physical alterations made by the lessee to the leased property when these benefits are expected to last beyond the current accounting period. An example is when the lessee builds room partitions in a leased building. (The lessee is the one obtaining the rights to possess and use the property.)

**Construction in progress** represents the partially completed stores or other buildings that a company such as The Home Depot plans to occupy when completed.

**Accumulated depreciation** is a contra asset account to depreciable assets such as buildings, machinery, and equipment. This account shows the total depreciation taken for the depreciable assets. On the balance sheet, companies deduct the accumulated depreciation (as a contra asset) from its related asset.

**Long-term investments** A **long-term investment** usually consists of securities of another company held with the intention of (1) obtaining control of another company, (2) securing a permanent source of income for the investor, or (3) establishing friendly business relations. The long-term investment classification in the balance sheet does not include those securities purchased for short-term purposes. For most businesses, long-term investments may be stocks or bonds of other corporations. Occasionally, long-term investments include funds accumulated for specific purposes, rental properties, and plant sites for future use.

**Intangible assets** **Intangible assets** consist of the noncurrent, nonmonetary, nonphysical assets of a business. Companies must charge the costs of intangible assets to expense over the period benefited. Among the intangible assets are rights granted by governmental bodies, such as patents and copyrights. Other intangible assets include leaseholds and goodwill.

A **patent** is a right granted by the federal government; it gives the owner of an invention the authority to manufacture a product or to use a process for a specified time.

A **copyright** granted by the federal government gives the owner the exclusive privilege of publishing written material for a specified time.

**Leaseholds** are rights to use rented properties, usually for several years.

**Goodwill** is an intangible value attached to a business, evidenced by the ability to earn larger net income per dollar of investment than that earned by competitors in the same industry. The ability to produce superior profits is a valuable resource of a business. Normally, companies record goodwill only at the time of purchase and then only at the price paid for it. The Home Depot has labeled its goodwill "cost in excess of the fair value of net assets acquired".

**Accumulated amortization** is a contra asset account to intangible assets. This account shows the total amortization taken on the intangible assets.

**Current liabilities** are debts due within one year or one operating cycle, whichever is longer. The payment of current liabilities normally requires the use of current assets. Balance sheets list current liabilities in the order they must be paid; the sooner a liability must be paid, the earlier it is listed. Examples of current liabilities follow.

**Accounts payable** are amounts owed to suppliers for goods or services purchased on credit. Accounts payable are generally due in 30 or 60 days and do not bear interest. In the balance sheet, the accounts payable amount is the sum of the individual accounts payable to suppliers shown in a subsidiary ledger or file.

**Notes payable** are unconditional written promises by the company to pay a specific sum of money at a certain future date. The notes may arise from borrowing money from a bank, from the purchase of assets, or from the giving of a note in settlement of an account payable. Generally, only notes payable due in one year or less are included as current liabilities.

**Salaries payable** are amounts owed to employees for services rendered. The company has not paid these salaries by the balance sheet date because they are not due until later.

**Sales taxes payable** are the taxes a company has collected from customers but not yet remitted to the taxing authority, usually the state.

Other accrued expenses might include taxes withheld from employees, income taxes payable, and interest payable. **Taxes withheld from employees** include federal income taxes, state income taxes, and social security taxes withheld from employees' paychecks. The company plans to pay these amounts to the proper governmental agencies within a short period. **Income taxes payable** are the taxes paid to the state and federal governments by a corporation on its income. **Interest payable** is interest that the company has accumulated on notes or bonds but has not paid by the balance sheet date because it is not due until later.

**Dividends payable**, or amounts the company has declared payable to stockholders, represent a distribution of income. Since the corporation has not paid these declared dividends by the balance sheet date, they are a liability.

**Unearned revenues** (revenues received in advance) result when a company receives payment for goods or services before earning the revenue, such as payments for subscriptions to a magazine. These unearned revenues represent a liability to perform the agreed services or other contractual requirements or to return the assets received.

Companies report any current installment on long-term debt due within one year under current liabilities. The remaining portion continues to be reported as a long-term liability.

#### 4. Completing the accounting cycle

**Long-term liabilities** are debts such as a mortgage payable and bonds payable that are not due for more than one year. Companies should show maturity dates in the balance sheet for all long-term liabilities. Normally, the liabilities with the earliest due dates are listed first.

**Notes payable** with maturity dates at least one year beyond the balance sheet date are long-term liabilities.

**Bonds payable** are long-term liabilities and are evidenced by formal printed certificates sometimes secured by liens (claims) on property, such as mortgages. Maturity dates should appear on the balance sheet for all major long-term liabilities.

The deferred income taxes on The Home Depot's balance sheet result from a difference between income tax expense in the accounting records and the income tax payable on the company's tax return.

**Stockholders' equity** shows the owners' interest in the business. This interest is equal to the amount contributed plus the income left in the business.

The items under stockholders' equity in The Home Depot's balance sheet are paid-in capital (including common stock) and retained earnings. **Paid-in capital** shows the capital paid into the company as the owners' investment. **Retained earnings** shows the cumulative income of the company less the amounts distributed to the owners in the form of dividends. Cumulative translation adjustments result from translating foreign currencies into US dollars (a topic discussed in advanced accounting courses). The unrealized loss on investments is discussed in Chapter 14.

The next section shows how two categories on the classified balance sheet relate to each other. Together they help reveal a company's short-term debt-paying ability.

#### Analyzing and using the financial results – the current ratio

The current ratio indicates the short-term debt-paying ability of a company. To find the **current ratio**, we divide current assets by current liabilities. For instance, Exhibit 26 shows that The Home Depot's current assets as of 2001 January 28, were USD 7,777,000,000 and its current liabilities were USD 4,385,000,000. Thus, its current

$$\text{ratio was: Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} = \frac{\text{USD } 7,777,000,000}{\text{USD } 4,385,000,000} = 1.77:1$$

The current ratio of 1.77:1 for The Home Depot means that it has almost twice as many current assets as current liabilities. Because current liabilities are normally paid with current assets, the company appears to be able to pay its short-term obligations easily.

In evaluating a company's short-term debt-paying ability, you should also examine the quality of the current assets. If they include large amounts of uncollectable accounts receivable and/or obsolete and unsalable inventory, even a 2:1 current ratio may be inadequate to allow the company to pay its current liabilities. The Home Depot undoubtedly does not have such a problem.

The current assets, current liabilities, and current ratios of some other companies as of the third quarter of 2001 were:

<b>Current Company</b>	<b>Current Assets</b>	<b>Current Liabilities</b>	<b>Ratio</b>
<i>Wal-Mart Stores, Inc.</i>	<i>\$ 32,620,000,000</i>	<i>\$ 32,869,000,000</i>	<i>.99:1</i>
<i>Hewlett-Packard Company</i>	<i>15,782,000,000</i>	<i>13,950,000,000</i>	<i>1.13:1</i>
<i>3M Corporation</i>	<i>6,556,000,000</i>	<i>5,006,000,000</i>	<i>1.31:1</i>
<i>General Electric Company</i>	<i>313,050,000,000</i>	<i>168,788,000,000</i>	<i>1.85:1</i>
<i>Johnson &amp; Johnson</i>	<i>19,079,000,000</i>	<i>7,504,000,000</i>	<i>2.54:1</i>

**We described each of these companies earlier in the text.**

As you can see from these comparisons, the current ratios vary a great deal. An old rule of thumb is that the current ratio should be at least 2:1. However, what constitutes an adequate current ratio depends on available lines of credit, the cash-generating ability of the company, and the nature of the industry in which the company operates. For instance, companies in the airline industry are able to generate huge amounts of cash on a daily basis and may be able to pay their current liabilities even if their current ratio is less than 1:1. Comparing a company's current ratio with other companies in the same industry makes sense because all of these companies face about the same economic conditions. A company with the lowest current ratio in its industry may be unable to pay its short-term obligations on a timely basis, unless it can borrow funds from a bank on a line of credit. A company with the highest current ratio in its industry may have on hand too many current assets, such as cash and marketable securities, which could be invested in more productive assets.

The next chapter describes the assumptions, concepts, and principles that constitute the accounting theory underlying financial accounting. Thus, accounting theory dictates the standards and procedures applied to the reporting of financial information in the financial statements.

### Understanding the learning objectives

- Analyze transactions by examining source documents.
- Journalize transactions in the journal.
- Post journal entries to the accounts in the ledger.
- Prepare a trial balance of the accounts and complete the work sheet.
- Prepare financial statements.
- Journalize and post adjusting entries.
- Journalize and post closing entries.
- Prepare a post-closing trial balance.
- The work sheet is a columnar sheet of paper on which accountants summarize information needed to make the adjusting and closing entries and to prepare the financial statements.
- Work sheets may vary in format. The work sheet illustrated in the chapter has 12 columns—two each for trial balance, adjustments, adjusted trial balance, income statement, statement of retained earnings, and balance sheet.
- The information needed to prepare the income statement is in the Income Statement columns of the work sheet. Net income for the period is the amount needed to balance the two Income Statement columns in the work sheet.
- The information needed to prepare the statement of retained earnings is in the Statement of Retained Earnings columns of the work sheet. The ending Retained Earnings balance is carried forward to the balance sheet.
- The information needed to prepare the balance sheet is in the Balance Sheet columns of the work sheet.
- As explained in Chapter 3, adjusting entries are necessary to bring the accounts to their proper balances before preparing the financial statements. Closing entries are necessary to reduce the balances of revenue, expense, and Dividends accounts to zero so they are ready to receive data for the next accounting period.
- Revenue accounts are closed by debiting them and crediting the Income Summary account.
- Expense accounts are closed by crediting them and debiting the Income Summary account.

#### 4. Completing the accounting cycle

- The balance in the Income Summary account represents the net income or net loss for the period.
- To close the Income Summary account, the balance is transferred to the Retained Earnings account.
- To close the Dividends account, the balance is transferred to the Retained Earnings account.
- Only the balance sheet accounts have balances and appear on the post-closing trial balance.
- All revenue, expense, and Dividends accounts have zero balances and are not included in the post-closing trial balance.
- Manual systems and computerized systems perform the same accounting functions.
- The ease of accounting with a PC has encouraged even small companies to convert to computerized systems.
- A classified balance sheet subdivides the major categories on the balance sheet. For instance, a classified balance sheet subdivides assets into current assets; long-term investments; property, plant, and equipment; and intangible assets. It subdivides liabilities into current liabilities and long-term liabilities. Later chapters show more accounts in the stockholders' equity section, but the subdivisions remain basically the same.
- The current ratio gives some indication of the short-term debt-paying ability of a company.
- To find the current ratio, divide current assets by current liabilities.

#### Demonstration problem

This problem involves using a work sheet for Green Hills Riding Stable, Incorporated, for the month ended 2010 July 31, and performing the closing process. The trial balance for Green Hills Riding Stable, Incorporated, as of 2010 July 31, was as follows:

**GREEN HILLS RIDING STABLE, INCORPORATED**  
**Trial Balance**  
**2010 July 31**

Acct.		Debits	Credits
100	Cash	\$ 10,700	
103	Accounts Receivable	8,100	
130	Land	40,000	
140	Buildings	24,000	
200	Accounts Payable		\$ 1,100
201	Notes Payable		40,000
300	Capital Stock		35,000
310	Retained Earnings, 2010 July 1		3,100
320	Dividends	1,000	
402	Horse Boarding Fees Revenue		4,500
404	Riding Lesson Fees Revenue		3,600
507	Salaries Expense	1,400	
513	Feed Expense	1,100	
540	Interest Expense	200	
568	Miscellaneous Expense	800	
		\$ 87,300	\$87,300

Depreciation expense for the month is USD 200. Accrued salaries on July 31 are USD 300.

- Prepare a 12-column work sheet for the month ended 2010 July 31.
- Journalize the adjusting entries.
- Journalize the closing entries.



Solution to demonstration problem

a. See the work sheet below.

GREEN HILLS RIDING STABLE, INCORPORATE													
Work Sheet													
For the Month Ended 2010 July 31													
Acct No.	Account Titles	Trial Balance		Adjustments		Adjusted Balance		Income Statement		Statement of Retained Earnings		Balance Sheet	
		Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit
100	Cash	10,700				10,700							10,700
103	Accounts Receivable	5,100				3,100							8,100
130	Land	40,000				40,000							40,000
140	Buildings	24,000				24,000							24,000
200	Accounts Payable		1,100				1,100						1,100
201	Notes Payable		40,000				40,000						40,000
300	Capital Stock		35,000				35,000						35,000
310	Retained Earnings		3,100				3,100				3,100		
2010 July 1													
320	Dividends	1,000				1,000				1,000			
402	Horse Boarding Fees Revenue		4,500				4,500	4,500					
404	Riding and Lesson Fees Revenue		3,500				3,600	3,600					
507	Salaries Expense	1,400		(2) 300		1,700		1,700					
513	Feed Expense	1,100				1,100		1,100					
540	Interest Expense	200				200		200					
563	Miscellaneous Expense	300				500		500					
		87,300	37,300										
520	Depreciation Expense—Buildings			(1) 200		200		200					
141	Accumulated Depreciation—Buildings				(1) 200		200						200
206	Salaries Payable			(2) 300			300						300
				E00 500		87,500	37,300						
	Net Income							4,000 8,100					
								4,100			4,100		
	Retained Earnings, 2010 July 31							8,100 8,100		1,000 7,200		82,300 76,600	6,200 6,200
										7,200 7,200		52,500 32,800	

Adjustments:

- (i) To record depreciation of building for July.
- (2) To record accrued salaries of \$300.

b.

GREEN HILLS RIDING STABLE, INCORPORATED				
General Journal				
Date	Account Titles and Explanation	Post. Ref.	Debit	Credit
2010	Adjusting Entries			
July 31	Depredation Expense—Buildings (-SE)	520	200	
	Accumulated Depreciation—Buildings (-A)	141		200
	To record depreciation expense.			
31	Salaries Expense (-SE)	507	300	
	Salaries Payable (+L)	206		300
	To record accrued salaries.			

c.

#### 4. Completing the accounting cycle

Date	Account Titles and Explanation	Post. Ref.	Debit	Credit
2010	Closing Entries			
July	31 Horse Boarding Fees Revenue	402	4 5 0 0	
	Riding Lesson Fees Revenue	404	3 6 0 0	
	Income Summary	600		8 1 0 0
	To close revenue accounts.			
	31 Income Summary	600	4 0 0 0	
	Salaries Expense	507		1 7 0 0
	Feed Expense	513		1 1 0 0
	Interest Expense	540		2 0 0
	Miscellaneous Expense	568		8 0 0
	Depreciation Expense—Buildings	520		2 0 0
	To close expense accounts.			
	31 Income Summary	600	4 1 0 0	
	Retained Earnings	310		4 1 0 0
	To close Income Summary account.			
	31 Retained Earnings	310	1 0 0 0	
	Dividends	320		1 0 0 0
	To close dividends account.			

#### Key terms\*

**Accounting cycle** Series of steps performed during the accounting period to analyze, record, classify, summarize, and report useful financial information for the purpose of preparing financial statements. The steps include analyzing transactions, journalizing transactions, posting journal entries, taking a trial balance and completing the work sheet, preparing financial statements, journalizing and posting adjusting entries, journalizing and posting closing entries, and taking a post-closing trial balance.

**Accounting system** A set of records and the procedures and equipment used to perform accounting functions.

**Accounts payable** Amounts owed to suppliers for goods or services purchased on credit.

**Accounts receivable** Amounts due from customers for services performed or merchandise sold on credit.

**Accumulated amortization** A contra account to intangible assets.

**Accumulated depreciation** A contra account to depreciable assets such as buildings, machinery, and equipment.

**Bonds payable** Written promises to pay a definite sum at a certain date as evidenced by formal printed certificates that are sometimes secured by liens on property, such as mortgages.

**Buildings** Structures used to carry on the business.

**Cash** Includes deposits in banks available for current operations at the balance sheet date plus cash on hand consisting of currency, undeposited checks, drafts, and money orders.

**Cash equivalents** Highly liquid, short-term investments acquired with temporarily idle cash.

**Classified balance sheet** Subdivides the three major balance sheet categories (assets, liabilities, and stockholders' equity) to provide more information for users of financial statements. Assets may be divided into current assets; long-term investments; property, plant, and equipment; and intangible assets. Liabilities may be divided into current liabilities and long-term liabilities.

**Closing process** The act of transferring the balances in the revenue and expense accounts to a clearing account called Income Summary and then to the Retained Earnings account. The balance in the Dividends account is also transferred to the Retained Earnings account.

**Construction in progress** Represents the partially completed stores or other buildings that a company plans to occupy when completed.

- Copyright** Grants the owner the exclusive privilege of publication of written material for a specific time.
- Current assets** Cash and other assets that a business can convert into cash or use up in one year or one operating cycle, whichever is longer.
- Current liabilities** Debts due within one year or one operating cycle, whichever is longer. The payment of current liabilities normally requires the use of current assets.
- Current ratio** Calculated by dividing current assets by current liabilities.
- Dividends payable** Amounts declared payable to stockholders and that represent a distribution of income.
- Goodwill** An intangible value attached to a business, evidenced by the ability to earn larger net income per dollar of investment than that earned by competitors in the same industry.
- Income Summary account** A clearing account used only at the end of an accounting period to summarize revenues and expenses for the period.
- Income taxes payable** Are the taxes payable to the state and federal governments by a corporation based on its income.
- Intangible assets** Noncurrent, nonmonetary, nonphysical assets of a business.
- Interest payable** Interest that has accumulated on debts, such as notes or bonds. This accrued interest has not been paid at the balance sheet date because it is not due until later.
- Interest receivable** Arises when interest has been earned but not collected at the balance sheet date.
- Land** Ground the company uses for business operations. Land could include ground on which the company locates its business buildings and that used for outside storage space or a parking lot.
- Leasehold improvements** Are any physical alterations made by the lessee to the leased property when these benefits are expected to last beyond the current accounting period.
- Leaseholds** Rights to use rented properties.
- Long-term assets** Assets that are on hand or used by a business for a relatively long time. Examples include long-term investments; property, plant, and equipment; and intangible assets.
- Long-term investment** Usually securities of another company held with the intention of (1) obtaining control of another company, (2) securing a permanent source of income for the investor, or (3) establishing friendly business relations.
- Long-term liabilities** Debts such as a mortgage payable and bonds payable that are not due for more than one year.
- Marketable securities** Temporary investments that a company makes to earn a return on idle cash.
- Merchandise inventory** Goods held for sale.
- Note** An unconditional written promise to pay to another party the amount owed either when demanded or at a certain date.
- Notes payable** Unconditional written promises by a company to pay a specific sum of money at a certain future date.
- Office equipment** Includes computers, copiers, FAX machines, and phone answering machines.
- Office furniture** Includes file cabinets, desks, chairs, and shelves.
- Operating cycle** The time it takes to start with cash, buy necessary items to produce revenues (such as materials, supplies, labor, and/or inventories), sell services or goods, and receive cash by collecting the resulting receivables.
- Paid-in capital** Shows the capital paid into the company as the owners' investment.
- Patent** A right granted by the federal government authorizing the owner of an invention to manufacture a product or to use a process for a specific time.
- Post-closing trial balance** A trial balance taken after the closing entries have been posted.
- Prepaid expenses** Assets awaiting assignment to expense. Items such as rent, insurance, and supplies that have been paid for but from which all of the benefits have not yet been realized (or consumed). Prepaid expenses are classified as current assets.
- Property, plant, and equipment** Assets with useful lives of more than one year that a company acquired for use in a business rather than for resale; also called plant assets or fixed assets.
- Retained earnings** Shows the cumulative income of the company less the amounts distributed to the owners in the form of dividends.
- Salaries payable** Amounts owed to employees for services rendered.

#### 4. Completing the accounting cycle

**Sales taxes payable** Are taxes a company has collected from customers but has not remitted to the taxing authority, usually the state.

**Stockholders' equity** Shows the owners' interest (equity) in the business.

**Taxes withheld from employees** Items such as federal income taxes, state income taxes, and social security taxes withheld from employees' paychecks.

**Unclassified balance sheet** A balance sheet showing only three major categories: assets, liabilities, and stockholders' equity.

**Unearned revenues (revenues received in advance)** Result when payment is received for goods or services before revenue has been earned.

**Work sheet** A columnar sheet of paper on which accountants have summarized information needed to make the adjusting and closing entries and to prepare the financial statements.

\*Some of these terms have been defined in earlier chapters but are included here for your convenience.

#### Self-test

##### True-false

Indicate whether each of the following statements is true or false.

At the end of the accounting period, three trial balances are prepared.

The amounts in the Adjustments columns are always added to the amounts in the Trial Balance columns to determine the amounts in the Adjusted Trial Balance columns.

If a net loss occurs, it appears in the Income Statement credit column and Statement of Retained Earnings debit column.

After the closing process is complete, no balance can exist in any revenue, expense, Dividends, or Income Summary account.

The post-closing trial balance may contain revenue and expense accounts.

All accounting systems currently in use are computerized.

##### Multiple-choice

Select the best answer for each of the following questions.

Which of the following accounts is least likely to be adjusted on the work sheet?

- a. Supplies on Hand.
- b. Land.
- c. Prepaid Rent.
- d. Unearned Delivery Fees.

If the Balance Sheet columns do not balance, the error is most likely to exist in the:

- a. General journal.
- b. General ledger.
- c. Last six columns of the work sheet.
- d. First six columns of the work sheet.

Net income for a period appears in all but which one of the following?

- a. Income Statement debit column of the work sheet.
- b. Statement of Retained Earnings credit column of the work sheet.
- c. Statement of retained earnings.
- d. Balance sheet.

Which of the following statements is false regarding the closing process?

- a. The Dividends account is closed to Income Summary.
- b. The closing of expense accounts results in a debit to Income Summary.
- c. The closing of revenues results in a credit to Income Summary.
- d. The Income Summary account is closed to the Retained Earnings account.

Which of the following statements is true regarding the classified balance sheet?

- a. Current assets include cash, accounts receivable, and equipment.
- b. Plant, property, and equipment is one category of long-term assets.
- c. Current liabilities include accounts payable, salaries payable, and notes receivable.
- d. Stockholders' equity is subdivided into current and long-term categories.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- At which stage of the accounting cycle is a work sheet usually prepared?
- Why are the financial statements prepared before the adjusting and closing entries are journalized and posted?
- Describe the purposes for which the work sheet is prepared.
- You have taken over a set of accounting books for a small business as a part-time job. At the end of the first accounting period, you have partially completed the work sheet by entering the proper ledger accounts and balances in the Trial Balance columns. You turn to the manager and ask, "Where is the list of additional information I can use in entering the adjusting entries?" The manager indicates there is no such list. (In all the text problems you have done, you have always been given this information.) How would you obtain the information for this real-life situation? What are the consequences of not making all of the required adjustments at the end of the accounting period?
- How are the amounts in the Adjusted Trial Balance columns of a work sheet determined?
- The work sheet for Bridges Company shows net income of USD 40,000. The following four adjustments were ignored:
  - Subscriptions Fees earned, USD 1,200.
  - Depreciation of equipment, USD 4,000.
  - Depreciation of building, USD 10,000.
  - Salaries accrued, USD 3,000. What is the correct net income?
- After the Adjusted Trial Balance columns of a work sheet have been totaled, which account balances are extended to the Income Statement columns, which account balances are extended to the Statement of Retained Earnings columns, and which account balances are extended to the Balance Sheet columns?
- How is the statement of retained earnings prepared?
- What is the purpose of closing entries? What accounts are not affected by closing entries?
- A company has net income of USD 50,000 for the year. In which columns of the work sheet would net income appear?
- Is it possible to prepare monthly financial statements without journalizing and posting adjusting and closing entries? How?

#### 4. Completing the accounting cycle

- What is the purpose of a post-closing trial balance?
- Describe some of the ways in which the manual accounting system has evolved.
- When did computerized accounting systems come into use?
- Define an accounting system.
- How is a classified balance sheet different than an unclassified balance sheet?
- **Real world question** Refer to "A broader perspective: Skills for the long haul" to answer the following true-false questions:
  - The same skills are needed at each level in a CPA firm.
  - The two most important traits at the staff accountant level are a positive attitude and the ability to learn quickly while adapting to unfamiliar situations.
  - The senior accountant needs management skills in addition to technical skills.
  - Partners become increasingly involved in technical matters and have less and less interaction with people.
- **Real world question** Referring to the Annual report appendix in your text, identify the classifications (or categories) of assets used by The Limited in its balance sheet.
- **Real world question** Referring to the Annual report appendix in your text, identify the classifications (or categories) of liabilities used by The Limited in its balance sheet.

#### Exercises

**Exercise A** List the steps in the accounting cycle. Would the system still work if any of the steps were performed out of order?

**Exercise B** Three of the major column headings on a work sheet are Trial Balance, Income Statement, and Balance Sheet. Determine under which major column headings each of the following items would appear and whether it would be a debit or credit. (For example, Cash would appear on the debit side of the Trial Balance and Balance Sheet columns.)

Account Titles	Trial Balance		Income Statement		Statement of Retained Earnings		Balance Sheet	
	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit
a. <i>Accounts Receivable</i>								
b. <i>Accounts Payable</i>								
c. <i>Interest Revenue</i>								
d. <i>Advertising Expense</i>								
e. <i>Capital Stock</i>								
f. <i>Retained Earnings (Beg.)</i>								
g. <i>Net income for the month</i>								
h. <i>Retained Earnings (End)</i>								

**Exercise C** Assume a beginning balance in Retained Earnings of USD 84,000 and net income for the year of USD 36,000. Illustrate how these would appear in the Statement of Retained Earnings columns and Balance Sheet columns in the work sheet.

**Exercise D** In the previous exercise, if there was a debit balance of USD 216,000 in the Retained Earnings account as of the beginning of the year and a net loss of USD 192,000 for the year, show how these would be treated in the work sheet.

**Exercise E** Damon Davis was preparing the work sheet for Drano Plumbing Company. He calculated the net income to be USD 50,000. When he totaled the Balance Sheet columns, the column totals were debit, USD

400,000; and credit, USD 300,000. What was the probable cause of this difference? If this was not the cause, what should he do to find the error?

**Exercise F** The Trial Balance of the Printer Repair Company at 2010 December 31, contains the following account balances listed in alphabetical order to increase your skill in sorting amounts to the proper work sheet columns.

**Printer Repair Company  
Trial Balance Account Balances**

**2010 December 31**

Accounts Payable	\$ 41,000
Accounts Receivable	92,000
Accumulated Depreciation—Buildings	25,000
Accumulated Depreciation—Equipment	9,000
Buildings	140,000
Capital Stock	65,000
Cash	60,000
Equipment	36,000
Prepaid Insurance	3,600
Retained Earnings, 2010 January 1	4,800
Salaries Expense	96,000
Service Revenue	290,000
Supplies on Hand	4,000
Utilities Expense	3,200

Using these account balances and the following additional information, prepare a work sheet for Printer Repair Company. Arrange the accounts in their approximate usual order.

- Supplies on hand at 2010 December 31, have a cost of USD 2,400.
- The balance in the Prepaid Insurance account represents the cost of a two-year insurance policy covering the period from 2010 January 1, through 2011 December 31.
- The estimated lives of depreciable assets are buildings, 40 years, and equipment, 20 years. No salvage values are anticipated.

**Exercise G** Texban Corporation had a 2010 January 1, balance in its Retained Earnings account of USD 90,000. For the year 2010, net income was USD 50,000 and dividends declared and paid were USD 24,000. Prepare a statement of retained earnings for the year ended 2010 December 31.

**Exercise H** Rubino Company reported net income of USD 100,000 for the current year. Examination of the work sheet and supporting data indicates that the following items were ignored:

- Accrued salaries were USD 6,000 at December 31.
- Depreciation on equipment acquired on July 1 amounted to USD 4,000.

Based on this information, (a) what adjusting journal entries should have been made at December 31, and (b) what is the correct net income?

**Exercise I** Refer to the work sheet prepared in the Printer Repair Company exercise. Prepare the adjusting and closing journal entries.

**Exercise J** The Income Statement column totals on a work sheet prepared at 2010 December 31, are debit, USD 500,000; and credit, USD 900,000. In T-account format, show how the postings to the Income Summary account would appear as a result of the closing process. Identify what each posting represents.

**Exercise K** After adjustment, these selected account balances of Cold Stream Campground are:

	Debits	Credits
Retained earnings		\$540,000.00
Rental revenue		960000
Salaries expense	\$336,000.00	

#### 4. Completing the accounting cycle

Depreciated expense – Buildings	64000
Utilities expense	208000
Dividends	32000

In T-account format, show how journal entries to close the books for the period would be posted. (You do not need to show the closing journal entries.) Enter these balances in the accounts before doing so. Key the postings from the first closing entry with the number (1), the second with the number (2), and so on.

**Exercise L** The following account balances appeared in the Income Statement columns of the work sheet entries prepared for Liu Company for the year ended 2010 December 31:

Account Titles	Income Statement	
	Debit	Credit
<i>Service Revenue</i>		330,000
<i>Advertising Expense</i>	1,350	
<i>Salaries Expense</i>	130,000	
<i>Utilities Expense</i>	2,250	
<i>Insurance Expense</i>	900	
<i>Rent Expense</i>	6,750	
<i>Supplies Expense</i>	2,250	
<i>Depreciation Expense—Equipment</i>	4,500	
<i>Interest Expense</i>	562	
<i>Interest Revenue</i>		1,125
	148,552	331,125
<i>Net Income</i>	182,553	
	331,125	331,125

Prepare the closing journal entries.

**Exercise M** Which of the following accounts are likely to appear in the post-closing trial balance for the Blake Company?

- Accounts Receivable
- Cash
- Service Revenue
- Buildings
- Salaries Expense
- Capital Stock
- Dividends
- Accounts Payable
- Income Summary
- Unearned Subscription Fees

**Exercise N** Using the legend at the right, determine the category (number) into which you would place each of these items.

Item	Legend
a. Land.	1. Current assets.
b. Marketable securities.	2. Long-term investments.
c. Notes payable, due in three years.	3. Property, plant, and equipment.
d. Taxes withheld from employees.	4. Intangible assets.
e. Patents.	5. Current liabilities.
f. Retained earnings.	6. Long-term liabilities.
g. Unearned subscription fees.	7. Stockholders' equity.



- h. Bonds of another corporation (a 20-year investment).
- i. Notes payable, due in six months.
- j. Accumulated depreciation.

**Exercise O** The following data are from the 2001 annual report of The Procter & Gamble Company and its subsidiaries. This company markets a broad range of laundry, cleaning, paper, beauty care, health care, food, and beverage products in more than 140 countries around the world. Leading brands include Ariel, Crest, Pampers, Pantene, Crisco, Vicks, and Max Factor. The dollar amounts are in millions.

	June 30	
	2001	2000
Current assets	\$10,889	\$10,146
Current liabilities	9,846	10,141

Calculate the current ratios for the two years. Comment on whether the trend is favorable or unfavorable.

### Problems

**Problem A** The following adjusted trial balance is for Jasper Appliance Repair Company:

<b>JASPER APPLIANCE REPAIR COMPANY</b>		
<b>Adjusted Trial Balance</b>		
<b>2010 June 30</b>		
	Debits	Credits
Cash	\$ 63,000	
Accounts Receivable	42,000	
Trucks	110,000	
Accumulated Depreciation—Trucks		\$ 30,000
Accounts Payable		10,800
Notes Payable		20,000
Capital Stock		50,000
Retained Earnings, 2009 July 1		5,500
Dividends	10,000	
Service Revenue		230,000
Rent Expense	12,000	
Advertising Expense	5,000	
Salaries Expense	90,000	
Supplies Expense	1,500	
Insurance Expense	1,200	
Depreciation Expense—Trucks	10,000	
Interest Expense	1,000	
Miscellaneous Expense	600	
	\$346,300	\$346,300

Prepare the closing journal entries at the end of the fiscal year, 2010 June 30.

**Problem B** The adjusted trial balance for Denver Architects , Inc., follows:

<b>DENVER ARCHITECTS, INC.</b>		
<b>Adjusted Trial Balance</b>		
<b>2010 December 31</b>		
	Debits	Credits
Cash	\$ 90,000	
Accounts Receivable	20,000	
Interest Receivable	200	

#### 4. Completing the accounting cycle

Notes Receivable	4,000	
Prepaid Insurance	960	
Prepaid Rent	2,400	
Supplies on Hand	600	
Equipment	60,000	
Accumulated Depreciation—Equipment		\$ 12,500
Buildings	140,000	
Accumulated Depreciation—Buildings		15,000
Land	56,240	
Accounts Payable		60,000
Notes Payable		10,000
Interest Payable		750
Salaries Payable		7,000
Capital Stock		100,000
Retained Earnings, 2010 January 1		20,200
Dividends	40,000	
Service Revenue		360,000
Insurance Expense	1,920	
Rent Expense	9,600	
Advertising Expense	1,200	
Depreciation Expense—Equipment	2,500	
Depreciation Expense—Buildings	3,000	
Supplies Expense	2,280	
Salaries Expense	150,000	
Interest Expense	750	
Interest Revenue		200
	\$ 585,650	\$ 585,650

- Prepare an income statement.
- Prepare a statement of retained earnings.
- Prepare a classified balance sheet.
- Prepare the closing journal entries.
- Show the post-closing trial balance assuming you had posted the closing entries to the general ledger.

**Problem C** The following trial balance and additional data are for Sure Sale Realty Company

##### SURE SALE REALTY COMPANY

##### Trial Balance

2010 December 31

	Debits	Credits
Cash	\$ 62,800	
Accounts Receivable	117,120	
Prepaid Rent	46,080	
Equipment	173,760	
Accumulated Depreciation—Equipment		\$ 21,120
Accounts Payable		62,400
Capital Stock		96,000
Retained Earnings, 2010 January 1		49,920
Dividends	46,080	
Commissions Revenue		653,200

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<i>Salaries Expense</i>	321,600	
<i>Travel Expense</i>	96,480	
<i>Miscellaneous Expense</i>	18,720	
	\$ 882,640	\$ 882,640

The prepaid rent is for the period 2010 July 1, to 2011 June 30.

The equipment has an expected life of 10 years with no salvage value.

Accrued salaries are USD 11,520.

Travel expenses accrued but unreimbursed to sales staff at December 31 were USD 17,280

a. Prepare a 12-column work sheet for the year ended 2010 December 31. You need not include account numbers or explanations of adjustments.

b. Prepare adjusting journal entries.

c. Prepare closing journal entries.

**Problem D** The following trial balance and additional data are for South Sea Tours, Inc.:

**SOUTH SEA TOURS, INC.**

**Trial Balance**

**2010 December 31**

	<b>Debits</b>	<b>Credits</b>
<i>Cash</i>	\$ 109,050	
<i>Accounts Receivable</i>	133,750	
<i>Prepaid Insurance</i>	4,350	
<i>Prepaid Advertising</i>	18,000	
<i>Notes Receivable</i>	11,250	
<i>Land</i>	90,000	
<i>Buildings</i>	165,000	
<i>Accumulated Depreciation—Buildings</i>		\$ 49,500
<i>Office Equipment</i>	83,400	
<i>Accumulated Depreciation—Office Equipment</i>		16,680
<i>Accounts Payable</i>		56,850
<i>Notes Payable</i>		75,000
<i>Capital Stock</i>		240,000
<i>Retained Earnings, 2010 January 1</i>		47,820
<i>Dividends</i>	30,000	
<i>Service Revenue</i>		368,350
<i>Salaries Expense</i>	96,000	
<i>Travel Expense</i>	111,000	
<i>Interest Revenue</i>		600
<i>Interest Expense</i>	3,000	
	\$ 854,800	\$ 854,800

The company consistently followed the policy of initially debiting all prepaid items to asset accounts.

The buildings have an expected life of 50 years with no salvage value.

The office equipment has an expected life of 10 years with no salvage value.

Accrued interest on notes receivable is USD 450.

Accrued interest on the notes payable is USD 1,000.

Accrued salaries are USD 2,100.

Expired prepaid insurance is USD 3,750.

#### 4. Completing the accounting cycle

Expired prepaid advertising is USD 16,500.

a. Prepare a 12-column work sheet for the year ended 2010 December 31. You need not include account numbers. Briefly explain the entries in the Adjustments columns at the bottom of the work sheet, as was done in Exhibit 20.

b. Prepare the required closing entries.

**Problem E** The following trial balance and additional data are for Florida Time-Share Property Management Company:

**FLORIDA TIME-SHARE PROPERTY MANAGEMENT COMPANY**  
**Trial Balance**  
**2010 December 31**

	<b>Debits</b>	<b>Credits</b>
<i>Cash</i>	\$ 424,000	
<i>Prepaid Rent</i>	28,800	
<i>Prepaid Insurance</i>	7,680	
<i>Supplies on Hand</i>	2,400	
<i>Office Equipment</i>	24,000	
<i>Accumulated Depreciation—Office Equipment</i>		\$ 5,760
<i>Automobiles</i>	64,000	
<i>Accumulated Depreciation—Automobiles</i>		16,000
<i>Accounts Payable</i>		2,880
<i>Unearned Management Fees</i>		12,480
<i>Capital Stock</i>		360,000
<i>Retained Earnings, 2010 January 1</i>		120,640
<i>Dividends</i>	28,000	
<i>Commissions Revenue</i>		260,000
<i>Management Fee Revenue</i>		19,200
<i>Salaries Expense</i>	199,840	
<i>Advertising Expense</i>	2,400	
<i>Gas and Oil Expense</i>	14,240	
<i>Miscellaneous Expense</i>	1,600	
	\$ 796,960	\$ 796,960

Insurance expense for the year, USD 3,840.

Rent expense for the year, USD 19,200.

Depreciation expense: office equipment, USD 2,880; and automobiles, USD 12,800.

Salaries earned but unpaid at December 31, USD 26,640.

Supplies on hand at December 31, USD 1,000.

The unearned management fees were received and recorded on 2010 November 1. The advance payment covered six months' management of an apartment building.

a. Prepare a 12-column work sheet for the year ended 2010 December 31. You need not include account numbers or explanations of adjustments.

b. Prepare an income statement.

c. Prepare a statement of retained earnings.

d. Prepare a classified balance sheet.

e. Prepare adjusting and closing entries.

## Alternate problems

**Alternate problem A** The following adjusted trial balance is for Dream Home Realty Company:

**DREAM HOME REALTY COMPANY**

**Adjusted Trial Balance**

**2010 June 30**

	<b>Debits</b>	<b>Credits</b>
Cash	\$ 98,000	
Accounts Receivable	40,000	
Office Equipment	35,000	
Accumulated Depreciation—Office Equipment		\$ 14,000
Automobiles	40,000	
Accumulated Depreciation—Automobiles		20,000
Accounts Payable		63,000
Capital Stock		75,000
Retained Earnings, 2009 July 1		54,700
Dividends	5,000	
Commissions Revenue		170,000
Salaries Expense	25,000	
Commissions Expense	120,000	
Gas and Oil Expense	4,000	
Rent Expense	14,800	
Supplies Expense	1,400	
Utilities Expense	2,000	
Depreciation Expense—Office Equipment	3,500	
Depreciation Expense—Automobiles	8,000	
	\$ 396,700	\$ 396,700

Prepare the closing journal entries at the end of the fiscal year, 2010 June 30.

**Alternate problem B** The adjusted trial balance for Penrod Insurance Consultants, Inc., follows:

**Penrod Insurance Consultants, Inc.**

**Adjusted Trial Balance**

**2010 December 31**

	<b>Debits</b>	<b>Credits</b>
Cash	\$ 107,200	
Accounts Receivable	68,000	
Interest Receivable	400	
Notes Receivable	20,000	
Prepaid Insurance	2,400	
Supplies on Hand	1,800	
Land	32,000	
Buildings	190,000	
Accumulated Depreciation—Buildings		\$ 40,000
Office Equipment	28,000	
Accumulated Depreciation—Office Equipment		8,000
Accounts Payable		48,000
Salaries Payable		8,500
Interest Payable		900

#### 4. Completing the accounting cycle

Notes Payable (due 2011)		64,000
Capital Stock		120,000
Retained Earnings, 2010 January 1		42,800
Dividends	40,000	
Commissions Revenue		392,520
Advertising Expense	24,000	
Commissions Expense	75,440	
Travel Expense	12,880	
Depreciation Expense—Buildings	8,500	
Salaries Expense	98,400	
Depreciation Expense—Office Equipment	2,800	
Supplies Expense	3,800	
Insurance Expense	3,600	
Repairs Expense	1,900	
Utilities Expense	3,400	
Interest Expense	1,800	
Interest Revenue		1,600
	\$ 726,320	\$ 726,320

- Prepare an income statement for the year ended 2010 December 31.
- Prepare a statement of retained earnings.
- Prepare a classified balance sheet.
- Prepare the closing journal entries.
- Show the post-closing trial balance assuming you had posted the closing entries to the general ledger.

**Alternate problem C** The following trial balance and additional data are for Ramon Data Processing Company:

**RAMON DATA PROCESSING COMPANY**

**Trial Balance**

**2010 December 31**

	<b>Debits</b>	<b>Credits</b>
Cash	\$ 76,000	
Accounts Receivable	98,000	
Prepaid Rent	7,200	
Prepaid Insurance	2,400	
Equipment	80,000	
Accumulated Depreciation—Equipment		\$ 40,000
Accounts Payable		30,000
Capital Stock		100,000
Retained Earnings, 2010 January 1		65,600
Dividends	24,000	
Service Revenue		370,000
Commissions Expense	270,000	
Travel Expense	36,000	
Miscellaneous Expense	12,000	
	\$ 605,600	\$ 605,600

The prepaid rent is for the period 2010 January 1, to 2011 December 31.

The equipment is expected to last 10 years with no salvage value.

The prepaid insurance was for the period 2010 April 1, to 2011 March 31.

Accrued commissions payable total USD 3,000 at December 31.

a. Prepare a 12-column work sheet for the year ended 2010 December 31. You need not include account numbers or explanations of adjustments.

b. Prepare the adjusting journal entries.

c. Prepare the closing journal entries.

**Alternate problem D** The following trial balance and additional data are for Best-Friend Pet Hospital, Inc.

**BEST-FRIEND PET HOSPITAL, INC.**

<b>Trial Balance</b>		
<b>2010 December 31</b>		
	<b>Debits</b>	<b>Credits</b>
Cash	\$ 16,490	
Accounts Receivable	54,390	
Supplies on Hand	900	
Prepaid Fire Insurance	1,800	
Prepaid Rent	21,600	
Equipment	125,000	
Accumulated Depreciation —Equipment		\$ 25,000
Accounts Payable		29,550
Notes Payable		9,000
Capital Stock		150,000
Retained Earnings, 2010 January 1		20,685
Service Revenue		179,010
Interest Expense	225	
Salaries Expense	142,200	
Advertising Expense	29,250	
Supplies Expense	2,135	
Miscellaneous Expense	3,705	
Legal and Accounting Expense	13,750	
Utilities Expense	1,800	
	\$ 413,245	\$ 413,245

The company consistently followed the policy of initially debiting all prepaid items to asset accounts.

Prepaid fire insurance is USD 600 as of the end of the year.

Supplies on hand are USD 638 as of the end of the year.

Prepaid rent is USD 2,625 as of the end of the year.

The equipment is expected to last 10 years with no salvage value.

Accrued salaries are USD 2,625.

a. Prepare a 12-column work sheet for the year ended 2010 December 31. You need not include account numbers. Briefly explain the entries in the Adjustments columns at the bottom of the work sheet, as was done in Exhibit 20.

b. Prepare the 2010 December 31, closing entries.

**Alternate problem E** The following trial balance and additional data are for Roswell Interior Decorators, Inc.:

**ROSWELL INTERIOR DECORATORS, INC**

**Trial Balance**  
**2010 December 31**

#### 4. Completing the accounting cycle

	Debits	Credits
<i>Cash</i>	\$ 85,400	
<i>Accounts Receivable</i>	81,600	
<i>Supplies on Hand</i>	4,000	
<i>Prepaid Rent</i>	12,240	
<i>Prepaid Advertising</i>	2,880	
<i>Prepaid Insurance</i>	4,400	
<i>Office Equipment</i>	7,600	
<i>Accumulated Depreciation—Office Equipment</i>		\$ 2,760
<i>Office Furniture</i>	29,200	
<i>Accumulated Depreciation—Office Furniture</i>		8,280
<i>Accounts Payable</i>		25,200
<i>Notes Payable (due 2011)</i>		4,000
<i>Capital Stock</i>		100,000
<i>Retained Earnings, 2010 January 1</i>		22,400
<i>Dividends</i>	45,520	
<i>Service Revenue</i>		250,000
<i>Salaries Expense</i>	98,800	
<i>Utilities Expense</i>	20,000	
<i>Miscellaneous Expense</i>	24,000	
	\$ 412,640	\$ 412,640

Supplies on hand at 2010 December 31, are USD 1,000.

Rent expense for 2010 is USD 10,000.

Advertising expense for 2010 is USD 2,304.

Insurance expense for 2010 is USD 2,400.

Depreciation expense is office equipment, USD 912, and office furniture, USD 3,000.

Accrued interest on notes payable is USD 150.

Accrued salaries are USD 4,200.

a. Prepare a 12-column work sheet for the year ended 2010 December 31. You need not include account numbers or explanations of adjustments.

b. Prepare an income statement.

c. Prepare a statement of retained earnings.

d. Prepare a classified balance sheet.

e. Prepare adjusting and closing entries.

#### Beyond the numbers—Critical thinking

**Business decision case A** Heather and Dan Holt met while both were employed in the interior trim and upholstery department of an auto manufacturer. After their marriage, they decided to earn some extra income by doing small jobs involving canvas, vinyl, and upholstered products. Their work was considered excellent, and at the urging of their customers, they decided to go into business for themselves, operating out of the basement of the house they owned. To do this, they invested USD 120,000 cash in their business. They spent USD 10,500 for a sewing machine (expected life, 10 years) and USD 12,000 for other miscellaneous tools and equipment (expected life, 5 years). They undertook only custom work, with the customers purchasing the required materials, to avoid stocking any inventory other than supplies. Generally, they required an advance deposit on all jobs.



The business seemed successful from the start, as the Holts received orders from many customers. But they felt something was wrong. They worked hard and charged competitive prices. Yet there seemed to be barely enough cash available from the business to cover immediate personal needs. Summarized, the checkbook of the business for 2010, their second year of operations, showed:

<i>Balance, 2010 January 1</i>			\$ 99,200
<i>Cash received from customers:</i>			
<i>For work done in 2009</i>	\$	36,000	
<i>For work done in 2010</i>		200,000	
<i>For work to be done in 2011</i>		48,000	284,000
			\$ 383,200
<i>Cash paid out:</i>			
<i>Two-year insurance policy dated 2010 January 1</i>	\$	19,200	
<i>Utilities</i>		48,000	
<i>Supplies</i>		104,000	
<i>Other Expenses</i>		72,000	
<i>Taxes, including sales taxes</i>		26,400	
<i>Dividends</i>		40,000	309,600
<i>Balance, 2010 December 31</i>			\$ 73,600

Considering how much they worked, the Holts were concerned that the cash balance decreased by USD 25,600 even though they only received dividends of USD 40,000. Their combined income from the auto manufacturer had been USD 45,000. They were seriously considering giving up their business and going back to work for the auto manufacturer. They turned to you for advice. You discovered the following:

Of the supplies purchased in 2010, USD 24,000 were used on jobs billed to customers in 2010; no supplies were used for any other work.

Work completed in 2010 and billed to customers for which cash had not yet been received by year-end amounted to USD 40,000.

Prepare a written report for the Holts, responding to their belief that their business is not sufficiently profitable. (Hint: Prepare an income statement for 2010 and include it in your report.)

**Annual report analysis B** Using the Annual report appendix, calculate the current ratios for the two years shown for The Limited, Inc. Write a summary of the results of your calculations. Also, look at some of the other data provided by the company in preparing your comments. For instance, look at the net income for the last three years.

**Broader perspective – Writing experience C** Read the "A broader perspective: Skills for the long haul". Write a description of a career in public accounting broader perspective at each level within the firm. Discuss the skills needed and how you could develop these skills.

**Group project D** In teams of two or three students, interview a management accountant. Management accountants may have the title of chief financial officer (CFO), controller, or some other accounting title within a company. Seek information on the advantages and disadvantages of working as a management accountant. Also inquire about the nature of the work and any training programs offered by the company. As a team, write a memorandum to the instructor summarizing the results of the interview. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project E** With a small group of students, obtain an annual report of a company in which you have some interest. You may obtain the annual report from your instructor, the library, the Internet, or the company.

#### 4. Completing the accounting cycle

Describe the nature of each item on the classified balance sheet. You may have to do library research on some of the items. Also, calculate the current ratio for the most recent two years and comment. Write a report to your instructor summarizing the results of the project.

**Group project F** With a small group of students and using library sources, write a paper comparing the features of three different accounting software packages (such as Peachtree Complete, Quikbooks Pro, DacEasy, MYOB Business Essentials, NetSuite Small Business and Cougar Mountain ). Give the strengths and weaknesses of each. Cite sources for the information and treat direct quotes properly.

##### Using the Internet—A view of the real world

Visit the following Internet site:

<http://www.merck.com>

Pursue choices you are offered on the screen under Investor Relations until you locate the most recent consolidated balance sheet. In a short report to your instructor, describe how you got to the balance sheet and identify the major headings used in the balance sheet. For instance, the first such heading is Assets. Also, calculate the current ratio.

Visit the following Internet site:

<http://www.kodak.com>

Type in "Annual report" in the search box to locate the most recent annual report and then find the consolidated statement of financial position. Identify the major headings within the balance sheet and calculate the current ratio for the most recent year. Write a memo to your instructor summarizing your findings.

##### Answers to self-test

###### True-false

**True.** The three trial balances are the unadjusted trial balance, the adjusted trial balance, and the post-closing trial balance. The first two trial balances appear on the work sheet.

**False.** If a debit-balance account (such as Prepaid Rent) is credited in the adjustment, the amount in the Adjustments columns is deducted from the amount in the Trial Balance columns to determine the amount for that item in the Adjusted Trial Balance columns.

**True.** The net loss appears in the Income Statement credit column to balance the Income Statement columns. Then the loss appears in the Statement of Retained Earnings debit column because it reduces Retained Earnings.

**True.** All of these accounts are closed, or reduced to zero balances, as a result of the closing process.

**False.** All revenue and expense accounts have zero balances after closing.

**False.** Some manual accounting systems are still in use.

###### Multiple-choice

**b.** The other accounts are very likely to be adjusted. The Land account would be adjusted only if an error has been made involving that account.

**c.** The Adjusted Trial Balance columns should balance before items are spread to the Income Statement, Statement of Retained Earnings, and Balance Sheet columns. Therefore, if the Balance Sheet columns do not balance, the error is likely to exist in the last six columns of the work sheet.

**d.** The net income for the period does not appear in the balance sheet. It does appear in all of the other places listed.

a. The Dividends account is closed to the Retained Earnings account rather than to the Income Summary account.

b. Plant, property, and equipment is one of the long-term asset categories. Response (a) should not include equipment. Response (c) should not include notes receivable. Stockholders' equity is not subdivided into current and long-term categories.

### Comprehensive review problem

Lopez Delivery Service Company has the following chart of accounts:

Acct.		Acct.	
No.	Account Title	No.	Account Title
100	Cash	310	Retained Earnings
103	Accounts Receivable	320	Dividends
107	Supplies on Hand	400	Service Revenue
108	Prepaid Insurance	507	Salaries Expense
112	Prepaid Rent	511	Utilities Expense
140	Buildings	512	Insurance Expense
141	Accumulated Depreciation—Buildings	515	Rent Expense
150	Trucks	518	Supplies Expense
151	Accumulated Depreciation—Trucks	520	Depreciation Expense—Buildings
200	Accounts Payable	521	Depreciation Expense—Trucks
206	Salaries Payable	568	Miscellaneous Expense
300	Capital Stock	600	Income Summary

The post-closing trial balance as of 2010 May 31, was as follows:

#### LOPEZ DELIVERY SERVICE COMPANY

##### Post-Closing Trial Balance

2010 May 31

Acct.		Debits	Credits
No.	Account Title		
100	Cash	\$ 80,000	
103	Accounts Receivable	30,000	
107	Supplies on Hand	14,000	
108	Prepaid Insurance	4,800	
112	Prepaid Rent	12,000	
140	Buildings	320,000	
141	Accumulated Depreciation —Buildings		\$ 36,000
150	Trucks	80,000	
151	Accumulated Depreciation—Trucks		30,000
200	Accounts Payable		24,000
300	Capital Stock		300,000
310	Retained Earnings		150,800
		\$ 540,800	\$ 540,800

The transactions for June 2010 were as follows:

June 1 Performed delivery services for customers on account, USD 60,000.

3 Paid dividends, USD 10,000.

4 Purchased a USD 20,000 truck on account.

7 Collected USD 22,000 of the accounts receivable.

8 Paid USD 16,000 of the accounts payable.

11 Purchased USD 4,000 of supplies on account. The asset account for supplies was debited.

17 Performed delivery services for cash, USD 32,000.

20 Paid the utilities bills for June, USD 1,200.

#### 4. Completing the accounting cycle

23 Paid miscellaneous expenses for June, USD 600.

28 Paid salaries of USD 28,000 for June.

- Depreciation expense on the buildings for June is USD 800.
- Depreciation expense on the trucks for June is USD 400.
- Accrued salaries at June 30 are USD 4,000.
- A physical count showed USD 12,000 of supplies on hand on June 30.
- The prepaid insurance balance of USD 4,800 applies to a two-year period beginning 2010 June 1.
- The prepaid rent of USD 12,000 applies to a one-year period beginning 2010 June 1.
- Performed USD 12,000 of delivery services for customers as of June 30 that will not be billed to those customers until July.

- a. Open three-column ledger accounts for the accounts listed in the chart of accounts.
- b. Enter the 2010 May 31, account balances in the accounts.
- c. Journalize the transactions for June 2010.
- d. Post the June journal entries and include cross-references (assume all journal entries appear on page 10 of the journal).
- e. Prepare a 12-column work sheet as of 2010 June 30.
- f. Prepare an income statement, a statement of retained earnings, and a classified balance sheet.
- g. Prepare and post the adjusting entries (assume they appear on page 11 of the general journal).
- h. Prepare and post the closing entries (assume they appear on page 12 of the general journal).
- i. Prepare a post-closing trial balance.

# 5. Accounting theory

## Learning objectives

After studying this chapter, you should be able to:

- Identify and discuss the underlying assumptions or concepts of accounting.
- Identify and discuss the major principles of accounting.
- Identify and discuss the modifying conventions (or constraints) of accounting.
- Describe the conceptual framework project of the Financial Accounting Standards Board.
- Discuss the nature and content of a company's summary of significant accounting policies in its annual report.

## A career as an accounting professor

Do you enjoy college life? Do you enjoy teaching others? If so, you might want to consider a career as a college professor. Although a position as a college professor may pay less than some other career alternatives, the intangible benefits are beyond measure. A college professor can make a real difference in the lives of hundreds, even thousands, of students over a career. Students come to college with great potential, but are in need of some additional training and guidance. The work of a college professor is a valuable investment in our nation's most valuable resource—people.

College faculty generally teach fewer hours each week than elementary and secondary school teachers. This is because most college faculty have at least two additional important responsibilities: research and service. The research component represents far more than just summarizing what others have already learned. It represents arriving at new knowledge by discovering things that previously were unknown. For instance, accounting research has demonstrated the ways in which accounting numbers such as earnings and stockholder's equity are related to stock prices. This illustrates the importance of accounting numbers and has resulted in a large stream of discovery called Capital Markets research. Besides teaching and research, most faculty have significant service responsibilities as well. Accounting faculty are involved in service to the university, the accounting profession, and to the general public. Many college faculty dedicate 10-20 hours or more each week to the service component of their jobs.

The demand for college professors varies greatly by discipline. In fields such as English, Fine Arts, Philosophy, and Psychology there is a large supply of candidates with advanced degrees and, thus, the competition for positions as college professors in these areas is intense. However, in applied fields such as accounting and engineering, there is a shortage of candidates with advanced degrees. The opportunities for professors in these applied fields are excellent, and the chance to make a real difference in the lives of others is exciting.

Chapter 1 briefly introduced the body of theory underlying accounting procedures. In this chapter, we discuss accounting theory in greater depth. Now that you have learned some accounting procedures, you are better able to relate these theoretical concepts to accounting practice. **Accounting theory** is "a set of basic concepts and

## 5. Accounting theory

assumptions and related principles that explain and guide the accountant's actions in identifying, measuring, and communicating economic information".<sup>12</sup>

To some people, the word theory implies something abstract and out of reach. Understanding the theory behind the accounting process, however, helps one make decisions in diverse accounting situations. Accounting theory provides a logical framework for accounting practice.

The first part of the chapter describes underlying accounting assumptions or concepts, the measurement process, the major principles, and modifying conventions or constraints. Accounting theory has developed over the years and is contained in authoritative accounting literature and textbooks. The next part of the chapter describes the development of the Financial Accounting Standards Board's (FASB) conceptual framework for accounting. This framework builds on accounting theory developed over time and serves as a basis for formulating accounting standards in the future. Presenting the traditional body of theory first and the conceptual framework second gives you a sense of the historical development of accounting theory. Despite some overlap between the two parts of the chapter, remember that FASB's conceptual framework builds on traditional theory rather than replaces it. The final part of the chapter discusses significant accounting policies contained in annual reports issued by companies and illustrates them with an actual example from an annual report of the Walt Disney Company.

### Traditional accounting theory

Traditional accounting theory consists of underlying assumptions, rules of measurement, major principles, and modifying conventions (or constraints). The following sections describe these aspects of accounting theory that greatly influence accounting practice.

### Underlying assumptions or concepts

The major underlying assumptions or concepts of accounting are (1) business entity, (2) going concern (continuity), (3) money measurement, (4) stable dollar, and (5) periodicity. This section discusses the effects of these assumptions on the accounting process.

Data gathered in an accounting system must relate to a specific business unit or entity. The **business entity concept** assumes that each business has an existence separate from its owners, creditors, employees, customers, interested parties, and other businesses. For each business (such as a horse stable or a fitness center), the business, not the business owner, is the accounting entity. Therefore, financial statements are identified as belonging to a particular business entity. The content of these financial statements reports only on the activities, resources, and obligations of that entity.

A business entity may be made up of several different legal entities. For instance, a large business (such as General Motors Corporation) may consist of several separate corporations, each of which is a separate legal entity. For reporting purposes, however, the corporations may be considered as one business entity because they have a common ownership. Chapter 14 illustrates this concept.

When accountants record business transactions for an entity, they assume it is a going concern. The **going-concern (continuity) assumption** states that an entity will continue to operate indefinitely unless strong evidence exists that the entity will terminate. The termination of an entity occurs when a company ceases business operations and sells its assets. The process of termination is called **liquidation**. If liquidation appears likely, the going-concern assumption is no longer valid.

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<sup>12</sup> American Accounting Association, *A Statement of Basic Accounting Theory* (Sarasota, Fla., 1966), pp. 1-2.

Accountants often cite the going-concern assumption to justify using historical costs rather than market values in measuring assets. Market values are of less significance to an entity using its assets rather than selling them. On the other hand, if an entity is liquidating, it should use liquidation values to report assets.

The economic activity of a business is normally recorded and reported in money terms. **Money measurement** is the use of a monetary unit such as the dollar instead of physical or other units of measurement. Using a particular monetary unit provides accountants with a common unit of measurement to report economic activity. Without a monetary unit, it would be impossible to add such items as buildings, equipment, and inventory on a balance sheet.

Financial statements identify their unit of measure (such as the dollar in the United States) so the statement user can make valid comparisons of amounts. For example, it would be difficult to compare relative asset amounts or profitability of a company reporting in US dollars with a company reporting in Japanese yen.

In the United States, accountants make another assumption regarding money measurement—the stable dollar assumption. Under the **stable dollar assumption**, the dollar is accepted as a reasonably stable unit of measurement. Thus, accountants make no adjustments for the changing value of the dollar in the primary financial statements.

Using the stable dollar assumption creates a difficulty in depreciation accounting. Assume, for example, that a company acquired a building in 1975 and computed the 30-year straight-line depreciation on the building without adjusting for any changes in the value of the dollar. Thus, the depreciation deducted in 2008 is the same as the depreciation deducted in 1975. The company makes no adjustments for the difference between the values of the 1975 dollar and the 2008 dollar. Both dollars are treated as equal monetary units of measurement despite substantial price inflation over the 30-year period. Accountants and business executives have expressed concern over this inflation problem, especially during periods of high inflation.

According to the **periodicity (time periods) assumption**, accountants divide an entity's life into months or years to report its economic activities. Then, accountants attempt to prepare accurate reports on the entity's activities for these periods. Although these time-period reports provide useful and timely financial information for investors and creditors, they may be inaccurate for some of these time periods because accountants must estimate depreciation expense and certain other adjusting entries.

Accounting reports cover relatively short periods. These time periods are usually of equal length so that statement users can make valid comparisons of a company's performance from period to period. The length of the accounting period must be stated in the financial statements. For instance, so far, the income statements in this text were for either one month or one year. Companies that publish their financial statements, such as publicly held corporations, generally prepare monthly statements for internal management and publish financial statements quarterly and annually for external statement users.

**Accrual basis and periodicity** Chapter 3 demonstrated that financial statements more accurately reflect the financial status and operations of a company when prepared under the accrual basis rather than the cash basis of accounting. Under the cash basis, we record revenues when cash is received and expenses when cash is paid. Under the accrual basis, however, we record revenues when services are rendered or products are sold and expenses when incurred.

The periodicity assumption requires preparing adjusting entries under the accrual basis. Without the periodicity assumption, a business would have only one time period running from its inception to its termination. Then, the concepts of cash basis and accrual basis accounting would be irrelevant because all revenues and all expenses would

## 5. Accounting theory

be recorded in that one time period and would not have to be assigned to artificially short periods of one year or less.

**Approximation and judgment because of periodicity** To provide periodic financial information, accountants must often estimate expected uncollectible accounts (see Chapter 9) and the useful lives of depreciable assets. Uncertainty about future events prevents precise measurement and makes estimates necessary in accounting. Fortunately, these estimates are often reasonably accurate.

### Other basic concepts

Other basic accounting concepts that affect accounting for entities are (1) general-purpose financial statements, (2) substance over form, (3) consistency, (4) double entry, and (5) articulation. We discuss these basic accounting concepts next.

Accountants prepare **general-purpose financial statements** at regular intervals to meet many of the information needs of external parties and top-level internal managers. In contrast, accountants can gather special-purpose financial information for a specific decision, usually on a one-time basis. For example, management may need specific information to decide whether to purchase a new computer system. Since special-purpose financial information must be specific, this information is best obtained from the detailed accounting records rather than from the financial statements.

In some business transactions, the economic substance of the transaction conflicts with its legal form. For example, a contract that is legally a lease may, in fact, be equivalent to a purchase. A company may have a three-year contract to lease (rent) an automobile at a stated monthly rental fee. At the end of the lease period, the company receives title to the auto after paying a nominal sum (say, USD 1). The economic substance of this transaction is a purchase rather than a lease of the auto. Thus, under the substance-over-form concept, the auto is an asset on the balance sheet and is depreciated instead of showing rent expense on the income statement. Accountants record a transaction's economic substance rather than its legal form.

**Consistency** generally requires that a company use the same accounting principles and reporting practices through time. This concept prohibits indiscriminate switching of accounting principles or methods, such as changing inventory methods every year. However, consistency does not prohibit a change in accounting principles if the information needs of financial statement users are better served by the change. When a company makes a change in accounting principles, it must make the following disclosures in the financial statements: (1) nature of the change; (2) reasons for the change; (3) effect of the change on current net income, if significant; and (4) cumulative effect of the change on past income.

Chapter 2 introduced the basic accounting concept of the double-entry method of recording transactions. Under the double-entry approach, every transaction has a two-sided effect on each party engaging in the transaction. Thus, to record a transaction, each party debits at least one account and credits at least one account. The total debits equal the total credits in each journal entry.

When learning how to prepare work sheets in Chapter 4, you learned that financial statements are fundamentally related and **articulate** (interact) with each other. For example, we carry the amount of net income from the income statement to the statement of retained earnings. Then we carry the ending balance on the statement of retained earnings to the balance sheet to bring total assets and total equities into balance.



In Exhibit 27 we summarize the underlying assumptions or concepts. The next section discusses the measurement process used in accounting.

### **The measurement process in accounting**

Earlier, we defined accounting as "the process of identifying, measuring, and communicating economic information to permit informed judgments and decisions by the users of the information".<sup>13</sup> In this section, we focus on the measurement process of accounting.

Accountants measure a business entity's assets, liabilities, and stockholders' equity and any changes that occur in them. By assigning the effects of these changes to particular time periods (periodicity), they can find the net income or net loss of the accounting entity for those periods.

Accountants measure the various assets of a business in different ways. They measure cash at its specified amount. Chapter 9 explains how they measure claims to cash, such as accounts receivable, at their expected cash inflows, taking into consideration possible uncollectibles. They measure inventories, prepaid expenses, plant assets, and intangibles at their historical costs (actual amounts paid). After the acquisition date, they carry some items, such as inventory, at the lower-of-cost-or-market value. After the acquisition date, they carry plant assets and intangibles at original cost less accumulated depreciation or amortization. They measure liabilities at the amount of cash that will be paid or the value of services that will be performed to satisfy the liabilities.

Accountants can easily measure some changes in assets and liabilities, such as the acquisition of an asset on credit and the payment of a liability. Other changes in assets and liabilities, such as those recorded in adjusting entries, are more difficult to measure because they often involve estimates and/or calculations. The accountant must determine when a change has taken place and the amount of the change. These decisions involve matching revenues and expenses and are guided by the principles discussed next.

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<sup>13</sup> Ibid., p. 1.

## 5. Accounting theory

<b>Assumption or Concept</b>	<b>Description</b>	<b>Importance</b>
Business entity	Each business has an existence separate from its owners, creditors, employees, customers, other interested parties, and other businesses.	Defines the scope of the business such as a horse stable or physical fitness center. Identifies which transactions should be recorded on the company's books.
Going concern (continuity)	An entity will continue to operate indefinitely unless strong evidence exists that the entity will terminate.	Allows a company to continue carrying plant assets at their historical costs in spite of a change in their market values.
Money measurement	Each business uses a monetary unit of measurement, such as the dollar, instead of physical or other units of measurement.	Provides accountants with a common unit of measure to report economic activity. This concept permits us to add and subtract items on the financial statements.
Stable dollar	The dollar is accepted as a reasonably stable unit of measure.	Permits us to make no adjustments in the financial statements for the changing value of the dollar. This assumption works fairly well in the United States because of our relatively low rate of inflation.
Periodicity (time periods)	An entity's life can be subdivided into months or years to report its economic activities.	Permits us to prepare financial statements that cover periods shorter than the entire life of a business. Thus, we know how well a business is performing before it terminates its operations. The need for adjusting entries arises because of this concept and the use of accrual accounting.
General-purpose financial statements	One set of financial statements serves the needs of all users.	Allows companies to prepare only one set of financial statements instead of a separate set for each potential type of user of those statements. The financial statements should be free of bias so they do not favor the interests of any one type of user.
Substance over form	Accountants should record the economic substance of a transaction rather than its legal form.	Encourages the accountant to record the true nature of a transaction rather than its apparent nature. This approach is the accounting equivalent of "tell it like it is." An apparent lease transaction that has all the characteristics of a purchase should be recorded as a purchase.
Consistency	Generally requires that a company use the same accounting principles and reporting practices every accounting period.	Prevents a company from changing accounting methods whenever it likes to present a better picture or to manipulate income. The inventory and depreciation chapters (Chapters 7 and 10) both mention the importance of this concept.
Double entry	Every transaction has a two-sided effect on each company or party engaging in the transaction.	Uses a system of checks and balances to help identify whether or not errors have been made in recording transactions. When the debits do not equal the credits, this inequality immediately signals us to stop and find the error.
Articulation	Financial statements are fundamentally related and articulate (interact) with each other.	Changes in account balances during an accounting period are reflected in financial statements that are related to one another. For instance, earning revenue increases net income on the income statement, retained earnings on the statement of retained earnings, and assets and retained earnings on the balance sheet. The statement of retained earnings ties the income statement and balance sheet together.

Exhibit 27: The underlying assumptions or concepts

### The major principles

Generally accepted accounting principles (GAAP) set forth standards or methods for presenting financial accounting information. A standardized presentation format enables users to compare the financial information of different companies more easily. Generally accepted accounting principles have been either developed through accounting practice or established by authoritative organizations. Organizations that have contributed to the development of the principles are the American Institute of Certified Public Accountants (AICPA), the Financial Accounting Standards Board (FASB), the Securities and Exchange Commission (SEC), the American Accounting Association (AAA), the Financial Executives Institute (FEI), and the Institute of Management Accounting (IMA). This section explains the following major principles:

- Exchange-price (or cost) principle.
- Revenue recognition principle.
- Matching principle.

- Gain and loss recognition principle.
- Full disclosure principle.

Whenever resources are transferred between two parties, such as buying merchandise on account, the accountant must follow the exchange-price (or cost) principle in presenting that information. The **exchange-price (or cost) principle** requires an accountant to record transfers of resources at prices agreed on by the parties to the exchange at the time of exchange. This principle sets forth (1) what goes into the accounting system—transaction data; (2) when it is recorded—at the time of exchange; and (3) the amounts—exchange prices—at which assets, liabilities, stockholders' equity, revenues, and expenses are recorded.

As applied to most assets, this principle is often called the **cost principle**. It dictates that purchased or self-constructed assets are initially recorded at historical cost. **Historical cost** is the amount paid, or the fair market value of the liability incurred or other resources surrendered, to acquire an asset and place it in a condition and position for its intended use. For instance, when the cost of a plant asset (such as a machine) is recorded, its cost includes the net purchase price plus any costs of reconditioning, testing, transporting, and placing the asset in the location for its intended use. Accountants prefer the term exchange-price principle to cost principle because it seems inappropriate to refer to liabilities, stockholders' equity, and such assets as cash and accounts receivable as being measured in terms of cost.

More recently, the FASB in SFAS 157 has moved definitively towards fair market value accounting, or “mark-to-market”, which records the value of an asset or liability at its current market value (also known as a “fair value”) rather than its book value.

SFAS 157 defines “fair value” as “the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date”.

It is also defined as “an exit price from the perspective of a market participant that holds the asset or owes the liability”, whether or not the business plans to hold the asset/liability for investment, or sell it.

“The fair value accounting standard SFAS 157 applies to financial assets of all publicly-traded companies in the US as of 2007 Nov. 15. It also applies to non-financial assets and liabilities that are recognized, or disclosed, at fair value on a recurring basis. Beginning in 2009, the standard will apply to other non-financial assets. SFAS 157 applies to items for which other accounting pronouncements require or permit fair value measurements except share-based payment transactions, such as stock option compensation.

“SFAS 157 provides a hierarchy of three levels of input data for determining the fair value of an asset or liability. This hierarchy ranks the quality and reliability of information used to determine fair values, with level 1 inputs being the most reliable and level 3 inputs being the least reliable.

- Level 1 is quoted prices for identical items in active, liquid and visible markets such as stock exchanges.
- Level 2 is observable information for similar items in active or inactive markets, such as two similarly situated buildings in a downtown real estate market.
- Level 3 are unobservable inputs to be used in situations where markets do not exist or are illiquid such as the present credit crisis. At this point fair market valuation becomes highly subjective.”

Fair value accounting has been a contentious topic since it was introduced, For example, “banks and investment banks have had to reduce the value of the mortgages and mortgage-backed securities to reflect current prices”. Those prices declined severely with the collapse of credit markets as mortgage defaults escalated in the financial crisis of 2008-2009. Despite debate over the proper implementation of fair market value accounting, International

## 5. Accounting theory

Financial Reporting Standards utilize this approach much more than the Generally Accepted Accounting Principles of the United States.

To learn more about fair market value accounting, visit the AICPA site, ([http://www.aicpa.org/MediaCenter/fva\\_faq.htm](http://www.aicpa.org/MediaCenter/fva_faq.htm)), the source used for the explanation of this topic.

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### An accounting perspective:

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#### Business insight

In some European countries, the financial statements contain secret reserves. These secret reserves arise from a company not reporting all of its profits when it has a very good year. The justification is that the stockholders vote on the amount of dividends they receive each year; if all profits were reported, the stockholders might vote to pay the entire amount out as dividends. By holding back some profits, not only are the creditors more protected but the company is also more solvent and has more resources to invest in productive assets.

Revenue is not difficult to define or measure; it is the inflow of assets from the sale of goods and services to customers, measured by the cash expected to be received from customers. However, the crucial question for the accountant is when to record a revenue. Under the **revenue recognition principle**, revenues should be earned and realized before they are recognized (recorded).

**Earning of revenue** All economic activities undertaken by a company to create revenues are part of the earning process. Many activities may have preceded the actual receipt of cash from a customer, including (1) placing advertisements, (2) calling on the customer several times, (3) submitting samples, (4) acquiring or manufacturing goods, and (5) selling and delivering goods. For these activities, the company incurs costs. Although revenue was actually being earned by these activities, accountants do not recognize revenue until the time of sale because of the requirement that revenue be substantially earned before it is recognized (recorded). This requirement is the **earning principle**.

**Realization of revenue** Under the **realization principle**, the accountant does not recognize (record) revenue until the seller acquires the right to receive payment from the buyer. The seller acquires this right from the buyer at the time of sale for merchandise transactions or when services have been performed in service transactions. Legally, a sale of merchandise occurs when title to the goods passes to the buyer. The time at which title passes normally depends on the shipping terms—FOB shipping point or FOB destination (as we discuss in Chapter 6). As a practical matter, accountants generally record revenue when goods are delivered.

The advantages of recognizing revenue at the time of sale are (1) the actual transaction—delivery of goods—is an observable event; (2) revenue is easily measured; (3) risk of loss due to price decline or destruction of the goods has passed to the buyer; (4) revenue has been earned, or substantially so; and (5) because the revenue has been earned, expenses and net income can be determined. As discussed later, the disadvantage of recognizing revenue at the time of sale is that the revenue might not be recorded in the period during which most of the activity creating it occurred.

**Exceptions to the realization principle** The following examples are instances when practical considerations may cause accountants to vary the point of revenue recognition from the time of sale. These

examples illustrate the effect that the business environment has on the development of accounting principles and standards.

**Cash collection as point of revenue recognition** Some small companies record revenues and expenses at the time of cash collection and payment, which may not occur at the time of sale. This procedure is the cash basis of accounting. The cash basis is acceptable primarily in service enterprises that do not have substantial credit transactions or inventories, such as business entities of doctors or dentists.

**Installment basis of revenue recognition** When collecting the selling price of goods sold in monthly or annual installments and considerable doubt exists as to collectibility, the company may use the installment basis of accounting. Companies make these sales in spite of the doubtful collectibility of the account because their margin of profit is high and the goods can be repossessed if the payments are not received. Under the **installment basis**, the percentage of total gross margin (selling price of a good minus its cost) recognized in a period is equal to the percentage of total cash from a sale that is received in that period. Thus, the gross margin recognized in a period is equal to the cash received times the gross margin percentage (gross margin divided by selling price). The formula to recognize gross profit on cash collections made on installment sales of a certain year is:

$$\text{Cash collections} \times \text{Gross margin percentage} = \text{Gross margin recognized}$$

To be more precise, we expand the descriptions in the formula as follows:

$$\begin{array}{l} \text{Cash collections this year resulting} \\ \text{from installment sales made in a} \\ \text{certain year} \end{array} \times \begin{array}{l} \text{Gross margin percentage} \\ \text{for the year of sale} \end{array} = \begin{array}{l} \text{Gross margin recognized} \\ \text{this year on cash collections} \\ \text{this year from installment sales} \\ \text{made in a certain year} \end{array}$$

To illustrate, assume a company sold a stereo set. The facts of the sale are:

Date of sale	Selling price	Cost	Gross margin (Selling price – Cost)	Gross margin percentage (Gross margin/Selling price)
2010 Oct. 1	USD 500	USD 300	(500-300) – 200	(200/500) = 40 per cent

The buyer makes 10 equal monthly installment payments of USD 50 to pay for the set (10 X USD 50 = USD 500). If the company receives three monthly payments in 2010, the total amount of cash received in 2010 is USD 150 (3 X USD 50). The gross margin to recognize in 2010 is:

$$\begin{array}{l} \text{2010 cash collections from} \\ \text{2010 installment sales} \end{array} \times \begin{array}{l} \text{Gross margin percentage} \\ \text{on 2010 installment sales} \end{array} = \begin{array}{l} \text{2010 gross margin} \\ \text{recognized on 2010 cash} \\ \text{collections from 2010} \\ \text{installment sales} \\ \text{= USD 60} \end{array}$$

**USD 150**                      X   **40 per cent**

The company collects the other installments when due so it receives a total of USD 350 in 2011 from 2010 installment sales. The gross margin to recognize in 2011 on these cash collections is as follows:

$$\begin{array}{l} \text{2011 cash collections from 2010} \\ \text{installment sales} \end{array} \times \begin{array}{l} \text{Gross margin percentage on 2010} \\ \text{installment sales} \end{array} = \begin{array}{l} \text{2011 gross margin recognized on} \\ \text{2011 cash collections from 2010} \\ \text{installment sales} \\ \text{= USD 140} \end{array}$$

**USD 350**                      X   **40 per cent**

In summary, the total receipts and gross margin recognized in the two years are as follows:

Year	Total Amount of Cash Recognized	Gross Margin Recognized
2010	\$150 30%	\$ 60 30%
2011	..... 350 70%	140 70%
	\$500 100%	\$200 100%

Because the installment basis delays some revenue recognition beyond the time of sale, it is acceptable for accounting purposes only when considerable doubt exists as to collectibility of the installments.

## 5. Accounting theory

**Revenue recognition on long-term construction projects** Companies recognize revenue from a long-term construction project under two different methods: (1) the completed-contract method or (2) the percentage-of-completion method. The **completed-contract method** does not recognize any revenue until the project is completed. In that period, they recognize all revenue even though the contract may have required three years to complete. Thus, the completed-contract method recognizes revenues at the time of sale, as is true for most sales transactions. Companies carry costs incurred on the project forward in an inventory account (Construction in Process) and charge them to expense in the period in which the revenue is recognized.

Some accountants argue that waiting so long to recognize any revenue is unreasonable. They believe that because revenue-producing activities have been performed during each year of construction, revenue should be recognized in each year of construction even if estimates are needed. The **percentage-of-completion method** recognizes revenue based on the estimated stage of completion of a long-term project. To measure the stage of completion, firms compare actual costs incurred in a period with the total estimated costs to be incurred on the project.

To illustrate, assume that a company has a contract to build a dam for USD 44 million. The estimated construction cost is USD 40 million. You calculate the estimated gross margin as follows:

Sales price of dam	Estimated costs of construct dam	Estimated gross margin (sales price – estimated costs)
USD 44 million	USD 40 million	(44 million – 40 million) = 4 million

The firm recognizes the USD 4 million gross margin in the financial statements by recording the assigned revenue for the year and then deducting actual costs incurred that year. The formula to recognize revenue is:

$$\frac{\text{Actual construction costs incurred during the period}}{\text{Total estimated construction costs for the entire project}} \times \text{Total sales price} = \text{Revenue recognized for period}$$

Suppose that by the end of the first year (2010), the company had incurred actual construction costs of USD 30 million. These costs are 75 per cent of the total estimated construction costs (USD 30 million/USD 40 million = 75 per cent). Under the percentage-of-completion method, the firm would use the 75 per cent figure to assign revenue to the first year. In 2011, it incurs another USD 6 million of construction costs. In 2012, it incurs the final USD 4 million of construction costs. The amount of revenue to assign to each year is as follows:

Year	Ratio of Actual Construction Costs to Total Estimated Construction Costs	X	Agreed Price of Dam =	Amount of Revenue to Recognize (Assign)
2010	(\$30 million + \$40 million = 75%)			
	75%	X	\$44 million =	\$33 million
2011	(\$6 million + \$40 million = 15%)			
	15%	X	\$44 million =	\$6.6 million
2012	(\$4 million + \$40 million = 10%)			
	10%	X	\$44 million =	\$4.4 million
				\$44 million

The amount of gross margin to recognize in each year is as follows:

Year	Assigned Revenues	Actual - Construction Costs	Recognized = Gross Margin
2010	\$33.0 million	- \$30.0 million	= \$3.0 million
2011	6.6	- 6.0	= 0.6
2012	4.4	- 4.0	= 0.4
	\$44.0 million	\$40.0 million	\$4.0 million

**Number of Companies**  
**2003 2002 2001 2000**

Percentage of completion	78	82	80	71
Units of delivery	32	26	21	19
Completed contract	9	5	3	5

Source: American Institute of Certified Public Accountants,

**Accounting Trends & Techniques (New York: AICPA, 2004), p. 432**

**Exhibit 28: Methods of accounting for long-term contracts**

This company would deduct other costs incurred in the accounting period, such as general and administrative expenses, from gross margin to determine net income. For instance, assuming general and administrative expenses were USD 100,000 in 2010, net income would be  $(\text{USD } 3,000,000 - \text{USD } 100,000) = \text{USD } 2,900,000$ .

Expense recognition is closely related to, and sometimes discussed as part of, the revenue recognition principle. The **matching principle** states that expenses should be recognized (recorded) as they are incurred to produce revenues. An expense is the outflow or using up of assets in the generation of revenue. Firms voluntarily incur expense to produce revenue. For instance, a television set delivered by a dealer to a customer in exchange for cash is an asset consumed to produce revenue; its cost becomes an expense. Similarly, the cost of services such as labor are voluntarily incurred to produce revenue.

**The measurement of expense** Accountants measure most assets used in operating a business by their historical costs. Therefore, they measure a depreciation expense resulting from the consumption of those assets by the historical costs of those assets. They measure other expenses, such as wages that are paid for currently, at their current costs.

**The timing of expense recognition** The matching principle implies that a relationship exists between expenses and revenues. For certain expenses, such as costs of acquiring or producing the products sold, you can easily see this relationship. However, when a direct relationship cannot be seen, we charge the costs of assets with limited lives to expense in the periods benefited on a systematic and rational allocation basis. Depreciation of plant assets is an example.

**Product costs** are costs incurred in the acquisition or manufacture of goods. As you will see in the next chapter, included as product costs for purchased goods are invoice, freight, and insurance-in-transit costs. For manufacturing companies, product costs include all costs of materials, labor, and factory operations necessary to produce the goods. Product costs attach to the goods purchased or produced and remain in inventory accounts as long as the goods are on hand. We charge product costs to expense when the goods are sold. The result is a precise matching of cost of goods sold expense to its related revenue.

**Period costs** are costs not traceable to specific products and expensed in the period incurred. Selling and administrative costs are period costs.

The **gain and loss recognition principle** states that we record gains only when realized, but losses when they first become evident. Thus, we recognize losses at an earlier point than gains. This principle is related to the conservatism concept.

**Gains** typically result from the sale of long-term assets for more than their book value. Firms should not recognize gains until they are realized through sale or exchange. Recognizing potential gains before they are actually realized is not allowed.

## 5. Accounting theory

**Losses** consume assets, as do expenses. However, unlike expenses, they do not produce revenues. Losses are usually involuntary, such as the loss suffered from destruction by fire on an uninsured building. A loss on the sale of a building may be voluntary when management decides to sell the building even though incurring a loss.

The **full disclosure principle** states that information important enough to influence the decisions of an informed user of the financial statements should be disclosed. Depending on its nature, companies should disclose this information either in the financial statements, in notes to the financial statements, or in supplemental statements. In judging whether or not to disclose information, it is better to err on the side of too much disclosure rather than too little. Many lawsuits against CPAs and their clients have resulted from inadequate or misleading disclosure of the underlying facts.

We summarize the major principles and describe the importance of each in Exhibit 29.

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### An accounting perspective:

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#### Business insight

The accounting model involves reporting revenues earned and expenses incurred by the company. Some have argued that social benefits and social costs created by the company should also be reported. Suppose, for instance, that a company is dumping toxic waste into a river and this action causes cancer among the citizens downstream. Should this cost be reported when preparing financial statements showing the performance of the company? What do you think?

#### Modifying conventions (or constraints)

In certain instances, companies do not strictly apply accounting principles because of modifying conventions (or constraints). **Modifying conventions** are customs emerging from accounting practice that alter the results obtained from a strict application of accounting principles. Three modifying conventions are cost-benefit, materiality, and conservatism.

**Cost-benefit** The **cost-benefit consideration** involves deciding whether the benefits of including optional information in financial statements exceed the costs of providing the information. Users tend to think information is cost free since they incur none of the costs of providing the information. Preparers realize that providing information is costly. The benefits of using information should exceed the costs of providing it. The measurement of benefits is inexact, which makes application of this modifying convention difficult in practice.

**Materiality** **Materiality** is a modifying convention that allows accountants to deal with immaterial (unimportant) items in an expedient but theoretically incorrect manner. The fundamental question accountants must ask in judging the materiality of an item is whether a knowledgeable user's decisions would be different if the information were presented in the theoretically correct manner. If not, the item is immaterial and may be reported in a theoretically incorrect but expedient manner. For instance, because inexpensive items such as calculators often do not make a difference in a statement user's decision to invest in the company, they are immaterial (unimportant) and may be expensed when purchased. However, because expensive items such as mainframe computers usually do make a difference in such a decision, they are material (important) and should be recorded as assets and depreciated. Accountants should record all material items in a theoretically correct manner. They may record



immaterial items in a theoretically incorrect manner simply because it is more convenient and less expensive to do so. For example, they may debit the cost of a wastebasket to an expense account rather than an asset account even though the wastebasket has an expected useful life of 30 years. It simply is not worth the cost of recording depreciation expense on such a small item over its life.

The FASB defines materiality as "the magnitude of an omission or misstatement of accounting information that, in the light of surrounding circumstances, makes it probable that the judgment of a reasonable person relying on the information would have been changed or influenced by the omission or misstatement".<sup>14</sup> The term magnitude in this definition suggests that the materiality of an item may be assessed by looking at its relative size. A USD 10,000 error in an expense in a company with earnings of USD 30,000 is material. The same error in a company earning USD 30,000,000 may not be material.

Materiality involves more than the relative dollar amounts. Often the nature of the item makes it material. For example, it may be quite significant to know that a company is paying bribes or making illegal political contributions, even if the dollar amounts of such items are relatively small.

**Conservatism** means being cautious or prudent and making sure that assets and net income are not overstated. Such overstatements can mislead potential investors in the company and creditors making loans to the company. We apply conservatism when the lower-of-cost-or-market rule is used for inventory (see Chapter 7). Accountants must realize a fine line exists between conservative and incorrect accounting.

See Exhibit 30 for a summary of the modifying conventions and their importance.

The next section of this chapter discusses the conceptual framework project of the Financial Accounting Standards Board. The FASB designed the conceptual framework project to resolve some disagreements about the proper theoretical foundation for accounting. We present only the portions of the project relevant to this text.

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<sup>14</sup> FASB, *Statement of Financial Accounting Concepts No. 2*, "Qualitative Characteristics of Accounting Information" (Stamford, Conn., 1980), p. xv. Copyright © by the Financial Accounting Standards Board, High Ridge Park, Stamford, Connecticut 06905, U.S.A. Quoted (or excerpted) with permission. Copies of the complete documents are available from the FASB.

## 5. Accounting theory

<b>Principle</b>	<b>Description</b>	<b>Importance</b>
Exchange-price (or cost)	Requires transfers of resources to be recorded at prices agreed on by the parties to the exchange at the time of the exchange.	Tells the accountant to record a transfer of resources at an objectively determinable amount at the time of the exchange. Also, self-constructed assets are recorded at their actual cost rather than at some estimate of what they would have cost if they had been purchased.
Revenue recognition	Revenues should be earned and realized before they are recognized (recorded).	Informs accountant that revenues generally should be recognized when services are performed or goods are sold. Exceptions are made for items such as installment sales and long-term construction projects.
Matching	Expenses should be recognized (recorded) as they are incurred to produce revenues.	Indicates that expenses are to be recorded as soon as they are incurred rather than waiting until some future time.
Gain and loss recognition	Gains may be recorded only when realized, but losses should be recorded when they first become evident.	Tells the accountant to be conservative when recognizing gains and losses. Gains can only be recognized when they have been realized through sale or exchange. Losses should be recognized as soon as they become evident. Thus, potential losses can be recorded, but only gains that have actually been realized can be recorded.
Full disclosure	Information important enough to influence the decisions of an informed user of the financial statements should be disclosed.	Requires the accountant to disclose everything that is important. A good rule to follow is—if in doubt, disclose. Another good rule is—if you are not consistent, disclose all the facts and the effect on income.

### Exhibit 29: The major principles

## 5. Accounting theory

<b>Modifying Convention</b>	<b>Description</b>	<b>Importance</b>
Cost-benefit	Optional information should be included in financial statements only if the benefits of providing it exceed its costs. In of	Lets the accountant know that information that is not required should be made available only if its benefits exceed its costs. An example may be companies going to the expense of providing information on the effects of inflation when the inflation rate is low and/or users do not seem to benefit significantly from the information.
Materiality	Only items that would affect a knowledgeable user's decision are material (important) and must be reported in a theoretically correct way.	Allow accountants to treat immaterial (relatively small dollar amount) information in a theoretically incorrect but expedient manner. For instance, a wastebasket can be expensed rather than capitalized and depreciated even though it may last for 30 years.
Conservatism	Transactions should be recorded so that assets and net income are not overstated.	Warns accountants that assets and net income are not to be overstated. "Anticipate (and record) all possible losses and do not anticipate (or record) any possible gains" is common advice under this constraint. Also, conservative application of the matching principle involves making sure that adjustments for expenses for such items as uncollectible accounts, warranties, and depreciation are adequate.

### Exhibit 30: Modifying conventions

## The financial accounting standards board's conceptual framework project

Experts have debated the exact nature of the basic concepts and related principles composing accounting theory for years. The debate continues today despite numerous references to generally accepted accounting principles (GAAP). To date, all attempts to present a concise statement of GAAP have received only limited acceptance.

Due to this limited success, many accountants suggest that the starting point in reaching a concise statement of GAAP is to seek agreement on the objectives of financial accounting and reporting. The belief is that if a person (1) carefully studies the environment, (2) knows what objectives are sought, (3) can identify certain qualitative traits of accounting information, and (4) can define the basic elements of financial statements, that person can discover the principles and standards leading to the stated objectives. The FASB completed the first three goals by publishing "Objectives of Financial Reporting by Business Enterprises" and "Qualitative Characteristics of Accounting Information".<sup>15</sup> Addressing the fourth goal are concepts statements entitled "Elements of Financial Statements of Business Enterprises" and "Elements of Financial Statements".<sup>16</sup>

## Objectives of financial reporting

**Financial reporting objectives** are the broad overriding goals sought by accountants engaging in financial reporting. According to the FASB, the first objective of financial reporting is to:

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15 FASB, *Statement of Financial Accounting Concepts No. 1*, "Objectives of Financial Reporting by Business Enterprises" (Stamford, Conn., 1978); and *Statement of Financial Accounting Concepts No. 2*, "Qualitative Characteristics of Accounting Information" (Stamford, Conn., 1980). Copyright © by the Financial Accounting Standards Board, High Ridge Park, Stamford, Connecticut 06905, U.S.A. Quoted (or excerpted) with permission. Copies of the complete documents are available from the FASB.

16 FASB, *Statement of Financial Accounting Concepts No. 3*, "Elements of Financial Statements of Business Enterprises" (Stamford, Conn., 1980); and *Statement of Financial Accounting Concepts No. 6*, "Elements of Financial Statements" (Stamford, Conn., 1985). Copyright © by the Financial Accounting Standards Board, High Ridge Park, Stamford, Connecticut 06905, U.S.A. Quoted (or excerpted) with permission. Copies of the complete documents are available from the FASB.

*provide information that is useful to present and potential investors and creditors and other users in making rational investment, credit, and similar decisions. The information should be comprehensible to those who have a reasonable understanding of business and economic activities and are willing to study the information with reasonable diligence.*<sup>17</sup>

Interpreted broadly, the term other users includes employees, security analysts, brokers, and lawyers. Financial reporting should provide information to all who are willing to learn to use it properly.

The second objective of financial reporting is to:

*provide information to help present and potential investors and creditors and other users in assessing the amounts, timing, and uncertainty of prospective cash receipts from dividends [owner withdrawals] or interest and the proceeds from the sale, redemption, or maturity of securities or loans. Since investors' and creditors' cash flows are related to enterprise cash flows, financial reporting should provide information to help investors, creditors, and others assess the amounts, timing, and uncertainty of prospective net cash inflows to the related enterprise.*<sup>18</sup>

This objective ties the cash flows of investors (owners) and creditors to the cash flows of the enterprise, a tie-in that appears entirely logical. Enterprise cash inflows are the source of cash for dividends, interest, and the redemption of maturing debt.

Third, financial reporting should:

*provide information about the economic resources of an enterprise, the claims to those resources (obligations of the enterprise to transfer resources to other entities and owners' equity), and the effects of transactions, events, and circumstances that change its resources and claims to those resources.*<sup>19</sup>

We can draw some conclusions from these three objectives and from a study of the environment in which financial reporting is carried out. For example, financial reporting should:

- Provide information about an enterprise's past performance because such information is a basis for predicting future enterprise performance.
- Focus on earnings and its components, despite the emphasis in the objectives on cash flows. (Earnings computed under the accrual basis generally provide a better indicator of ability to generate favorable cash flows than do statements prepared under the cash basis.)

On the other hand, financial reporting does not seek to:

- Measure the value of an enterprise but to provide information useful in determining its value.
- Evaluate management's performance, predict earnings, assess risk, or estimate earning power but to provide information to persons who wish to make these evaluations.

These conclusions are some of those reached in *Statement of Financial Accounting Concepts No. 1*. As the Board stated, these statements "are intended to establish the objectives and concepts that the Financial Accounting Standards Board will use in developing standards of financial accounting and reporting".<sup>20</sup> How successful the Board will be in the approach adopted remains to be seen.

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17 FASB, *Statement of Financial Accounting Concepts No. 1*, p. viii.

18 Ibid.

19 Ibid.

20 Ibid., p. i.

## 5. Accounting theory

### Qualitative characteristics

Accounting information should possess **qualitative characteristics** to be useful in decision making. This criterion is difficult to apply. The usefulness of accounting information in a given instance depends not only on information characteristics but also on the capabilities of the decision makers and their professional advisers. Accountants cannot specify who the decision makers are, their characteristics, the decisions to be made, or the methods chosen to make the decisions. Therefore, they direct their attention to the characteristics of accounting information. Note the FASB's graphic summarization of the qualities accountants consider in Exhibit 28<sup>21</sup>

To have **relevance**, information must be pertinent to or affect a decision. The information must make a difference to someone who does not already have it. Relevant information makes a difference in a decision either by affecting users' predictions of outcomes of past, present, or future events or by confirming or correcting expectations. Note that information need not be a prediction to be useful in developing, confirming, or altering expectations. Expectations are commonly based on the present or past. For example, any attempt to predict future earnings of a company would quite likely start with a review of present and past earnings. Although information that merely confirms prior expectations may be less useful, it is still relevant because it reduces uncertainty.

Critics have alleged that certain types of accounting information lack relevance. For example, some argue that a cost of USD 1 million paid for a tract of land 40 years ago and reported in the current balance sheet at that amount is irrelevant (except for possible tax implications) to users for decision making today. Such criticism has encouraged research into the types of information relevant to users. Some suggest using a different valuation basis, such as current cost, in reporting such assets.

**Predictive value and feedback value** Since actions taken now can affect only future events, information is obviously relevant when it possesses **predictive value**, or improves users' abilities to predict outcomes of events. Information that reveals the relative success of users in predicting outcomes possesses **feedback value**. Feedback reports on past activities and can make a difference in decision making by (1) reducing uncertainty in a situation, (2) refuting or confirming prior expectations, and (3) providing a basis for further predictions. For example, a report on the first quarter's earnings of a company reduces the uncertainty surrounding the amount of such earnings, confirms or refutes the predicted amount of such earnings, and provides a possible basis on which to predict earnings for the full year. Remember that although accounting information may possess predictive value, it does not consist of predictions. Making predictions is a function performed by the decision maker.

**Timeliness** **Timeliness** requires accountants to provide accounting information at a time when it may be considered in reaching a decision. Utility of information decreases with age. To know what the net income for 2010 was in early 2011 is much more useful than receiving this information a year later. If information is to be of any value in decision making, it must be available before the decision is made. If not, the information is of little value. In determining what constitutes timely information, accountants consider the other qualitative characteristics and the cost of gathering information. For example, a timely estimate for uncollectible accounts may be more valuable than a later, verified actual amount. Timeliness alone cannot make information relevant, but potentially relevant information can be rendered irrelevant by a lack of timeliness.

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21 FASB, *Statement of Financial Accounting Concepts No. 2*, p. 15.

**Illustration 5.5** A Hierarchy of Accounting Qualities

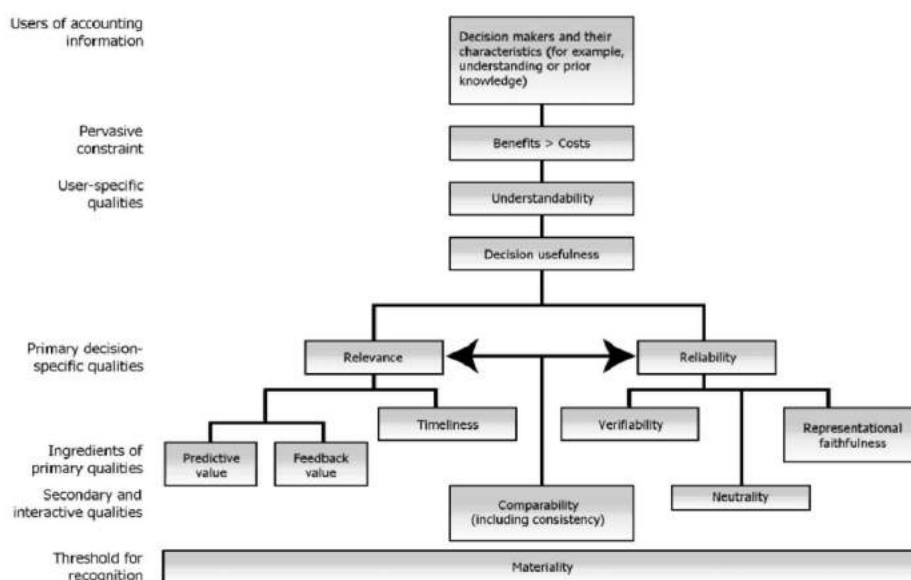


Exhibit 31: A hierarchy of accounting qualities

In addition to being relevant, information must be reliable to be useful. Information has **reliability** when it faithfully depicts for users what it purports to represent. Thus, accounting information is reliable if users can depend on it to reflect the underlying economic activities of the organization. The reliability of information depends on its representational faithfulness, verifiability, and neutrality. The information must also be complete and free of bias.

**Representational faithfulness** To gain insight into this quality, consider a map. When it shows roads and bridges where roads and bridges actually exist, a map possesses **representational faithfulness**. A correspondence exists between what is on the map and what is present physically. Similarly, representational faithfulness exists when accounting statements on economic activity correspond to the actual underlying activity. Where there is no correspondence, the cause may be (1) bias or (2) lack of completeness.

- **Effects of bias.** Accounting measurements contain **bias** if they are consistently too high or too low. Accountants create bias in accounting measurements by choosing the wrong measurement method or introducing bias either deliberately or through lack of skill.

- **Completeness.** To be free from bias, information must be sufficiently complete to ensure that it validly represents underlying events and conditions. **Completeness** means disclosing all significant information in a way that aids understanding and does not mislead. Firms can reduce the relevance of information by omitting information that would make a difference to users. Currently, full disclosure requires presentation of a balance sheet, an income statement, a statement of cash flows, and necessary notes to the financial statements and supporting schedules. Also required in annual reports of corporations are statements of changes in stockholders' equity which contain information included in a statement of retained earnings. Such statements must be complete, with items properly classified and segregated (such as reporting sales revenue separately from other revenues). Required disclosures may be made in (1) the body of the financial statements, (2) the

## 5. Accounting theory

notes to such statements, (3) special communications, and/or (4) the president's letter or other management reports in the annual report.

Another aspect of completeness is fully disclosing all changes in accounting principles and their effects.<sup>22</sup> Disclosure should include unusual activities (loans to officers), changes in expectations (losses on inventory), depreciation expense for the period, long-term obligations entered into that are not recorded by the accountant (a 20-year lease on a building), new arrangements with certain groups (pension and profit-sharing plans for employees), and significant events that occur after the date of the statements (loss of a major customer). Firms must also disclose accounting policies (major principles and their manner of application) followed in preparing the financial statements.<sup>23</sup> Because of its emphasis on disclosure, we often call this aspect of reliability the full disclosure principle.

**Verifiability** Financial information has **verifiability** when independent measurers can substantially duplicate it by using the same measurement methods. Verifiability eliminates measurer bias. The requirement that financial information be based on objective evidence arises from the demonstrated needs of users for reliable, unbiased financial information. Unbiased information is especially necessary when parties with opposing interests (credit seekers and credit grantors) rely on the same information. If the information is verifiable, this enhances the reliability of information.

Financial information is never completely free of subjective opinion and judgment; it always possesses varying degrees of verifiability. Canceled checks and invoices support some measurements. Accountants can never verify other measurements, such as periodic depreciation charges, because of their very nature. Thus, financial information in many instances is verifiable only in that it represents a consensus of what other accountants would report if they followed the same procedures.

**Neutrality** **Neutrality** means that the accounting information should be free of measurement method bias. The primary concern should be relevance and reliability of the information that results from application of the principle, not the effect that the principle may have on a particular interest. Non-neutral accounting information favors one set of interested parties over others. For example, a particular form of measurement might favor stockholders over creditors, or vice versa. "To be neutral, accounting information must report economic activity as faithfully as possible, without coloring the image it communicates for the purpose of influencing behavior in some particular direction."<sup>24</sup> Accounting standards are not like tax regulations that deliberately foster or restrain certain types of activity. Verifiability seeks to eliminate measurer bias; neutrality seeks to eliminate measurement method bias.

When **comparability** exists, reported differences and similarities in financial information are real and not the result of differing accounting treatments. Comparable information reveals relative strengths and weaknesses in a single company through time and between two or more companies at the same time.

**Consistency** requires that a company use the same accounting principles and reporting practices through time. Consistency leads to comparability of financial information for a single company through time. Comparability between companies is more difficult because they may account for the same activities in different ways. For example, Company B may use one method of depreciation, while Company C accounts for an identical asset in

<sup>22</sup> APB, APB Opinion No. 20, "Accounting Changes" (New York: AICPA, July 1971).

<sup>23</sup> APB, APB Opinion No. 22, "Disclosure of Accounting Policies" (New York: AICPA, April 1972).

<sup>24</sup> FASB, *Statement of Financial Accounting Concepts No. 2*, par. 100.

similar circumstances using another method. A high degree of inter-company comparability in accounting information does not exist unless accountants are required to account for the same activities in the same manner across companies and through time.

As we show in Exhibit 28, accountants must consider one pervasive constraint and one threshold for recognition in providing useful information. First, the benefits secured from the information must be greater than the costs of providing that information. Second, only material items need be disclosed and accounted for strictly in accordance with generally accepted accounting principles (GAAP). We discussed cost-benefit and materiality earlier in the chapter.

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### An accounting perspective:

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#### Use of technology

You may want to visit the home page of the Financial Accounting Standards Board at:

<http://www.fasb.org>

You can check out the latest developments at the FASB to see how the rules of accounting might be changing. You can investigate facts about the FASB, press releases, exposure drafts, publications, emerging issues, board actions, forthcoming meetings, and many other topics.

#### The basic elements of financial statements

Thus far we have discussed objectives of financial reporting and qualitative characteristics of accounting information. A third important task in developing a conceptual framework for any discipline is identifying and defining its basic elements. The FASB identified and defined the basic elements of financial statements in *Concepts Statement No. 3*. Later, *Concepts Statement No. 6* revised some of the definitions. We defined most of the terms earlier in this text in a less technical way; the more technical definitions follow. (These items are not repeated in this chapter's Key terms.)

**Assets** are probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events.

**Liabilities** are probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events.

**Equity or net assets** is the residual interest in the assets of an entity that remains after deducting its liabilities. In a business enterprise, the equity is the ownership interest. In a not-for-profit organization, which has no ownership interest in the same sense as a business enterprise, net assets is divided into three classes based on the presence or absence of donor-imposed restrictions—permanently restricted, temporarily restricted, and unrestricted net assets.

**Comprehensive income** is the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners.



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**Revenues** are inflows or other enhancements of assets of any entity or settlements of its liabilities (or a combination of both) from delivering or producing goods, rendering services, or other activities that constitute the entity's ongoing major or central operations.

**Expenses** are outflows or other using up of assets or incurrences of liabilities (or a combination of both) from delivering or producing goods, rendering services, or carrying out other activities that constitute the entity's ongoing major or central operations.

**Gains** are increases in equity (net assets) from peripheral or incidental transactions of an entity and from all other transactions and other events and circumstances affecting the entity except those that result from revenues or investments by owners.

**Losses** are decreases in equity (net assets) from peripheral or incidental transactions of an entity and from all other transactions and other events and circumstances affecting the entity except those that result from expenses or distributions to owners.

**Investments by owners** are increases in equity of a particular business enterprise resulting from transfers to it from other entities of something valuable to obtain or increase ownership interests (or equity) in it. Assets are most commonly received as investments by owners, but that which is received may also include services or satisfaction or conversion of liabilities of the enterprise.

**Distributions to owners** are decreases in equity of a particular business enterprise resulting from transferring assets, rendering services, or incurring liabilities by the enterprise to owners. Distributions to owners decrease ownership interest (or equity) in an enterprise.<sup>25</sup>

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### An accounting perspective:

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#### Business insight

Accountants record expenditures on physical resources such as land, buildings, and equipment that benefit future periods as assets. However, they expense expenditures on human resources for hiring and training that benefit future periods. Also, when a computer is dropped and destroyed, accountants record a loss. However, when the president of the company dies, they record no loss. Should the accounting model be changed regarding the accounting for human resources?

### Recognition and measurement in financial statements

In December 1984, the FASB issued *Statement of Financial Accounting Concepts No. 5*, "Recognition and Measurement in Financial Statements of Business Enterprises", describing recognition criteria and providing guidance for the timing and nature of information included in financial statements.<sup>26</sup> The recognition criteria

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<sup>25</sup> FASB, *Statement of Financial Accounting Concepts No. 6*.

<sup>26</sup> FASB, *Statement of Financial Accounting Concepts No. 5*, "Recognition and Measurement in Financial Statements of Business Enterprises" (Stamford, Conn., 1984). Copyright © by the Financial Accounting Standards Board, High Ridge Park, Stamford, Connecticut 06905, U.S.A. Copies of the complete document are available from the FASB. (In case you are wondering why we do not mention *Statement of Financial Accounting Concepts No. 4*, it pertains to accounting for not-for-profit organizations and is, therefore, not relevant to this

established in the Statement are fairly consistent with those used in current practice. The Statement indicates, however, that when information more useful than currently reported information is available at a reasonable cost, it should be included in financial statements.

### Summary of significant accounting policies

As part of their annual reports, companies include summaries of significant accounting policies. These policies assist users in interpreting the financial statements. To a large extent, accounting theory determines the nature of these policies. Companies must follow generally accepted accounting principles in preparing their financial statements.

The accounting policies of The Walt Disney Company, one of the world's leading entertainment companies, as contained in a recent annual report follow. After each, the chapter of this text where we discuss that particular policy is in parentheses. While a few of the items have already been covered, the remainder offer a preview of the concepts explained in later chapters.

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### An ethical perspective: Maplehurst company

Maplehurst Company manufactures large spinning machines for the textile industry. The company had purchased USD 100,000 of small hand tools to use in its business. The company's accountant recorded the tools in an asset account and was going to write them off over 20 years. Management wanted to write these tools off as an expense of this year because revenues this year had been abnormally high and were expected to be lower in the future. Management's goal was to smooth out income rather than showing sharp increases and decreases. When told by the accountant that USD 100,000 was a material item that must be accounted for in a theoretically correct manner, management decided to consider the tools as consisting of 10 groups, each having a cost of USD 10,000. Since amounts under USD 20,000 are considered immaterial for this company, all of the tools could then be charged to expense this year.

The accountant is concerned about this treatment. She doubts that she could successfully defend management's position if the auditors challenge the expensing of these items.

### Significant accounting policies

#### *Principles of consolidation*

The consolidated financial statements of the Company include the accounts of The Walt Disney Company and its subsidiaries after elimination of inter-company accounts and transactions.

Investments in affiliated companies are accounted for using the equity method. (Chapter 14)

#### *Accounting changes*

The Company changed its method of accounting for pre-opening costs (see Note 12). These changes had no cash impact.

The pro forma amounts presented in the consolidated statement of income reflect the effect of retroactive application of expensing pre-opening costs. (Chapters 13 and 14)

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text.)

## 5. Accounting theory

### *Revenue recognition*

Revenues from the theatrical distribution of motion pictures are recognized when motion pictures are exhibited. Television licensing revenues are recorded when the program material is available for telecasting by the licensee and when certain other conditions are met. Revenues from video sales are recognized on the date that video units are made widely available for sale by retailers.

Revenues from participants and sponsors at the theme parks are generally recorded over the period of the applicable agreements commencing with the opening of the related attraction. (Chapter 5)

### *Cash, cash equivalents and investments*

Cash and cash equivalents consist of cash on hand and marketable securities with original maturities of three months or less. (Chapter 8)

*SFAS 115* requires that certain investments in debt and equity securities be classified into one of three categories. Debt securities that the Company has the positive intent and ability to hold to maturity are classified as "held-to-maturity" and reported at amortized cost. Debt securities not classified as held-to-maturity and marketable equity securities are classified as either "trading" or "available-for-sale", and are recorded at fair value with unrealized gains and losses included in earnings or stockholders' equity, respectively. (Chapter 14)

### *Merchandise inventories*

Carrying amounts of merchandise, materials and supplies inventories are generally determined on a moving average cost basis and are stated at the lower of cost or market. (Chapter 7)

### *Film and television costs*

Film and television production and participation costs are expensed based on the ratio of the current period's gross revenues to estimated total gross revenues from all sources on an individual production basis. Estimates of total gross revenues are reviewed periodically and amortization is adjusted accordingly.

Television broadcast rights are amortized principally on an accelerated basis over the estimated useful lives of the programs. (Chapter 11)

### *Theme parks, resorts and other property*

Theme parks, resorts and other property are carried at cost. Depreciation is computed on the straight-line method based upon estimated useful lives ranging from three to fifty years. (Chapter 3)

### *Other assets*

Rights to the name, likeness and portrait of Walt Disney, goodwill and other intangible assets are amortized over periods ranging from two to forty years. (Chapter 11)

### *Risk management contracts*

In the normal course of business, the Company employs a variety of off-balance-sheet financial instruments to manage its exposure to fluctuations in interest and foreign currency exchange rates, including interest rate and cross-currency swap agreements, forward and option contracts, and interest rate exchange-traded futures. The company designates interest rate and cross-currency swaps as hedges of investments and debt, and accrues the differential to be paid or received under the agreements as interest rates change over the lives of the contracts. Differences paid or received on swap agreements are recognized as adjustments to interest income or expense over the life of the swaps, thereby adjusting the effective interest rate on the underlying investment or obligation. Gains

and losses on the termination of swap agreements, prior to the original maturity, are deferred and amortized to interest income or expense over the original term of the swaps. Gains and losses arising from interest rate futures, forwards and option contracts, and foreign currency forward and option contracts are recognized in income or expense as offsets of gains and losses resulting from the underlying hedged transactions. (Chapter 14)

Cash flows from interest rate and foreign exchange risk management activities are classified in the same category as the cash flows from the related investment, borrowing or foreign exchange activity. (Chapter 16)

The Company classifies its derivative financial instruments as held or issued for purposes other than trading. (Chapter 14)

### *Earnings per share*

Earnings per share amounts are based upon the weighted average number of common and common equivalent shares outstanding during the year. Common equivalent shares are excluded from the computation in periods in which they have an antidilutive effect. (Chapter 13)

As you proceed through the remaining chapters, you can see the accounting theories introduced in this chapter being applied. In Chapter 6, for instance, we discuss why sales revenue is recognized and recorded only after goods have been delivered to the customer. So far, we have used service companies to illustrate accounting techniques. Chapter 6 introduces merchandising operations. Merchandising companies, such as clothing stores, buy goods in their finished form and sell them to customers.

### *Understanding the learning objectives*

- The major underlying assumptions or concepts of accounting are (1) business entity, (2) going concern (continuity), (3) money measurement, (4) stable dollar, (5) periodicity, and (6) accrual basis and periodicity.
- Other basic accounting concepts that affect the accounting for entities are (1) general-purpose financial statements, (2) substance over form, (3) consistency, (4) double entry, and (5) articulation.
- The major principles include exchange-price (or cost), revenue recognition, matching, gain and loss recognition, and full disclosure. Major exceptions to the realization principle include cash collection as point of revenue recognition, installment basis of revenue recognition, and the percentage-of-completion method of recognizing revenue on long-term construction projects.
- Modifying conventions include cost-benefit, materiality, and conservatism.
- The FASB has defined the objectives of financial reporting, qualitative characteristics of accounting information, and elements of financial statements.
- Financial reporting objectives are the broad overriding goals sought by accountants engaging in financial reporting.
- Qualitative characteristics are those that accounting information should possess to be useful in decision making. The two primary qualitative characteristics are relevance and reliability. Another qualitative characteristic is comparability.
- Pervasive constraints include cost-benefit analysis and materiality.
- The FASB has identified and defined the basic elements of financial statements.
- The FASB has also described revenue recognition criteria and provided guidance as to the timing and nature of information to be included in financial statements.
- The summary of significant accounting policies aid users in interpreting the financial statements.

## 5. Accounting theory

- To a large extent, accounting theory determines the nature of those policies.

### Demonstration problem

For each of the following transactions or circumstances and the entries made, state which, if any, of the assumptions, concepts, principles, or modifying conventions of accounting have been violated. For each violation, give the entry to correct the improper accounting assuming the books have not been closed.

During the year, Dorsey Company did the following:

- Had its buildings appraised. They were found to have a market value of USD 410,000, although their book value was only USD 380,000. The accountant debited the Buildings and Accumulated Depreciation—Buildings accounts for USD 15,000 each and credited Paid-in Capital—From Appreciation. No separate mention was made of this action in the financial statements.
- Purchased new electric pencil sharpeners for its offices at a total cost of USD 60. These pencil sharpeners were recorded as assets and are being depreciated over five years.

### Solution to demonstration problem

- The cost principle and the modifying convention of conservatism may have been violated. Such write-ups simply are not looked on with favor in accounting. To correct the situation, the entry made needs to be reversed:

<b>Paid-in Capital</b>	<b>30,000</b>	
<b>Building</b>		<b>15,000</b>
<b>Accumulated Depreciation—Building</b>		<b>15,000</b>

- Theoretically, no violations occurred, but the cost of compiling insignificant information could be considered a violation of acceptable accounting practice. As a practical matter, the USD 60 could have been expensed on materiality grounds.

### Key terms

**Accounting theory** "A set of basic concepts and assumptions and related principles that explain and guide the accountant's actions in identifying, measuring, and communicating economic information".

**Bias** Exists when accounting measurements are consistently too high or too low.

**Business entity concept** The specific unit for which accounting information is gathered. Business entities have a separate existence from owners, creditors, employees, customers, other interested parties, and other businesses.

**Comparability** A qualitative characteristic of accounting information; when information is comparable, it reveals differences and similarities that are real and are not the result of differing accounting treatments.

**Completed-contract method** A method of recognizing revenue on long-term projects under which no revenue is recognized until the period in which the project is completed; similar to recognizing revenue upon the completion of a sale.

**Completeness** A qualitative characteristic of accounting information; requires disclosure of all significant information in a way that aids understanding and does not mislead; sometimes called the full disclosure principle.

**Conservatism** Being cautious or prudent and making sure that net assets and net income are not overstated.

**Consistency** Requires a company to use the same accounting principles and reporting practices through time.

**Cost-benefit consideration** Determining whether benefits of including information in financial statements exceed costs.

**Cost principle** See Exchange-price principle.

**Earning principle** The requirement that revenue be substantially earned before it is recognized (recorded).

**Exchange-price (or cost) principle** Transfers of resources are recorded at prices agreed on by the parties at the time of the exchange.

**Feedback value** A qualitative characteristic that information has when it reveals the relative success of users in predicting outcomes.

**Financial reporting objectives** The broad overriding goals sought by accountants engaging in financial reporting.

**Full disclosure principle** Information important enough to influence the decisions of an informed user of the financial statements should be disclosed.

**Gain and loss recognition principle** Gains may be recorded only when realized, but losses should be recorded when they first become evident.

**Gains** Typically result from the sale of long-term assets for more than their book value.

**Going-concern (continuity) assumption** The assumption that an entity will continue to operate indefinitely unless strong evidence exists that the entity will terminate.

**Historical cost** The amount paid, or the fair market value of a liability incurred or other resources surrendered, to acquire an asset and place it in a condition and position for its intended use.

**Installment basis** A revenue recognition procedure in which the percentage of total gross margin recognized in a period on an installment sale is equal to the percentage of total cash from the sale that is received in that period.

**Liquidation** Terminating a business by ceasing business operations and selling off its assets.

**Losses** Asset expirations that are usually involuntary and do not create revenues.

**Matching principle** Expenses should be recognized as they are incurred to produce revenues.

**Materiality** A modifying convention that allows the accountant to deal with immaterial (unimportant) items in an expedient but theoretically incorrect manner; also a qualitative characteristic specifying that financial accounting report only information significant enough to influence decisions or evaluations.

**Modifying conventions** Customs emerging from accounting practice that alter the results obtained from a strict application of accounting principles; conservatism is an example.

**Money measurement** Use of a monetary unit of measurement, such as the dollar, instead of physical or other units of measurement—feet, inches, grams, and so on.

**Neutrality** A qualitative characteristic that requires accounting information to be free of measurement method bias.

**Percentage-of-completion method** A method of recognizing revenue based on the estimated stage of completion of a long-term project. The stage of completion is measured by comparing actual costs incurred in a period with total estimated costs to be incurred in all periods.

**Period costs** Costs that cannot be traced to specific products and are expensed in the period incurred.

**Periodicity (time periods) assumption** An assumption of the accountant that an entity's life can be divided into time periods for reporting its economic activities.

**Predictive value** A qualitative characteristic that information has when it improves users' abilities to predict outcomes of events.

**Product costs** Costs incurred in the acquisition or manufacture of goods. Product costs are accounted for as if they were attached to the goods, with the result that they are charged to expense when the goods are sold.

**Qualitative characteristics** Characteristics that accounting information should possess to be useful in decision making.

**Realization principle** A principle that directs that revenue is recognized only after the seller acquires the right to receive payment from the buyer.

**Relevance** A qualitative characteristic requiring that information be pertinent to or affect a decision.

**Reliability** A qualitative characteristic requiring that information faithfully depict for users what it purports to represent.

**Representational faithfulness** A qualitative characteristic requiring that accounting statements on economic activity correspond to the actual underlying activity.

**Revenue recognition principle** The principle that revenues should be earned and realized before they are recognized (recorded).

**Stable dollar assumption** An assumption that the dollar is a reasonably stable unit of measurement.

## 5. Accounting theory

**Timeliness** A qualitative characteristic requiring that accounting information be provided at a time when it may be considered before making a decision.

**Verifiability** A qualitative characteristic of accounting information; information is verifiable when it can be substantially duplicated by independent measurers using the same measurement methods.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

The business entity concept assumes that each business has an existence separate from all parties except its owners.

When the substance of a transaction differs from its legal form, the accountant should record the economic substance.

The matching principle is fundamental to the accrual basis of accounting.

Exceptions to the realization principle include the installment basis of revenue recognition for sales revenue and the completed-contract method for long-term construction projects.

Immaterial items do not have to be recorded at all.

The conceptual framework project resulted in identifying two primary qualitative characteristics that accounting information should possess—relevance and reliability.

#### Multiple-choice

Select the best answer for each of the following questions.

The underlying assumptions of accounting includes all the following except:

- Business entity.
- Going concern.
- Matching.
- Money measurement and periodicity.

The concept that requires companies to use the same accounting practices and reporting practices through time is:

- Substance over form.
- Consistency.
- Articulation.
- None of the above.

Which of the following statements is false regarding the revenue recognition principle?

- Revenue must be substantially earned before it is recognized.
- The accountant usually recognizes revenue before the seller acquires the right to receive payment from the buyer.
- Some small companies use the cash basis of accounting.
- Under the installment basis, the gross margin recognized in a period is equal to the amount of cash received from installment sales times the gross margin percentage for the year of sale.

Assume the following facts regarding the construction of a bridge:

Construction costs this period..... USD 3,000,000

Total estimated construction costs...10,000,000

Total sales price..... 15,000,000

The revenue that should be recognized this period is:

- a. USD 3,000,000.
- b. USD 4,500,000.
- c. USD 5,000,000.
- d. USD 6,500,000.

Modifying conventions include all of the following except:

- a. Periodicity.
- b. Cost-benefit.
- c. Materiality.
- d. Conservatism.

Which of the following is not part of the conceptual framework project?

- a. Objectives of financial reporting.
- b. Quantitative characteristics.
- c. Qualitative characteristics.
- d. Basic elements of financial statements.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- Name the assumptions underlying generally accepted accounting principles. Comment on the validity of the stable unit of measurement assumption during periods of high inflation.
- Why does the accountant use the business entity concept?
- When is the going-concern assumption not to be used?
- What is meant by the term accrual basis of accounting? What is its alternative?
- What does it mean to say that accountants record substance rather than form?
- If a company changes an accounting principle because the change better meets the information needs of users, what disclosures must be made?
- What is the exchange-price (or cost) principle? What is the significance of adhering to this principle?
- What two requirements generally must be met before recognizing revenue in a period?
- Under what circumstances, if any, is the receipt of cash an acceptable time to recognize revenue?
- What two methods may be used in recognizing revenues on long-term construction contracts?
- Define expense. What principles guide the recognition of expense?
- How does an expense differ from a loss?
- What is the full disclosure principle?
- What role does cost-benefit play in financial reporting?
- What is meant by the accounting term conservatism? How does it affect the amounts reported in the financial statements?
- Does materiality relate only to the relative size of dollar amounts?
- Identify the three major parts of the conceptual framework project.
- What are the two primary qualitative characteristics?
- **Real world question** A recent annual report of the American Ship Building Company stated:



## 5. Accounting theory

*Revenues, costs, and profits applicable to construction and conversion contracts are included in the consolidated statements of operations using the... percentage-of- completion accounting method.... The completed contract method was used for income tax reporting in the years this method was allowed.*

Why might the management of a company want to use two different methods for accounting and tax purposes?

➤ **Real world question** A recent annual report of Chevron Corporation stated:

*Environmental expenditures that relate to current or future revenues are expensed or capitalized as appropriate. Expenditures that relate to an existing condition caused by past operations, and do not contribute to current or future revenue generation, are expensed.*

Which principle of accounting is being followed by this policy?

➤ What is the purpose of including a "Summary of significant accounting policies" in the company's annual report?

### Exercises

**Exercise A** Match the items in Column A with the proper descriptions in Column B.

#### Column A

Going concern (continuity).

Consistency.

Disclosure.

Periodicity.

Conservatism.

Stable dollar.

Matching.

Materiality.

Exchange-price (cost).

Business entity.

#### Column B

a. An assumption relied on in the preparation of the primary financial statements that would be unreasonable when the inflation rate is high.

b. Concerned with relative dollar amounts.

c. The usual basis for the recording of assets.

d. Required if the accounting treatment differs from that previously used for a particular item.

e. An assumption that would be unreasonable to use in reporting on a firm that had become insolvent.

f. None of these.

g. Requires a company to use the same accounting procedures and practices through time.

h. An assumption that the life of an entity can be subdivided into time periods for reporting purposes.

i. Discourages undue optimism in measuring and reporting net assets and net income.

j. Requires separation of personal from business activities in the recording and reporting processes.

**Exercise B** Parker Clothing Company sells its products on an installment sales basis. Data for 2010 and 2011 follow:

	2010	2011
Installment sales.....	\$800,000	\$960,000
Cost of goods sold on installment sales ....	560,000	720,000
Other expenses.....	120,000	160,000
Cash collected from 2010 sales.....	480,000	240,000
Cash collected from 2011 sales.....		640,000

- Compute the net income for 2011, assuming use of the accrual (sales) basis of revenue recognition.
- Compute the net income for 2011, assuming use of the installment basis of recognizing gross margin.

**Exercise C** A company has a contract to build a ship at a price of USD 500 million and an estimated cost of USD 400 million. Costs of USD 100 million were incurred. Under the percentage-of-completion method, how much revenue would be recognized?

**Exercise D** A company follows a practice of expensing the premium on its fire insurance policy when the policy is paid. In 2010, the company charged to expense the USD 6,000 premium paid on a three-year policy covering the period 2010 July 1, to 2010 June 30. In 2010, a premium of USD 5,400 was charged to expense on the same policy for the period 2010 July 1, to 2010 July 30.

- State the principle of accounting that was violated by this practice.
- Compute the effects of this violation on the financial statements for the calendar year 2010.
- State the basis on which the company's practice might be justified.

**Exercise E** Match the descriptions in Column B with the accounting qualities in Column A. Use some descriptions more than once.

**Column A: Accounting qualities**

Relevance.

Feedback value.

Decision makers.

Representational faithfulness.

Reliability.

Comparability.

Benefits exceed costs.

Predictive value.

Timeliness.

Decision usefulness.

Verifiability.

Understandability.

Neutrality.

Materiality.

**Column B: Descriptions**

a. Users of accounting information.

b. Pervasive constraint.

c. User-specific qualities.

d. Primary decision-specific qualities.

e. Ingredients of primary qualities.

f. Secondary and interactive qualities.

g. Threshold for recognition.

## 5. Accounting theory

### Problems

**Problem A** Select the best answer to each of the following questions:

The assumption that each business has an existence separate from its owners, creditors, employees, customers, other interested parties, and other businesses is the:

- Going-concern assumption.
- Business entity concept.
- Separate entity concept.
- Corporation concept.

Companies should use liquidation values to report assets if which of the following conditions exists?

- There are changes in the value of the dollar.
- The periodicity assumption is applied.
- The company is not a going concern and will be dissolved.
- The accrual basis of accounting is not used.

Assume that a company has paid for advertising and that the ad has already appeared. The company chose to report the item as prepaid advertising and includes it among the assets on the balance sheet. Previously, the company had always expensed expenditures such as this. This practice is a violation of:

- Generally accepted accounting principles.
- The matching concept.
- The consistency concept.
- All of the above.

Recording revenue only after the seller has obtained the right to receive payment from the buyer for merchandise sold or services performed is called the:

- Earning principle.
- Installment basis.
- Realization principle.
- Completed-contract method.

**Problem B** Ramirez Video, Inc., sells video recorders under terms calling for a small down payment and monthly payments spread over three years. Following are data for the first three years of the company's operations:

2008	2009	2010
Gross margin rate 30%	40%	50%
Cash collected in 2010:		
From sales in.....\$216,000		
From sales in.....	\$288,000	
From sales in.....		\$480,000

Total sales for 2010 were USD 1,600,000, while general and selling expenses amounted to USD 400,000.

- Compute net income for 2010, assuming revenues are recognized at the time of sale.
- Compute net income for 2010, using the installment method of accounting for sales and gross margin.

**Problem C** The following data relate to Merit Construction Company's long-term construction projects for the year 2010:

	Completed Projects	Incomplete Projects
Contract price.....	\$20,000,000	\$100,000,000
Costs incurred prior to 2010 .....	3,700,000	16,000,000
Costs incurred in 2010.....	11,100,000	32,000,000
Estimated costs to be incurred in future years.....	- 0-	32,000,000

General and administrative expenses incurred in 2010 amounted to USD 2 million, none of which is to be considered a construction cost.

- a. Compute net income for 2010 under the completed-contract method.
- b. Compute net income for 2010 under the percentage-of-completion method.

**Problem D** For each of the following numbered items, state the letter or letters of the principle(s), assumption(s), or concept(s) used to justify the accounting procedure followed. The accounting procedures are all correct.

- a. Business entity.
- b. Conservatism.
- c. Earning principle of revenue recognition.
- d. Going concern (continuity).
- e. Exchange-price (cost) principle.
- f. Matching principle.
- g. Period cost (or principle of immediate recognition of expense).
- h. Realization principle.
- i. Stable dollar assumption.

Inventory is recorded at the lower of cost or market value.

A truck purchased in January was reported at 80 per cent of its cost even though its market value at year-end was only 70 per cent of its cost.

The collection of USD 40,000 of cash for services to be performed next year was reported as a current liability.

The president's salary was treated as an expense of the year even though he spent most of his time planning the next two years' activities.

No entry was made to record the company's receipt of an offer of USD 800,000 for land carried in its accounts at USD 435,000.

A supply of printed stationery, checks, and invoices with a cost of USD 8,500 was treated as a current asset at year-end even though it had no value to others.

A tract of land acquired for USD 180,000 was recorded at that price even though it was appraised at USD 230,000, and the company would have been willing to pay that amount.

The company paid and charged to expense the USD 4,200 paid to Craig Nelson for rent of a truck owned by him. Craig Nelson is the sole stockholder of the company.

**Problem E** Match the descriptions in Column B with the proper terms in Column A.

<b>Column A</b>	<b>Column B</b>
1. Financial reporting objectives.	a. Information is free of measurement method bias.
2. Qualitative characteristics.	b. The benefits exceed the costs.
3. Relevance.	c. Relatively large items must be accounted for in a theoretically correct way.
4. Predictive value.	d. The information can be substantially duplicated by independent measurers using the same measurement methods.
5. Feedback value.	e. When information improves users' ability to predict outcomes of events.
6. Timeliness.	f. Broad overriding goals sought by accountants engaging in financial reporting.
7. Reliability.	g. When information is pertinent or bears on a decision.
8. Representational faithfulness.	h. The characteristics that accounting information should possess to be useful in decision making.
9. Verifiability.	i. Information that reveals the relative success of users in predicting outcomes.
10. Neutrality.	j. When accounting statements on economic activity correspond to the actual underlying activity.
11. Comparability.	k. When information is provided soon enough that it may be considered in decision making.
12. Consistency.	l. When information faithfully depicts for users what it purports to represent.
13. Cost-benefit.	m. Requires a company to use the same accounting principles and reporting

## 5. Accounting theory

14. Materiality. *n.* practices through time.  
When reported differences and similarities in information are real and not the result of differing accounting treatments.

### Alternate problems

**Alternate problem A** Select the best answer to each of the following questions:

A set of basic concepts and assumptions and related principles that explain and guide the accountant's actions in identifying, measuring, and communicating economic information is called:

- a. Accounting theory.
- b. Accounting rules.
- c. Accrual basis.
- d. Matching concept.

Which of the following statements is false?

- a. Several separate legal entities properly may be considered to be one accounting entity.
- b. The stable dollar assumption is used only when the dollar is absolutely stable.
- c. Publicly held corporations generally prepare monthly financial statements for internal management and publish quarterly and annual financial statements for users outside the company.
- d. Without the periodicity assumption, a business would have only one time period running from the inception of the business to its termination.

Which of the following statements is true?

- a. When the substance of a transaction conflicts with the legal form of the transaction, the accountant should be guided by the legal form in recording the transaction.
- b. The consistency concept prohibits a change in accounting principle even when such a change would better meet the information needs of financial statement users.
- c. Under the double-entry approach, each transaction must be recorded with one debit and one credit of equal dollar amounts.
- d. Special-purpose financial information for a specific decision, such as whether or not to purchase a new machine, is best obtained from the detailed accounting records rather than from the financial statements.

Which of the following statements is true?

- a. All assets are carried indefinitely at their original costs in the financial statements.
- b. Liabilities are measured in the cash to be paid or the value of services to be performed to satisfy the liabilities.
- c. Accounting principles are derived by merely summarizing accounting practices used to date.
- d. Accountants can easily measure all changes in assets and liabilities since they never involve estimates or calculations.

Which of the following statements is false?

- a. The exchange-price principle is also called the cost principle.
- b. The matching principle is closely related to the revenue recognition principle.
- c. The installment sales method recognizes revenue sooner than it would normally be recognized.
- d. The percentage-of-completion method recognizes revenue sooner than the completed- contract method.

**Alternate problem B** Nevada Real Estate Sales Company sells lots in its development in Dry Creek Canyon under terms calling for small cash down payments with monthly installment payments spread over a few years. Following are data on the company's operations for its first three years:

	2008	2009	2010
Gross margin rate .....	45%	48%	50%
Cash collected in 2010 from sales of lots made in.....	\$640,000	\$800,000	\$900,000

The total selling price of the lots sold in 2010 was USD 3,000,000, while general and administrative expenses (which are not included in the costs used to determine gross margin) were USD 800,000.

- Compute net income for 2010 assuming revenue is recognized on the sale of a lot.
- Compute net income for 2010 assuming use of the installment basis of accounting for sales and gross margin.

**Alternate problem C** The following contract prices and costs relate to all of Orlando Construction Company's long-term construction projects (in millions of dollars):

	Contract Price	Costs Incurred		Cost to Be Incurred in Future Years
		Prior to 2010	In 2010	
On projects completed in 2010	\$46	\$4	\$36	\$0
On incomplete projects	144	24	48	48

General and administrative expenses for 2010 amounted to USD 1,200,000. Assume that the general and administrative expenses are not to be treated as a part of the construction cost.

- Compute net income for 2010 using the completed-contract method.
- Compute net income for 2010 using the percentage-of-completion method.

**Alternate problem D** In each of these circumstances, the accounting practices may be questioned. Indicate whether you agree or disagree with the accounting practice employed and state the assumptions, concepts, or principles that justify your position.

The salaries paid to the top officers of the company were charged to expense in the period in which they were incurred even though the officers spent over half of their time planning next year's activities.

No entry was made to record the belief that the market value of the land owned (carried in the accounts at USD 800,000) had increased.

The acquisition of a tract of land was recorded at the price paid for it of USD 400,000, even though the company would have been willing to pay USD 600,000.

A truck acquired at the beginning of the year was reported at year-end at 80 per cent of its acquisition price even though its market value then was only 65 per cent of its original acquisition price.

**Alternate problem E** Select the best answer to each of the following questions:

In the conceptual framework project, how many financial reporting objectives were identified by the FASB?

- One.
- Two.
- Three.
- Four.

The two primary qualitative characteristics are:

- Predictive value and feedback value.
- Timeliness and verifiability.
- Comparability and neutrality.
- Relevance and reliability.

A pervasive constraint of accounting information is that:

- Benefits must exceed costs.

## 5. Accounting theory

- b. The information must be timely.
- c. The information must be neutral.
- d. The information must be verifiable.

To be reliable, information must (identify the incorrect quality):

- a. Be verifiable.
- b. Be timely.
- c. Have representational faithfulness.
- d. Be neutral.

The basic elements of financial statements consist of:

- a. Terms and their definitions.
- b. The objectives of financial reporting.
- c. The qualitative characteristics.
- d. The new income statement format.

### Beyond the numbers—Critical thinking

**Business decision case A** Jim Casey recently received his accounting degree from State University and went to work for a Big-Four CPA firm. After he had been with the firm for about six months, he was sent to the Ling Clothing Company to work on the audit. He was not very confident of his knowledge at this early point in his career. He noticed, however, that some of the company's transactions and events were recorded in a way that might be in violation of accounting theory and generally accepted accounting principles.

Study each of the following facts to see if the auditors should challenge the financial accounting practices used or the intentions of management. Write your decisions and the reasoning behind your conclusions.

This problem can serve as an opportunity to apply accounting theory to situations with which you are not yet familiar and as a preview of future chapters. Some of the following situations relate to material you have already covered, and some situations relate to material to be covered in future chapters. After each item, we have given an indication of the chapter in which that item is discussed. You may research future chapters to find the correct answer. Alternatively, you could use your present knowledge of accounting theory to determine whether or not Casey should challenge each of the financial accounting practices used. Realize, however, that some generally accepted accounting practices were based on compromise and seem to differ with accounting theory as described in this chapter.

One of the senior members of management stated the company planned to replace all of the furniture next year. He said that the cash in the Accumulated Depreciation account would be used to pay for the furniture. (Ch. 3)

The company held the books open at the end of 2010 so they could record some early 2011 sales as 2010 revenue. The justification for this practice was that 2010 was not a good year for profits. (Ch. 3, 5, 6)

The company's buildings were appraised for insurance purposes. The appraised values were USD 10,000,000 higher than the book value. The accountant debited Buildings and credited Paid-in Capital from Appreciation for the difference. (Ch. 5)

The company recorded purchases of merchandise at the list price rather than the gross selling (invoice) price. (Ch. 6)

Goods shipped to the company from a supplier, FOB destination, were debited to Purchases. The goods were not included in ending inventory because the goods had not yet arrived. (Ch. 5, 6)

The company counted some items twice in taking the physical inventory at the end of the year. The person taking the inventory said he had forgotten to include some items in last year's physical inventory, and counting some items twice would make up for the items missed last year so that net income this year would be about correct. (Ch. 7)

The company switched from FIFO to LIFO in accounting for inventories. The preceding year it had switched from the weighted-average method to FIFO. The reason given for the most recent change was that federal income taxes would be lower. No indication of this switch was to appear in the financial statements. (Ch. 5, 7)

Since things were pretty hectic at year-end, the accountant made no effort to reconcile the bank account. His reason was that the bank probably had not made any errors. The bank balance was lower than the book balance, so the accountant debited Miscellaneous Expense and credited Cash for the difference. (Ch. 8)

When a customer failed to pay the amount due, the accountant debited Allowance for Uncollectible Accounts and credited Accounts Receivable. The amount of accounts written off in this manner was huge. (Ch. 9)

A completely depreciated machine was still being used. The accountant left the asset and its related accumulated depreciation on the books, stopped recording depreciation on the machine, and did not go back and correct earlier years' net income and reduce accumulated depreciation. (Ch. 10)

The accountant stated that even though research and development costs incurred to develop a new product would benefit future periods, these costs must be expensed as incurred. This year USD 200,000 of these costs were charged to expense. (Ch. 11)

An old truck was traded for a new truck. Since the trade-in value of the old truck was higher than its book value, a gain was recorded on the transaction. (Ch. 11)

The company paid for a franchise giving it the exclusive right to operate in a given geographical area for 60 years. The accountant is amortizing the asset over 60 years. (Ch. 11)

The company leases a building and has a nonrenewable lease that expires in 15 years. The company made some improvements to the building. Since the improvements will last 30 years, they are being written off over 30 years. (Ch. 11)

**Annual report analysis B** Refer to the "Summary of significant accounting policies" in the annual report of The Limited, Inc. List the policies discussed. For each of the policies, explain in writing what the company is trying to communicate.

**Ethics – A writing experience C** Refer to the item "An ethical perspective: Maplehurst company". Write out the answers to the following questions:

Is management being ethical in this situation? Explain.

Is the accountant correct in believing that management's position could not be successfully defended? Explain.

What would you do if you were the accountant? Describe in detail.

**Group project D** In teams of two or three students, go to the library to locate one company's annual report for the most recent year. (As an alternative, annual reports can be downloaded from the SEC's EDGAR site at [www.sec.gov/edgar.shtml](http://www.sec.gov/edgar.shtml)) Examine the "Summary of accounting policies", which is part of the "Notes to financial statements" section immediately following the financial statements. As a team, write a memorandum to the instructor detailing the significant accounting policies of the company. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.



## 5. Accounting theory

**Group project E** With one or two other students and using library sources, write a paper on the history and achievements of the Financial Accounting Standards Board. This board is responsible for establishing the accounting standards and principles for financial accounting in the private sector. It was formed in 1973 and took over the rule setting function from the Accounting Principles Board of the American Institute of Certified Public Accountants at that time. Be sure to cite sources used and to treat direct quotes properly.

**Group project F** Your team of students should obtain a copy of the report, "Improving Business Reporting—A Customer Focus" by the AICPA Special Committee on Financial Reporting (1994). Your library might have a copy. If not, it can be obtained from the AICPA [Product No. 019303, Order Department, AICPA, Harborside Financial Center, 201 Plaza Three, Jersey City, NJ 07311- 3881] [Toll free number 1-800-862-4272; FAX 1-800-362-5066]. Write a report giving a description of the recommendations of the committee. Be sure to cite sources used and treat direct quotes properly.

### Using the Internet—A view of the real world

Visit the following Internet site for General Electric:

<http://www.ge.com>

Find the annual report listed under Financial Reporting, and then Notes to Financial Statements. Print a copy of the summary of Significant Accounting Policies. Write a short report to your instructor summarizing your findings.

Visit the following Internet site for Oracle.:

<http://www.oracle.com>

Click on "about", then under "Investor Relations" click on "Detailed Financials". Examine the notes on the financial statements for the latest quarter. Write a short report for your instructor on your findings.

### Answers to self-test

#### True-false

**False.** The business entity concept assumes that each business has an existence separate from its owners, creditors, employees, customers, other interested parties, and other businesses.

**True.** Accountants should be guided by the economic substance of a transaction rather than its legal form.

**True.** The accrual basis of accounting seeks to match effort and accomplishment by matching expenses against the revenues they created.

**False.** Exceptions include the installment basis of revenue recognition for sales and the percentage-of-completion method for long-term construction projects.

**False.** Immaterial items do have to be recorded, but they can be recorded in a theoretically incorrect way (e.g. expensing a wastebasket that will last many years).

**True.** Relevance and reliability are the two primary characteristics.

#### Multiple-choice

**c.** The matching concept is one of the major principles of accounting rather than an assumption.

**b.** The consistency concept requires that a company use the same accounting principles and reporting practices through time.

**b.** Usually, the accountant does not recognize revenue until the seller acquires the right to receive payment from the buyer.

**b.**  $\frac{\text{USD } 3,000,000}{\text{USD } 10,000,000} \times \text{USD } 15,000,000 = \text{USD } 4,500,000$  .

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- a.** Periodicity is an underlying assumption rather than a modifying convention.
- b.** The category, quantitative characteristics, is not part of the conceptual framework project.

# 6. Merchandising transactions

## Introduction to inventories and the classified income statement

### Learning objective

After studying this chapter, you should be able to:

- Record journal entries for sales transactions involving merchandise.
- Describe briefly cost of goods sold and the distinction between perpetual and periodic inventory procedures.
- Record journal entries for purchase transactions involving merchandise.
- Describe the freight terms and record transportation costs.
- Determine cost of goods sold.
- Prepare a classified income statement.
- Analyze and use the financial results—gross margin percentage.
- Prepare a work sheet and closing entries for a merchandising company (Appendix).

### A career as a CEO

Are you a leader? Would you enjoy someday becoming the president or chief executive officer (CEO) of the company you work for? Then you should consider a degree in accounting. The accounting field greatly values individuals with leadership potential. Accounting students with the most job offers and the highest starting salaries are also likely to be the ones who best demonstrate an ability to lead others. Recruiters in public accounting (i.e. auditing, tax, consulting) and private accounting (i.e. financial reporting, cost accounting, financial analysis, internal auditing) alike demonstrate a strong preference for students with leadership potential.

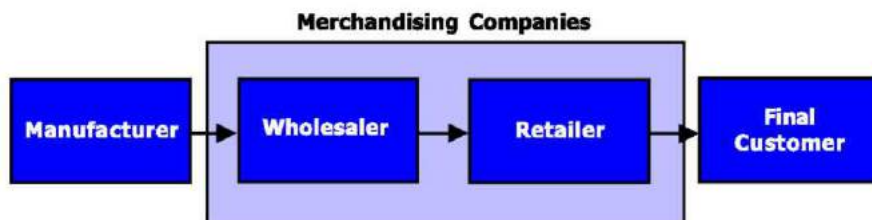
Fortunately, you do not have to run a company to demonstrate leadership abilities to college recruiters. Some examples of leadership potential that would look good on a resume include organizing a successful fund-raiser, participating effectively as an officer in a student club, or taking the lead in a group project. If you do not have a resume yet, stop by the career placement center at your college and ask them to assist you in preparing one. Many students at your level already have a resume, and it takes time to refine and develop an effective one. A well-prepared resume will be important for securing internship opportunities and part-time work in the business field, as well as for landing that first job upon graduation.

Did you know that the chief executive officers (CEO) of many of the largest manufacturing, merchandising, and service organizations in the United States have degrees in accounting? James Dimon of JPMorgan Chase, Gary C. Kelly of Southwest Airlines, Phil Knight of Nike, James J. Mulva of ConocoPhillips, and Indra K. Nooyi of PepsiCo all have degrees in accounting. It is really not that surprising that accounting majors are so successful, as accounting provides an excellent foundation in business. With a strong accounting foundation and the continued development of leadership abilities over your career, you might become a CEO yourself someday.

## 6. Merchandising transactions

Your study of accounting began with service companies as examples because they are the least complicated type of business. You are now ready to apply the accounting process to a more complex business—a merchandising company. Although the fundamental accounting concepts for service businesses apply to merchandising businesses, merchandise accounting requires some additional accounts and techniques to record sales and purchases.

The normal flow of goods from manufacturer to final customer is as follows:



**Manufacturers** produce goods from raw materials and normally sell them to wholesalers. After performing certain functions, such as packaging or labeling, **wholesalers** sell the goods to retailers. **Retailers** sell the goods to final customers. The two middle boxes in the diagram represent merchandising companies. These companies buy goods in finished form for resale.

This chapter begins by comparing the income statement of a service company with that of a merchandising company. Then, we describe (1) how to record merchandise-related transactions (2) a classified income statement and (3) the gross margin percentage. Finally, in the appendix we explain the work sheet and the closing process for a merchandising company.

SERVICE COMPANY		MERCHANDISING COMPANY	
Income Statement		Income Statement	
For the Year Ended 2010 December 31		For the Year Ended 2010 December 31	
Service revenues	\$13,200	Sales revenues	\$262,000
		Cost of goods sold	159,000
		Gross Margin	\$103,000
Expenses	6,510	Expenses	74,900
Net income	\$ 6,690	Net income	\$ 28,100

Exhibit 32: Condensed income statements of a service company and a merchandising company compared

### Two income statements compared— Service company and merchandising company

In Exhibit 32 we compare the main divisions of an income statement for a service company with those for a merchandising company. To determine profitability or net income, a service company deducts total expenses incurred from revenues earned. A merchandising company is a more complex business and, therefore, has a more complex income statement.

As shown in Exhibit 32, merchandising companies must deduct from revenues the cost of the goods they sell to customers to arrive at gross margin. Then, they deduct other expenses. The income statement of a merchandising company has three main divisions: (1) sales revenues, which result from the sale of goods by the company; (2) cost of goods sold, which is an expense that indicates how much the company paid for the goods sold; and (3) expenses, which are the company's other expenses in running the business.

In the next two sections we discuss the first two main divisions of the income statement of a merchandising company. The third division (expenses) is similar to expenses for a service company, which we illustrated in preceding chapters. As you study these sections, keep in mind how the divisions of the merchandising income

statement are related to each other and produce the final figure—net income or net loss—which indicates the profitability of the company.

## Sales revenues

The sale of goods occurs between two parties. The seller of the goods transfers them to the buyer in exchange for cash or a promise to pay at a later date. This exchange is a relatively simple business transaction. Sellers make sales to create revenues; this inflow of assets in the form of cash or accounts receivable results from selling goods to customers.

In Exhibit 32, we show a condensed income statement to emphasize its major divisions. Next, we describe the more complete income statement actually prepared by accountants. The merchandising company that we use to illustrate the income statement is Hanlon Retail Food Store. This section explains how to record sales revenues, including the effect of trade discounts. Then, we explain how to record two deductions from sales revenues—sales discounts and sales returns and allowances (Exhibit 33). The amount that remains is **net sales**. The formula for determining net sales is:

$$\text{Net sales} = \text{Gross sales} - (\text{Sales discounts} + \text{Sales returns and allowances})$$

### HANLON RETAIL FOOD STORE

#### Partial income Statement

For the Year Ended 2010 December 31

Operating revenues:

Gross sales		\$282,000
Less: Sales discounts	\$ 5,000	
Sales returns and allowances	15,000	20,000
Net sales		\$262,000

### Exhibit 33: Partial income statement of merchandising company

**BRYAN WHOLESale CO.**  
476 Mason Street  
Detroit, Michigan 48823

**Invoice No.:** 1258 **Date:** 2010 Dec. 19,

**Customer's Order No.:** 218

**Sold to:** Baier Company

**Address:** 2255 Hannon Street

Big Rapids, Michigan 48106

**Date Shipped:** 2010 Dec. 19,

**Terms:** Net 30, FOB Destination

**Shipped by:** Nagel Trucking Co.

Description	Item Number	Quantity	Price per Unit	Total Amount
True-tone stereo radio	Model No. 5868-24393	200	\$100	\$20,000
		Total		\$20,000

### Exhibit 34: Invoice

In a sales transaction, the seller transfers the legal ownership (title) of the goods to the buyer. Usually, the physical delivery of the goods occurs at the same time as the sale of the goods. A business document called an invoice (a sales invoice for the seller and a purchase invoice for the buyer) becomes the basis for recording the sale.

An **invoice** is a document prepared by the seller of merchandise and sent to the buyer. The invoice contains the details of a sale, such as the number of units sold, unit price, total price billed, terms of sale, and manner of shipment. A retail company prepares the invoice at the point of sale. A wholesale company, which supplies goods to retailers, prepares the invoice after the shipping department notifies the accounting department that it has shipped

## 6. Merchandising transactions

the goods to the retailer. Exhibit 34 is an example of an invoice prepared by a wholesale company for goods sold to a retail company.

Using the invoice as the source document, a wholesale company records the revenue from the sale at the time of the sale for the following reasons:

- The seller has passed legal title of the goods to the buyer, and the goods are now the responsibility and property of the buyer.
- The seller has established the selling price of the goods.
- The seller has completed its obligation.
- The seller has exchanged the goods for another asset, such as cash or accounts receivable.
- The seller can determine the costs incurred in selling the goods.

Each time a company makes a sale, the company earns revenue. This revenue increases a revenue account called Sales. Recall from Chapter 2 that credits increase revenues. Therefore, the firm credits the Sales account for the amount of the sale.

Usually sales are for cash or on account. When a sale is for cash, the company credits the Sales account and debits Cash. For example, it records a USD 20,000 sale for cash as follows:

Cash (+A)	20,000	
Sales (+SE)		20,000

To record the sales of merchandise for cash.

When a sale is on account, it credits the Sales account and debits Accounts Receivable. The following entry records a USD 20,000 sale on account:

Accounts Receivable (+A)	20,000	
Sales (+SE)		20,000

To record the sales of merchandise on account.

Usually, a seller quotes the gross selling price, also called the invoice price, of goods to the buyer. However, sometimes a seller quotes a list price of goods along with available trade discounts. In this latter situation, the buyer must calculate the gross selling price. The list price less all trade discounts is the **gross selling price**. Merchandising companies that sell goods use the gross selling price as the credit to sales.

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### An accounting perspective:

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#### Uses of technology

A database management system stores related data—such as monthly sales data (salespersons, customers, products, and sales amounts)—independent of the application. Once you have defined this information to the database management system, you can use commands to answer such questions as: Which products have been sold to which customers? What are the amounts of sales by individual salespersons? You could also print a customer list sorted by ZIP code, the alphabet, or salesperson.

A **trade discount** is a percentage deduction, or discount, from the specified list price or catalog price of merchandise. Companies use trade discounts to:

- Reduce the cost of catalog publication. A seller can use a catalog for a longer time by printing list prices in the catalog and giving separate discount sheets to salespersons whenever prices change.
- Grant quantity discounts.
- Allow quotation of different prices to various customers, such as retailers and wholesalers.

The seller's invoice may show trade discounts. However, sellers do not record trade discounts in their accounting records because the discounts are used only to calculate the gross selling price. Nor do trade discounts appear on the books of the purchaser. To illustrate, assume an invoice contains the following data:

List price, 200 swimsuits at \$24	\$4,800
Less: Trade discount, 30%	1,440
Gross selling price (invoice price)	\$3,360

The seller records a sale of USD 3,360. The purchaser records a purchase of USD 3,360. Thus, neither the seller nor the purchaser enters list prices and trade discounts on their books.

Sometimes the list price of a product is subject to several trade discounts; this series of discounts is a **chain discount**. Chain discounts exist, for example, when a wholesaler receives two trade discounts for services performed, such as packaging and distributing. When more than one discount is given, the buyer applies each discount to the declining balance successively. If a product has a list price of USD 100 and is subject to trade discounts of 20 per cent and 10 per cent, the gross selling price (invoice price) would be  $USD\ 100 - 0.2(USD\ 100) = USD\ 80$ ;  $USD\ 80 - 0.1(USD\ 80) = USD\ 72$ , computed as follows:

List price	\$100
Less 20%	- 20
	\$ 80
Less 10%	■
	8
Gross selling price (invoice price)	\$ 72

You could obtain the same results by multiplying the list price by the complements of the trade discounts allowed. The complement of 20 per cent is 80 per cent because  $20\ \text{per cent} + 80\ \text{per cent} = 100\ \text{per cent}$ . The complement of 10 per cent is 90 per cent because  $10\ \text{per cent} + 90\ \text{per cent} = 100\ \text{per cent}$ . Thus, the gross selling price is  $USD\ 100 \times 0.8 \times 0.9 = USD\ 72$ .

Two common deductions from gross sales are (1) sales discounts and (2) sales returns and allowances. Sellers record these deductions in contra revenue accounts to the Sales account. Contra accounts have normal balances that are opposite to the balance of the account they reduce. For example, since the Sales account normally has a credit balance, the Sales Discounts account and Sales Returns and Allowances account have debit balances. We explain the methods of recording these contra revenue accounts next.

**Sales discounts** Whenever a company sells goods on account, it clearly specifies terms of payment on the invoice. For example, the invoice in Exhibit 34 states the terms of payment as "net 30".

Net 30 is sometimes written as "n/30". Either way, this term means that the buyer may not take a discount and must pay the entire amount of the invoice (USD 20,000) on or before 30 days after 2010 December 19 (invoice date)—or 2011 January 18. In Exhibit 34, if the terms had read "n/10/EOM" (EOM means end of month), the buyer could not take a discount, and the invoice would be due on the 10th day of the month following the month of sale—or 2011 January 10. Credit terms vary from industry to industry.

In some industries, credit terms include a cash discount of 1 per cent to 3 per cent to induce early payment of an amount due. A **cash discount** is a deduction from the invoice price that can be taken only if the invoice is paid within a specified time. A cash discount differs from a trade discount in that a cash discount is a deduction from the

## 6. Merchandising transactions

gross selling price for the prompt payment of an invoice. In contrast, a trade discount is a deduction from the list price to determine the gross selling price (or invoice price). Sellers call a cash discount a **sales discount** and buyers call it a **purchase discount**. Companies often state cash discount terms as follows:

- **2/10, n/30**—means a buyer who pays within 10 days following the invoice date may deduct a discount of 2 per cent of the invoice price. If payment is not made within the discount period, the entire invoice price is due 30 days from the invoice date.
- **2/EOM, n/60**—means a buyer who pays by the end of the month of purchase may deduct a 2 per cent discount from the invoice price. If payment is not made within the discount period, the entire invoice price is due 60 days from the invoice date.
- **2/10/EOM, n/60**—means a buyer who pays by the 10th of the month following the month of purchase may deduct a 2 per cent discount from the invoice price. If payment is not made within the discount period, the entire invoice price is due 60 days from the invoice date.

Sellers cannot record the sales discount before they receive the payment since they do not know when the buyer will pay the invoice. A cash discount taken by the buyer reduces the cash that the seller actually collects from the sale of the goods, so the seller must indicate this fact in its accounting records. The following entries show how to record a sale and a subsequent sales discount.

Assume that on July 12, a business sold merchandise for USD 2,000 on account; terms are 2/10, n/30. On July 21 (nine days after invoice date), the business received a USD 1,960 check in payment of the account. The required journal entries for the seller are:

July	12	Accounts Receivable (+A)	2,000	
		Sales (+SE)		2,000
		To record sale on account; terms 2/10, n/30		
	21	Cash (+A)	1,960	
		Sales Discounts (-SE; Contra-Revenue Account)	40	
		Accounts Receivable (-A)		2,000
		To record collection on account, less a discount.		

The **Sales Discounts account** is a contra revenue account to the Sales account. In the income statement, the seller deducts this contra revenue account from gross sales. Sellers use the Sales Discounts account (rather than directly reducing the Sales account) so management can examine the sales discounts figure to evaluate the company's sales discount policy. Note that the Sales Discounts account is not an expense incurred in generating revenue. Rather, the purpose of the account is to reduce recorded revenue to the amount actually realized from the sale.

**Sales returns and allowances** Merchandising companies usually allow customers to return goods that are defective or unsatisfactory for a variety of reasons, such as wrong color, wrong size, wrong style, wrong amounts, or inferior quality. In fact, when their policy is satisfaction guaranteed, some companies allow customers to return goods simply because they do not like the merchandise. A **sales return** is merchandise returned by a buyer. Sellers and buyers regard a sales return as a cancellation of a sale. Alternatively, some customers keep unsatisfactory goods, and the seller gives them an allowance off the original price. A **sales allowance** is a deduction from the original invoiced sales price granted when the customer keeps the merchandise but is dissatisfied for any of a number of reasons, including inferior quality, damage, or deterioration in transit. When a seller agrees to the sales return or sales allowance, the seller sends the buyer a credit memorandum indicating a reduction (crediting) of the



buyer's account receivable. A credit memorandum is a document that provides space for the name and address of the concerned parties, followed by a space for the reason for the credit and the amount to be credited. A credit memorandum becomes the basis for recording a sales return or a sales allowance.

In theory, sellers could record both sales returns and sales allowances as debits to the Sales account because they cancel part of the recorded selling price.

However, because the amount of sales returns and sales allowances is useful information to management, it should be shown separately. The amount of returns and allowances in relation to goods sold can indicate the quality of the goods (high-return percentage, equals low quality) or of pressure applied by salespersons (high-return percentage, equals high-pressure sales). Thus, sellers record sales returns and sales allowances in a separate Sales Returns and Allowances account. The **Sales Returns and Allowances account** is a contra revenue account (to Sales) that records the selling price of merchandise returned by buyers or reductions in selling prices granted. (Some companies use separate accounts for sales returns and for sales allowances, but this text does not.)

Following are two examples illustrating the recording of sales returns in the Sales Returns and Allowances account:

- Assume that a customer returns USD 300 of goods sold on account. If payment has not yet been received, the required entry is:

Sales Returns and Allowances (-SE)	300	
Accounts Receivable (-A)		300

To record a sales return from a customer.

- Assume that the customer has already paid the account and the seller gives the customer a cash refund. Now, the credit is to Cash rather than to Accounts Receivable. If the customer has taken a 2 per cent discount when paying the account, the company would return to the customer the sales price less the sales discount amount. For example, if a customer returns goods that sold for USD 300, on which a 2 per cent discount was taken, the following entry would be made:

Sales Returns and Allowances (-SE)	300	
Cash (-A)		294
Sales Discount (+SE)		6

To record a sales return from a customer who had taken a discount and was sent a cash refund.

The debit to the Sales Returns and Allowances account is for the full selling price of the purchase. The credit of USD 6 reduces the balance of the Sales Discounts account.

Next, we illustrate the recording of a sales allowance in the Sales Returns and Allowances account. Assume that a company grants a USD 400 allowance to a customer for damage resulting from improperly packed merchandise. If the customer has not yet paid the account, the required entry would be:

Sales Returns and Allowances (-SE)	400	
Accounts Receivable (-A)		400

To record a sales allowance granted for damaged merchandise.

If the customer has already paid the account, the credit is to Cash instead of Accounts Receivable. If the customer took a 2 per cent discount when paying the account, the company would refund only the net amount (USD 392). Sales Discounts would be credited for USD 8. The entry would be:

## 6. Merchandising transactions

Sales Returns and Allowances (-SE)	400	
Cash (-A)		392
Sales Discount (+SE)		8

To record a sales allowance when a customer has paid and taken a 2% discount.

### HANLON RETAIL FOOD STORE

#### Partial income Statement

For the Year Ended 2010 December 31,

Operating revenues:

Gross sales		\$282,000
Less: Sales discounts	\$ 5,000	
Sales returns and allowances	15,000	20,000
Net sales		\$262,000

\*This illustration is the same as Exhibit 33, repeated here for your convenience.

Exhibit 35: Partial income statement\*

Exhibit 35 shows how a company could report sales, sales discounts, and sales returns and allowances in the income statement. More often, the income statement in a company's annual report begins with "Net sales" because sales details are not important to external financial statement users.

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### An accounting perspective:

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#### Business insight

When examining a company's sales cycle, management and users of financial data should be aware of any seasonal changes that may affect its reported sales. A national retailer of personal computers and related products and services, for example, should include wording similar to that in the following paragraph in its Annual Report describing seasonality.

#### **Seasonality**

*Based upon its operating history, the company believes that its business is seasonal. Excluding the effects of new store openings, net sales and earnings are generally lower during the first and fourth fiscal quarters than in the second and third fiscal quarters.*

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### An accounting perspective:

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#### Business insight

For many retailers a large percentage of their annual sales occurs during the period from Thanksgiving to Christmas. They attempt to stock just the right amount of goods to meet demand. Since this is a difficult estimate to make accurately, many retailers end up with a large amount of unsold goods at the end of this season. The only way they can unload these goods is to offer huge discounts during the following period.

## Cost of goods sold

The second main division of an income statement for a merchandising business is cost of goods sold. **Cost of goods sold** is the cost to the seller of the goods sold to customers. For a merchandising company, the cost of goods sold can be relatively large. All merchandising companies have a quantity of goods on hand called merchandise inventory to sell to customers. **Merchandise inventory** (or inventory) is the quantity of goods available for sale at any given time. Cost of goods sold is determined by computing the cost of (1) the beginning inventory, (2) the net cost of goods purchased, and (3) the ending inventory.

Look at the cost of goods sold section of Hanlon Retail Food Store's income statement in Exhibit 36. The merchandise inventory on 2010 January 1, was USD 24,000. The net cost of purchases for the year was USD 166,000. Thus, Hanlon had USD 190,000 of merchandise available for sale during 2010. On 2010 December 31, the merchandise inventory was USD 31,000, meaning that this amount was left unsold. Subtracting the unsold inventory (the ending inventory), USD 31,000, from the amount Hanlon had available for sale during the year, USD 190,000, gives the cost of goods sold for the year of USD 159,000. Understanding this relationship shown on Hanlon Retail Food Store's partial income statement gives you the necessary background to determine the cost of goods sold as presented in this section.

Cost of goods sold:

Merchandise inventory, 2010 January 1		\$	24,000
Purchases	\$167,000		
	0		
Less: Purchase discounts	\$3,000		
	0		
Purchase returns and allowances	8,000	11,000	
Net Purchases	\$156,000		
	0		
Add: Transportation-in	10,000		
Net cost of purchases		166,000	
Cost of goods available for sale		\$190,000	
		0	
Less: Merchandise inventory, 2010 December 31		31,000	
Cost of goods sold		\$159,000	
		0	

### Exhibit 36: Determination of cost of goods sold for Hanlon Retail Food Store

To determine the cost of goods sold, accountants must have accurate merchandise inventory figures. Accountants use two basic methods for determining the amount of merchandise inventory—perpetual inventory procedure and periodic inventory procedure. We mention perpetual inventory procedure only briefly here. In the next chapter, we emphasize perpetual inventory procedure and further compare it with periodic inventory procedure.

When discussing inventory, we need to clarify whether we are referring to the physical goods on hand or the Merchandise Inventory account, which is the financial representation of the physical goods on hand. The difference between perpetual and periodic inventory procedures is the frequency with which the Merchandise Inventory account is updated to reflect what is physically on hand. Under **perpetual inventory procedure**, the Merchandise Inventory account is continuously updated to reflect items on hand. For example, your supermarket uses a scanner to ring up your purchases. When your box of Rice Krispies crosses the scanner, the Merchandise Inventory account shows that one less box of Rice Krispies is on hand.

## 6. Merchandising transactions

Under **periodic inventory procedure**, the Merchandise Inventory account is updated periodically after a physical count has been made. Usually, the physical count takes place immediately before the preparation of financial statements.

**Perpetual inventory procedure** Companies use perpetual inventory procedure in a variety of business settings. Historically, companies that sold merchandise with a high individual unit value, such as automobiles, furniture, and appliances, used perpetual inventory procedure. Today, computerized cash registers, scanners, and accounting software programs automatically keep track of inflows and outflows of each inventory item. Computerization makes it economical for many retail stores to use perpetual inventory procedure even for goods of low unit value, such as groceries.

Under perpetual inventory procedure, the Merchandise Inventory account provides close control by showing the cost of the goods that are supposed to be on hand at any particular time. Companies debit the Merchandise Inventory account for each purchase and credit it for each sale so that the current balance is shown in the account at all times. Usually, firms also maintain detailed unit records showing the quantities of each type of goods that should be on hand. Company personnel also take a physical inventory by actually counting the units of inventory on hand. Then they compare this physical count with the records showing the units that should be on hand. Chapter 7 describes perpetual inventory procedure in more detail.

**Periodic inventory procedure** Merchandising companies selling low unit value merchandise (such as nuts and bolts, nails, Christmas cards, or pencils) that have not computerized their inventory systems often find that the extra costs of record-keeping under perpetual inventory procedure more than outweigh the benefits. These merchandising companies often use periodic inventory procedure.

Under periodic inventory procedure, companies do not use the Merchandise Inventory account to record each purchase and sale of merchandise. Instead, a company corrects the balance in the Merchandise Inventory account as the result of a physical inventory count at the end of the accounting period. Also, the company usually does not maintain other records showing the exact number of units that should be on hand. Although periodic inventory procedure reduces record-keeping, it also reduces control over inventory items.

Companies using periodic inventory procedure make no entries to the Merchandise Inventory account nor do they maintain unit records during the accounting period. Thus, these companies have no up-to-date balance against which to compare the physical inventory count at the end of the period. Also, these companies make no attempt to determine the cost of goods sold at the time of each sale. Instead, they calculate the cost of all the goods sold during the accounting period at the end of the period. To determine the cost of goods sold, a company must know:

- Beginning inventory (cost of goods on hand at the beginning of the period).
- Net cost of purchases during the period.
- Ending inventory (cost of unsold goods at the end of the period).

The company would show this information as follows:

Beginning inventory	\$ 34,000
Add: Net cost of purchases during the period	140,000
Cost of goods available for sale during the period	\$174,000
Deduct: Ending inventory	20,000
Cost of goods sold during the period	\$154,000

In this schedule, notice that the company began the accounting period with USD 34,000 of merchandise and purchased an additional USD 140,000, making a total of USD 174,000 of goods that could have been sold during the period. Then, a physical inventory showed that USD 20,000 remained unsold, which implies that USD 154,000

was the cost of goods sold during the period. Of course, the USD 154,000 is not necessarily the precise amount of goods sold because no actual record was made of the dollar cost of the goods sold. Periodic inventory procedure basically assumes that everything not on hand at the end of the period has been sold. This method disregards problems such as theft or breakage because the Merchandise Inventory account contains no up-to-date balance at the end of the accounting period against which to compare the physical count.

Under periodic inventory procedure, a merchandising company uses the **Purchases account** to record the cost of merchandise bought for resale during the current accounting period. The Purchases account, which is increased by debits, appears with the income statement accounts in the chart of accounts.

To illustrate entries affecting the Purchases account, assume that Hanlon Retail Food Store made two purchases of merchandise from Smith Wholesale Company. Hanlon purchased USD 30,000 of merchandise on credit (on account) on May 4, and on May 21 purchased USD 20,000 of merchandise for cash. The required journal entries for Hanlon are:

May	4	Purchases (+A)	30,000	
		Accounts Payable (+L)		30,000
		To record purchases of merchandise on account.		
	21	Purchases (+A)	20,000	
		Cash (-A)		20,000
		To record purchase of merchandise for cash.		

The buyer deducts purchase discounts and purchase returns and allowances from purchases to arrive at net purchases. The accountant records these items in contra accounts to the Purchases account.

**Purchase discounts** Often companies purchase merchandise under credit terms that permit them to deduct a stated cash discount if they pay invoices within a specified time. Assume that credit terms for Hanlon's May 4 purchase are 2/10, n/30. If Hanlon pays for the merchandise by May 14, the store may take a 2 per cent discount. Thus, Hanlon must pay only USD 29,400 to settle the USD 30,000 account payable. The entry to record the payment of the invoice on May 14 is:

May	14	Accounts Payable (-L)	30,000	
		Cash (-A)		29,400
		Purchase Discount (+SE)		600
		To record payment on account within the discount period.		

The buyer records the purchase discount only when the invoice is paid within the discount period and the discount is taken. The **Purchase Discounts account** is a contra account to Purchases that reduces the recorded invoice price of the goods purchased to the price actually paid. Hanlon reports purchase discounts in the income statement as a deduction from purchases.

Companies base purchase discounts on the invoice price of goods. If an invoice shows purchase returns or allowances, they must be deducted from the invoice price before calculating purchase discounts. For example, in the previous transaction, the invoice price of goods purchased was USD 30,000. If Hanlon returned USD 2,000 of the goods, the seller calculates the 2 per cent purchase discount on USD 28,000.

**Interest rate implied in cash discounts** To decide whether you should take advantage of discounts by using your cash or borrowing, make this simple analysis. Assume that you must pay USD 10,000 within 30 days or USD 9,800 within 10 days to settle a USD 10,000 invoice with terms of 2/10, n/30. By advancing payment 20 days from the final due date, you can secure a discount of USD 200. The interest expense incurred to borrow USD 9,800 at 12

## 6. Merchandising transactions

per cent per year for 20 days is USD 65.33, calculated as (USD 9,800 x .12 x 20/360). You would save USD 134.67 (USD 200 - USD 65.33) by borrowing the money and paying the invoice within the discount period.

In terms of an annual rate of interest, the 2 per cent rate of discount for 20 days is equivalent to a 36 per cent annual rate:  $(360/20) \times 2$  per cent. The formula is:

$$\text{Equivalent annual rate of interest} = \frac{\text{The number of days in a year (assumed to be 360)}}{\text{The number of days from the end of the discount period until the final due date}} \times \text{The percentage rate of discount}$$

You can convert all cash discount terms to their approximate annual interest rate equivalents by use of this formula. Thus, a company could afford to pay up to 36 per cent  $[(360/20) \times 2$  per cent] on borrowed funds to take advantage of discount terms of 2/10, n/ 30. The company could pay 18 per cent on terms of 1/10, n/30.

**Purchase returns and allowances** A purchase return occurs when a buyer returns merchandise to a seller. When a buyer receives a reduction in the price of goods shipped, a purchase allowance results. Then, the buyer commonly uses a debit memorandum to notify the seller that the account payable with the seller is being reduced (Accounts Payable is debited). The buyer may use a copy of a debit memorandum to record the returns or allowances or may wait for confirmation, usually a credit memorandum, from the seller.

Both returns and allowances reduce the buyer's debt to the seller and decrease the cost of the goods purchased. The buyer may want to know the amount of returns and allowances as the first step in controlling the costs incurred in returning unsatisfactory merchandise or negotiating purchase allowances. For this reason, buyers record purchase returns and allowances in a separate **Purchase Returns and Allowances account**. If Hanlon returned USD 350 of merchandise to Smith Wholesale before paying for the goods, it would make this journal entry:

Accounts Payable (-L)	350	
Purchase Returns and Allowances (+SE)		350
To record return of damaged merchandise to supplier		

The entry would have been the same to record a USD 350 allowance. Only the explanation would change.

If Hanlon had already paid the account, the debit would be to Cash instead of Accounts Payable, since Hanlon would receive a refund of cash. If the company took a discount at the time it paid the account, only the net amount would be refunded. For instance, if a 2 per cent discount had been taken, Hanlon's journal entry for the return would be:

Cash (+A)	343	
Purchase Discounts (-SE)	7	
Purchase Returns and Allowances (+SE)		350
To record return of damaged merchandise to supplier and record receipt of cash.		

Purchase returns and allowances is a contra account to the Purchases account, and the income statement shows it as a deduction from purchases. When both purchase discounts and purchase returns and allowances are deducted from purchases, the result is **net purchases**.

Transportation costs are an important part of cost of goods sold. To understand how to account for transportation costs, you must know the meaning of the following terms:

- **FOB shipping point** means "free on board at shipping point". The buyer incurs all transportation costs after the merchandise has been loaded on a railroad car or truck at the point of shipment. Thus, the buyer is responsible for ultimately paying the freight charges.

- **FOB destination** means "free on board at destination". The seller ships the goods to their destination without charge to the buyer. Thus, the seller is ultimately responsible for paying the freight charges.

- **Passage of title** is a term that indicates the transfer of the legal ownership of goods. Title to the goods normally passes from seller to buyer at the FOB point. Thus, when goods are shipped FOB shipping point, title usually passes to the buyer at the shipping point. When goods are shipped FOB destination, title usually passes at the destination.

- **Freight prepaid** means the seller must initially pay the freight at the time of shipment.

- **Freight collect** indicates the buyer must initially pay the freight bill on the arrival of the goods.

To illustrate the use of these terms, assume that a company ships goods FOB shipping point, freight collect. Title passes at the shipping point. The buyer is responsible for paying the USD 100 freight costs and does so. The seller makes no entry for freight charges; the entry on the buyer's books is:

Transportation-In (or Freight-In) (+SE)	100	
Cash (-A)		100

To record payment of freight bill on goods purchased.

The **Transportation-In account** records the inward freight costs of acquiring merchandise. Transportation-In is an adjunct account in that it is added to net purchases to arrive at **net cost of purchases**. An **adjunct account** is closely related to another account (Purchases, in this instance), and its balance is added to the balance of the related account in the financial statements. Recall that a contra account is just the opposite of an adjunct account. Buyers deduct a contra account, such as accumulated depreciation, from the related fixed asset account in the financial statements.

When shipping goods FOB destination, freight prepaid, the seller is responsible for and pays the freight bill. Because the seller cannot bill a separate freight cost to the buyer, the buyer shows no entry for freight on its books. The seller, however, has undoubtedly considered the freight cost in setting selling prices. The following entry is required on the seller's books:

Delivery Expense (or Transportation-Out Expense) (-SE)	100	
Cash (-A)		100

To record freight cost on goods sold.

When the terms are FOB destination, the seller records the freight costs as **delivery expense**; this selling expense appears on the income statement with other selling expenses.

FOB terms are especially important at the end of an accounting period. Goods in transit then belong to either the seller or the buyer, and one of these parties must include these goods in its ending inventory. Goods shipped FOB destination belong to the seller while in transit, and the seller includes these goods in its ending inventory. Goods shipped FOB shipping point belong to the buyer while in transit, and the buyer records these goods as a purchase and includes them in its ending inventory. For example, assume that a seller ships goods on 2009 December 30, and they arrive at their destination on 2010 January 5. If terms are FOB destination, the seller includes the goods in its 2009 December 31, inventory, and neither seller nor buyer records the exchange

## 6. Merchandising transactions

transaction until 2010 January 5. If terms are FOB shipping point, the buyer includes the goods in its 2009 December 31, inventory, and both parties record the exchange transaction as of 2009 December 30.

Sometimes the seller prepays the freight as a convenience to the buyer, even though the buyer is ultimately responsible for it. The buyer merely reimburses the seller for the freight paid. For example, assume that Wood Company sold merchandise to Loud Company with terms of FOB shipping point, freight prepaid. The freight charges were USD 100. The following entries are necessary on the books of the buyer and the seller:

Buyer—Loud Company			Seller—Wood Company		
Transportation-In (-SE)	100		Accounts Receivable (+A)	100	
Accounts Payable (+L)		100	Cash (-A)		100

Such entries are necessary because Wood initially paid the freight charges when not required to do so. Therefore, Loud Company must reimburse Wood for the charges. If the buyer pays freight for the seller (e.g. FOB destination, freight collect), the buyer merely deducts the freight paid from the amount owed to the seller. The following entries are necessary on the books of the buyer and the seller:

Buyer—Loud Company			Seller—Wood Company		
Accounts Payable (-L)	100		Delivery Expense (-SE)	100	
Cash (-A)		100	Accounts Receivable (-A)		100

Purchase discounts may be taken only on the purchase price of goods. Therefore, a buyer who owes the seller for freight charges cannot take a discount on the freight charges owed, even if the buyer makes payment within the discount period. We summarize our discussion of freight terms and the resulting journal entries to record the freight charges in Exhibit 37.

**Merchandise inventory** is the cost of goods on hand and available for sale at any given time. To determine the cost of goods sold in any accounting period, management needs inventory information. Management must know its cost of goods on hand at the start of the period (beginning inventory), the net cost of purchases during the period, and the cost of goods on hand at the close of the period (ending inventory). Since the ending inventory of the preceding period is the beginning inventory for the current period, management already knows the cost of the beginning inventory. Companies record purchases, purchase discounts, purchase returns and allowances, and transportation-in throughout the period. Therefore, management needs to determine only the cost of the ending inventory at the end of the period in order to calculate cost of goods sold.

**Taking a physical inventory** Under periodic inventory procedure, company personnel determine ending inventory cost by taking a **physical inventory**. Taking a physical inventory consists of counting physical units of each type of merchandise on hand. To calculate inventory cost, they multiply the number of each kind of merchandise by its unit cost. Then, they combine the total costs of the various kinds of merchandise to provide the total ending inventory cost.

In taking a physical inventory, company personnel must be careful to count all goods owned, regardless of where they are located, and include them in the inventory.



Shipping point: Detroit-  
**Goods travel from shipping point to destination**  
**If shipping terms are:**

Destination: San Diego

FOB shipping point—Buyer incurs the freight charges

FOB destination—Seller incurs the freight charge

Freight prepaid—Seller initially pays the freight charges

Freight collect—Buyer initially pays the freight charges

**If the freight terms are combined as follows:**

Party that		Ultimately Bears
Initially Pays		Expense
Buyer		Buyer
Seller		Seller
Seller		Buyer
Buyer		Seller

**Terms**

- (1) FOB shipping point, freight collect
- (2) FOB destination, freight prepaid
- (3) FOB shipping point, freight prepaid
- (4) FOB destination, freight collect

**Exhibit 37: Summary of shipping terms**

**Explanations:**

*FOB shipping point, freight collect* – Buyer both incurs and initially pays the freight charges. The proper party (buyer) paid the freight. The buyer debits Transportation-In and credits Cash.

*FOB destination, freight prepaid* – Seller both incurs and initially pays the freight charges. The proper party (seller) paid the freight. The seller debits Delivery Expense and credits Cash.

*FOB shipping point, freight prepaid* – Buyer incurs the freight charges, and seller initially pays the freight charges. Buyer must reimburse seller for freight charges. The seller debits Accounts Receivable and credits Cash upon paying the freight. The buyer debits Transportation-In and credits Accounts Payable when informed of the freight charges.

*FOB destination, freight collect* – Seller incurs freight charges, and buyer initially pays freight charges. Buyer deducts freight charges from amount owed to seller. The buyer debits Accounts Payable and credits Cash when paying the freight. The seller debits Delivery Expense and credits Accounts Receivable when informed of the freight charges.

Thus, companies should include goods shipped to potential customers on approval in their inventories. Similarly, companies should not record **consigned goods** (goods delivered to another party who attempts to sell them for a commission) as sold goods. These goods remain the property of the owner (consignor) until sold by the consignee and must be included in the owner's inventory.

**Merchandise in transit** is merchandise in the hands of a freight company on the date of a physical inventory. As stated above, buyers must record merchandise in transit at the end of the accounting period as a purchase if the goods were shipped FOB shipping point and they have received title to the merchandise. In general, the goods belong to the party who ultimately bears the transportation charges.

When accounting personnel know the beginning and ending inventories and the various items making up the net cost of purchases, they can determine the cost of goods sold. To illustrate, assume the following account balances for Hanlon Retail Food Store as of 2010 December 31:

Merchandise Inventory, 2010 January 1	\$ 24,000	Dr.
Purchases	167,000	Dr.
Purchase Discounts	3,000	Cr.
Purchase Returns and Allowances	8,000	Cr.
Transportation-In	10,000	Dr.

By taking a physical inventory, Hanlon determined the 2010 December 31, merchandise inventory to be USD 31,000. Hanlon then calculated its cost of goods sold as shown in Exhibit 38. This computation appears in a section of the income statement directly below the calculation of net sales.

## 6. Merchandising transactions

Cost of goods sold:			
Merchandise inventory, 2010 January 1			\$ 24,000
Purchases		\$167,000	
Less: Purchase discounts	\$3,000		
Purchase returns and allowances	8,000	11,000	
Net Purchases		\$156,000	
Add: Transportation-in		10,000	
Net cost of purchases			166,000
Cost of goods available for sale			\$190,000
Less: Merchandise inventory, 2010 December 31			31,000
Cost of goods sold			\$159,000

This illustration is the same as Exhibit 36, repeated here for your convenience.

### Exhibit 38: Determination of cost of goods sold for Hanlon Retain Food Store\*

In Exhibit 38, Hanlon's beginning inventory (USD 24,000) plus net cost of purchases (USD 166,000) is equal to **cost of goods available for sale** (USD 190,000). The firm deducts the ending inventory cost (USD 31,000) from cost of goods available for sale to arrive at cost of goods sold (USD 159,000).

Another way of looking at this relationship is the following diagram:



Beginning inventory and net cost of purchases combine to form cost of goods available for sale. Hanlon divides the cost of goods available for sale into ending inventory (which is the cost of goods not sold) and cost of goods sold.

To continue the calculation appearing in Exhibit 38, net cost of purchases (USD 166,000) is equal to purchases (USD 167,000), less purchase discounts (USD 3,000) and purchase returns and allowances (USD 8,000), plus transportation-in (USD 10,000).

As shown in Exhibit 38, ending inventory cost (merchandise inventory) appears in the income statement as a deduction from cost of goods available for sale to compute cost of goods sold. Ending inventory cost (merchandise inventory) is also a current asset in the end-of-period balance sheet.

Companies use periodic inventory procedure because of its simplicity and relatively low cost. However, periodic inventory procedure provides little control over inventory. Firms assume any items not included in the physical count of inventory at the end of the period have been sold. Thus, they mistakenly assume items that have been stolen have been sold and include their cost in cost of goods sold.

To illustrate, suppose that the cost of goods available for sale was USD 200,000 and ending inventory was USD 60,000. These figures suggest that the cost of goods sold was USD 140,000. Now suppose that USD 2,000 of goods

were actually shoplifted during the year. If such goods had not been stolen, the ending inventory would have been USD 62,000 and the cost of goods sold only USD 138,000. Thus, the USD 140,000 cost of goods sold calculated under periodic inventory procedure includes both the cost of the merchandise delivered to customers and the cost of merchandise stolen.

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### An accounting perspective:

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#### Uses of technology

Many companies are building private networks to link their employees, customers, and suppliers together. These networks within the Internet are referred to as companies' intranets. The Internet can be likened to the entire universe, while an intranet can be likened to a solar system within the universe. A company's intranet is built to be secure from outside users. For instance, these networks are designed to be secure against "hackers" and other unauthorized persons. The intranet software typically encrypts data sent over the Internet to safeguard financial transactions.

#### Classified income statement

In preceding chapters, we illustrated the unclassified (or single-step) income statement. An **unclassified income statement** has only two categories—revenues and expenses. In contrast, a **classified income statement** divides both revenues and expenses into operating and nonoperating items. The statement also separates operating expenses into selling and administrative expenses. A classified income statement is also called a multiple-step income statement.

In Exhibit 39, we present a classified income statement for Hanlon Retail Food Store. This statement uses the previously presented data on sales (Exhibit 35) and cost of goods sold (Exhibit 38), together with additional assumed data on operating expenses and other expenses and revenues. Note in Exhibit 39 that a classified income statement has the following four major sections:

- Operating revenues.
- Cost of goods sold.
- Operating expenses.
- Nonoperating revenues and expenses (other revenues and other expenses).

The classified income statement shows important relationships that help in analyzing how well the company is performing. For example, by deducting cost of goods sold from operating revenues, you can determine by what amount sales revenues exceed the cost of items being sold. If this margin, called gross margin, is lower than desired, a company may need to increase its selling prices and/or decrease its cost of goods sold. The classified income statement subdivides operating expenses into selling and administrative expenses. Thus, statement users can see how much expense is incurred in selling the product and how much in administering the business. Statement users can also make comparisons with other years' data for the same business and with other businesses. Nonoperating revenues and expenses appear at the bottom of the income statement because they are less significant in assessing the profitability of the business.

## 6. Merchandising transactions

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**An accounting perspective:**

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**Business insight**

Management chooses whether to use a classified or unclassified income statement to present a company's financial data. This choice may be based either on how their competitors present their data or on the costs associated with assembling the data.

**HANLON RETAIL FOOD STORE**

**Income Statement**

**For the Year Ended 2010 December 31**

Operating revenues:			
Gross sales			\$282,000
Less: Sales discounts		\$ 5,000	
Sales return and allowances		15,000	20,000
Net sales			\$262,000
Cost of goods sold:			
Merchandise inventory, 2010 January 1		\$24,000	
Purchases		\$167,000	
		0	
Less: Purchase discount	\$3,000		
	0		
Purchase returns and allowances	8,000	11,000	
Net purchases		\$156,000	
		0	
Add: Transportation-in		10,000	
Net cost of purchases			166,000
Cost of goods available for sale		\$190,000	
		0	
Less: Merchandise inventory, 2010 December 31		31,000	
Cost of goods sold			159,000
Gross Margin			\$103,000
Operating expenses:			
Selling expenses:			
Salaries and commissions expense		\$	26,000
Salespersons' travel expense		3,000	
Delivery expense		2,000	
Advertising expense		4,000	
Rent expense—store building		2,500	
Supplies expense		1,000	
Utilities expense		1,800	
Depreciation expense—store equipment		700	
Other selling expense	400		\$41,400
Administrative expenses:			
Salaries expense, executive		\$29,000	
Rent expense—administrative building		1,600	
Insurance expense		1,500	
Supplies expense		800	
Depreciation expense—office equipment		1,100	
Other administrative expenses	300		34,300
Total operating expenses			75,700
Income from operations			\$ 27,300
Nonoperating revenues and expenses:			
Nonoperating revenues:			
Interest revenue		1,400	
			\$ 28,700
Nonoperating expenses:			
Interest expense		600	
Net income			\$ 28,100

Exhibit 39: Classified income statement for a merchandising company

## 6. Merchandising transactions

Next, we explain the major headings of the classified income statement in Exhibit 39. The terms in some of these headings are already familiar to you. Although future illustrations of classified income statements may vary somewhat in form, we retain the basic organization.

- **Operating revenues** are the revenues generated by the major activities of the business—usually the sale of products or services or both.

- **Cost of goods sold** is the major expense in merchandising companies. Note the cost of goods sold section of the classified income statement in Exhibit 39. This chapter has already discussed the items used in calculating cost of goods sold. Merchandisers usually highlight the amount by which sales revenues exceed the cost of goods sold in the top part of the income statement. The excess of net sales over cost of goods sold is the **gross margin** or **gross profit**. To express gross margin as a percentage rate, we divide gross margin by net sales. In Exhibit 39, the gross margin rate is approximately 39.3 per cent (USD 103,000/USD 262,000). The gross margin rate indicates that out of each sales dollar, approximately 39 cents is available to cover other expenses and produce income. Business owners watch the gross margin rate closely since a small percentage fluctuation can cause a large dollar change in net income. Also, a downward trend in the gross margin rate may indicate a problem, such as theft of merchandise. For instance, one Southeastern sporting goods company, SportsTown, Inc., suffered significant gross margin deterioration from increased shoplifting and employee theft.

- **Operating expenses** for a merchandising company are those expenses, other than cost of goods sold, incurred in the normal business functions of a company. Usually, operating expenses are either selling expenses or administrative expenses. **Selling expenses** are expenses a company incurs in selling and marketing efforts. Examples include salaries and commissions of salespersons, expenses for salespersons' travel, delivery, advertising, rent (or depreciation, if owned) and utilities on a sales building, sales supplies used, and depreciation on delivery trucks used in sales. **Administrative expenses** are expenses a company incurs in the overall management of a business. Examples include administrative salaries, rent (or depreciation, if owned) and utilities on an administrative building, insurance expense, administrative supplies used, and depreciation on office equipment.

Certain operating expenses may be shared by the selling and administrative functions. For example, a company might incur rent, taxes, and insurance on a building for both sales and administrative purposes. Expenses covering both the selling and administrative functions must be analyzed and prorated between the two functions on the income statement. For instance, if USD 1,000 of depreciation expense relates 60 per cent to selling and 40 per cent to administrative based on the square footage or number of employees, the income statement would show USD 600 as a selling expense and USD 400 as an administrative expense.

- **Nonoperating revenues** (other revenues) and **nonoperating expenses** (other expenses) are revenues and expenses not related to the sale of products or services regularly offered for sale by a business. An example of a nonoperating revenue is interest that a business earns on notes receivable. An example of a nonoperating expense is interest incurred on money borrowed by the company.

To summarize the more important relationships in the income statement of a merchandising firm in equation form:

- **Net sales** = Gross sales - (Sales discounts + Sales returns and allowances).
- **Net purchases** = Purchases - (Purchase discounts + Purchase returns and allowances).

- **Net cost of purchases** = Net purchases + Transportation-in.
- **Cost of goods sold** = Beginning inventory + Net cost of purchases - Ending inventory.
- **Gross margin** = Net sales - Cost of goods sold.
- **Income from operations** = Gross margin - Operating (selling and administrative) expenses.
- **Net income** = Income from operations + Nonoperating revenues - Nonoperating expenses.

Each of these relationships is important because of the way it relates to an overall measure of business profitability. For example, a company may produce a high gross margin on sales. However, because of large sales commissions and delivery expenses, the owner may realize only a very small percentage of the gross margin as profit. The classifications in the income statement allow a user to focus on the whole picture as well as on how net income was derived (statement relationships).

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### An ethical perspective: World auto parts corporation

John Bentley is the chief financial officer for World Auto Parts Corporation. The company buys approximately USD 500 million of auto parts each year from small suppliers all over the world and resells them to auto repair shops in the United States.

Most of the suppliers have cash discount terms of 2/10, n/30. John has instructed his personnel to pay invoices on the 30th day after the invoice date but to take the 2 per cent discount even though they are not entitled to do so. Whenever a supplier complains, John instructs his purchasing agent to find another supplier who will go along with this practice. When some of his own employees questioned the practice, John responded as follows:

*This practice really does no harm. These small suppliers are much better off to go along and have our business than to not go along and lose it. For most of them, we are their largest customer. Besides, if they are willing to sell to others at a 2 per cent discount, why should they not be willing to sell to us at that same discount even though we pay a little later? The benefit to our company is very significant. Last year our profits were USD 100 million. A total of USD 10 million of the profits was attributable to this practice. Do you really want me to change this practice and give up USD 10 million of our profits?*

### Analyzing and using the financial results—Gross margin percentage

As discussed earlier, you can calculate the **gross margin percentage** by using the following formula:

$$\text{Gross margin percentage} = \frac{\text{Gross margin}}{\text{Netsales}}$$

To demonstrate the use of this ratio, consider the following information from the 2000 Annual Report of Abercrombie & Fitch.

(\$ millions)	2000	1999	1998
Revenues	\$ 1,238.6	\$ 1,030.9	\$ 805.2
Gross profit	509.4	450.4	331.4
Gross profit (margin) percentage	\$ 509.4/\$1,238.6 = 41.13%	\$450.4/\$1,030.9 = 43.69%	\$331.4/\$805.2 = 41.16%

Abercrombie's gross margin held at a rather high 41-43 per cent over those three years.

## 6. Merchandising transactions

You should now understand the distinction between accounting for a service company and a merchandising company. The next chapter continues the discussion of merchandise inventory carried by merchandising companies.

### Understanding the learning objectives

- In a sales transaction, the seller transfers the legal ownership (title) of the goods to the buyer.
- An invoice is a document, prepared by the seller of merchandise and sent to the buyer, that contains the details of a sale, such as the number of units sold, unit price, total price, terms of sale, and manner of shipment.
- Usually sales are for cash or on account. When a sale is for cash, the debit is to Cash and the credit is to Sales. When a sale is on account, the debit is to Accounts Receivable and the credit is to Sales.
- When companies offer trade discounts, the gross selling price (gross invoice price) at which the sale is recorded is equal to the list price minus any trade discounts.
- Two common deductions from gross sales are (1) sales discounts and (2) sales returns and allowances. These deductions are recorded in contra revenue accounts to the Sales account. Both the Sales Discounts account and the Sales Returns and Allowances account normally have debit balances.  $\text{Net sales} = \text{Sales} - (\text{Sales discounts} + \text{Sales returns and allowances})$ .
- Sales discounts arise when the seller offers the buyer a cash discount of 1 per cent to 3 per cent to induce early payment of an amount due.
- Sales returns result from merchandise being returned by a buyer because the goods are considered unsatisfactory or have been damaged. A sales allowance is a deduction from the original invoiced sales price granted to a customer when the customer keeps the merchandise but is dissatisfied.
- $\text{Cost of goods sold} = \text{Beginning inventory} + \text{Net cost of purchases} - \text{Ending inventory}$   
 $\text{Net cost of purchases} = \text{Purchases} - (\text{Purchase discounts} + \text{Purchase returns}) + \text{Transportation-in}$
- Two methods of accounting for inventory are perpetual inventory procedure and periodic inventory procedure. Under perpetual inventory procedure, the inventory account is continuously updated during the accounting period. Under periodic inventory procedure, the inventory account is updated only periodically—after a physical count has been made.
- Purchases of merchandise are recorded by debiting Purchases and crediting Cash (for cash purchases) or crediting Accounts Payable (for purchases on account).
- Two common deductions from purchases are (1) purchase discounts and (2) purchase returns and allowances. In the general ledger, both of these items normally carry credit balances. From the buyer's side of the transactions, cash discounts are purchase discounts, and merchandise returns and allowances are purchase returns and allowances.
- FOB shipping point means free on board at shipping point—the buyer incurs the freight.
- FOB destination means free on board at destination—the seller incurs the freight.
- Passage of title is a term indicating the transfer of the legal ownership of goods.
- Freight prepaid is when the seller must initially pay the freight at the time of shipment.
- Freight collect is when the buyer must initially pay the freight on the arrival of the goods.



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- Expansion and application of the relationship introduced in Learning objective 2. Beginning inventory + Net cost of purchases = Cost of goods available for sale. Cost of goods available for sale - Ending inventory = Cost of goods sold.
- A classified income statement has four major sections—operating revenues, cost of goods sold, operating expenses, and nonoperating revenues and expenses.
- Operating revenues are the revenues generated by the major activities of the business—usually the sale of products or services or both.
- Cost of goods sold is the major expense in merchandising companies.
- Operating expenses for a merchandising company are those expenses other than cost of goods sold incurred in the normal business functions of a company. Usually, operating expenses are classified as either selling expenses or administrative expenses.
- Nonoperating revenues and expenses are revenues and expenses not related to the sale of products or services regularly offered for sale by a business.
- $\text{Gross margin percentage} = \frac{\text{Gross margin}}{\text{Net sales}}$
- The gross margin rate indicates the amount of sales dollars available to cover expenses and produce income.
- Except for the merchandise-related accounts, the work sheet for a merchandising company is the same as for a service company.
- Any revenue accounts and contra purchases accounts in the Adjusted Trial Balance credit column of the work sheet are carried to the Income Statement credit column.
- Beginning inventory, contra revenue accounts. Purchases, Transportation-In, and expense accounts in the Adjusted Trial Balance debit column are carried to the Income Statement debit column.
- Ending merchandise inventory is entered in the Income Statement credit column and in the Balance Sheet debit column.
- Closing entries may be prepared directly from the work sheet. The first journal entry debits all items appearing in the Income Statement credit column and credits Income Summary. The second entry credits all items appearing in the Income Statement debit column and debits Income Summary. The third entry debits Income Summary and credits the Retained Earnings account (assuming positive net income). The fourth entry debits the Retained Earnings account and credits the Dividends account.

### Appendix: The work sheet for a merchandising company

Exhibit 40 shows a work sheet for a merchandising company. Lyons Company is a small sporting goods firm. The illustration for Lyons Company focuses on merchandise-related accounts. Thus, we do not show the fixed assets (land, building, and equipment). Except for the merchandise-related accounts, the work sheet for a merchandising company is the same as for a service company. Recall that use of a work sheet assists in the preparation of the adjusting and closing entries. The work sheet also contains all the information needed for the preparation of the financial statements.

To further simplify this illustration, assume Lyons needs no adjusting entries at month-end. The trial balance is from the ledger accounts at 2010 December 31. The USD 7,000 merchandise inventory in the trial balance is the

## 6. Merchandising transactions

beginning inventory. The sales and sales-related accounts and the purchases and purchases-related accounts summarize the merchandising activity for December 2010.

Lyons carries any revenue accounts (Sales) and contra purchases accounts (Purchase Discounts, Purchase Returns and Allowances) in the Adjusted Trial Balance credit columns of the work sheet to the Income Statement credit column. It carries beginning inventory, contra revenue accounts (Sales Discounts, Sales Returns and Allowances), Purchases, Transportation-In, and expense accounts (Selling Expenses, Administrative Expenses) in the Adjusted Trial Balance debit column to the Income Statement debit column.

Assume that ending inventory is USD 8,000. Lyons enters this amount in the Income Statement credit column because it is deducted from cost of goods available for sale (beginning inventory plus net cost of purchases) in determining cost of goods sold. It also enters the ending inventory in the Balance Sheet debit column to establish the proper balance in the Merchandise Inventory account. The beginning and ending inventories are on the Income Statement because Lyons uses both to calculate cost of goods sold in the income statement. Net income of USD 5,843 for the period balances the Income Statement columns. The firm carries the net income to the Statement of Retained Earnings credit column. Retained earnings of USD 18,843 balances the Statement of Retained Earnings columns. Lyons Company carries the retained earnings to the Balance Sheet credit column.

Lyons carries all other asset account balances (Cash, Accounts Receivable, and ending Merchandise Inventory) to the Balance Sheet debit column. It also carries the liability (Accounts Payable) and Capital Stock account balances to the Balance Sheet credit column. The balance sheet columns total to USD 29,543.

Once the work sheet has been completed, Lyons prepares the financial statements. After entering any adjusting and closing entries in the journal, the firm posts them to the ledger. This process clears the records for the next accounting period. Finally, it prepares a post-closing trial balance.

**Income statement** Exhibit 41 shows the income statement Lyons prepared from its work sheet in Exhibit 40. The focus in this income statement is on determining the cost of goods sold.

**Statement of retained earnings** The statement of retained earnings, as you recall, is a financial statement that summarizes the transactions affecting the Retained Earnings account balance. In Exhibit 42, the statement of retained earnings shows an increase in equity resulting from net income and a decrease in equity resulting from dividends.

<b>LYONS COMPANY</b>												
<b>Worksheet</b>												
<b>For the Month Ended 2010 December 31</b>												
Acct. no.	Account Titles	Trial Balance		Adjustments		Adjusted Trial Balance		Income Statement		Statement of Retained Earnings		Balance Sheet
		Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
100	Cash	19,663				19,663						19,653
103	Accounts Receivable	1,380				1,880						1,880
105	Merchandise Inventory, December 1	7,000				7,000		7,000	8,000			8,000
200	Accounts Payable		700				700					
300	Capital Stock		10,000				10,000					
			0				0					
310	Retained Earnings, December 1		15,000				15,000				15,000	
			0				0					
320	Dividends	2,000				2,000				2,000		
410	Sales		14,600				14,600	14,600				
			0				0					
411	Sales Discounts	44				44		44				
412	Sales Returns and Allowances	20				20		20				
500	Purchases	6,000				6,000		6,000				
501	Purchases Discounts		82				82		32			
502	Purchase Returns and Allowances		100				100		100			
503	Transportation-In	75				75		75				
557	Miscellaneous Selling Expenses	2,650				2,650		2,650				
567	Miscellaneous Administrative Expenses	1,150				1,150		1,150				
		40,482	40,482			40,432	40,482	16,939	22,782			
			2				2					
	Net Income							5,843			5,343	
								22,732	22,782	2,000	20,343	29,543
	Retained Earnings, December 31									18,543		
										20,843	20,843	29,543

Exhibit 40: Work sheet for a merchandising company

## 6. Merchandising transactions

<b>LYONS COMPANY</b>			
<b>Income Statement</b>			
<b>For the Month Ended 2010 December 31</b>			
Operating revenues:			
Gross sales			\$14,600
Less: Sales discounts		\$ 44	
Sales return and allowances		20	64
Net sales			\$14,536
Cost of goods sold:			
Merchandise inventory, 2010 January 1			\$ 7,000
Purchases		\$ 6,000	
Less: Purchase discount	\$ 82		
Purchase returns and allowances	100	182	
Net purchases		\$5,818	
Add: Transportation-in		75	
Net cost of purchases			5,893
Cost of goods available for sale			\$12,893
Less: Merchandise inventory, 2010 December 31			8,000
Cost of goods sold			4,893
Gross Margin			\$ 9,643
Operating expenses:			
Miscellaneous selling expense			\$2,650
Miscellaneous administrative expense			1,150
Total operating expenses			3,800
Net income			\$ 5,843

### Exhibit 41: Income statement for a merchandising company

<b>LYONS COMPANY</b>	
<b>Statement of Retained Earnings</b>	
<b>For the Month Ended 2010 December 31</b>	
Retained earnings, 2010 December 1	\$15,000
Add: Net income for the month	5,843
Total	\$20,843
Deduct: Dividends	2,000
Retained earnings, 2010 December 31	\$18,843

### Exhibit 42: Statement of retained earnings

<b>LYONS COMPANY</b>	
<b>Balance Sheet 2010 December 31</b>	
<b>Assets</b>	
Cash	\$19,663
Accounts receivable	1,880
Merchandise inventory	8,000
Total assets	\$29,543
<b>Liabilities and Stockholders' Equity</b>	
Liabilities:	
Accounts payable	\$ 700
Stockholders' equity:	
Capital stock	\$ 10,000
Retained earnings	18,843
Total stockholders' equity	28,843
Total liabilities and stockholders' equity	\$29,543

### Exhibit 43: Balance sheet for a merchandising company

**Balance sheet** The balance sheet, Exhibit 43, contains the assets, liabilities, and stockholders' equity items taken from the work sheet. Note the USD 8,000 ending inventory is a current asset. The Retained Earnings account balance comes from the statement of retained earnings.

Recall from Chapter 4 that the closing process normally takes place after the accountant has prepared the financial statements for the period. The closing process closes revenue and expense accounts by transferring their balances to a clearing account called Income Summary and then to Retained Earnings. The closing process reduces the revenue and expense account balances to zero so that information for each accounting period may be accumulated separately.

Lyons's accountant would prepare closing entries directly from the work sheet in Exhibit 40 using the same procedure presented in Chapter 4. The closing entries for Lyons Company follow.

The first journal entry debits all items appearing in the Income Statement credit column of the work sheet and credits Income Summary for the total of the column, USD 22,782.

		2010		
	Dec.	31	Merchandise Inventory (ending)	8,000
			Sales	14,600
			Purchase Discounts	82
• 1 <sup>st</sup> entry			Purchase Returns and Allowances	100
			Income Summary	22,782
			To close accounts with a credit balance in the Income Statement columns and to establish ending merchandise inventory.	

The second entry credits all items appearing in the Income Statement debit column and debits Income Summary for the total of that column, USD 16,939.

		2010		
	Dec.	31	Income Summary	16,939
			Merchandise Inventory (beginning)	7,000
			Sales Discounts	44
			Sales Returns and Allowance	20
• 2 <sup>nd</sup> entry			Purchases	6,000
			Transportation-In	75
			Miscellaneous Selling Expenses	2,650
			Miscellaneous Administrative Expenses	1,150
			To close accounts with a debit balance in the Income Statement columns.	

The third entry closes the credit balance in the Income Summary account of USD 5,843 to the Retained Earnings account.

		2010		5,843
	Dec.	31	Income Summary	5,843
			Retained Earnings	
			To close the Income Summary account to the Retained Earnings account.	

The fourth entry closes the Dividends account balance of \$2,000 to the Retained Earnings account by debiting Retained Earnings and crediting Dividends.

		2010		2,000
	Dec.	31	Retained Earnings	2,000
			Dividends	
			To close the Dividends account to the Retained Earnings account.	

Note how the first three closing entries tie into the totals in the Income Statement columns of the work sheet in Exhibit 40. In the first closing journal entry, the credit to the Income Summary account is equal to the total of the Income Statement credit column. In the second entry, the debit to the Income Summary account is equal to the

## 6. Merchandising transactions

subtotal of the Income Statement debit column. The difference between the totals of the two Income Statement columns (USD 5,843) represents net income and is the amount of the third closing entry.

### Demonstration problem

The following transactions occurred between Companies C and D in June 2010:

June 10 Company C purchased merchandise from Company D for USD 80,000; terms 2/10/EOM, n/60, FOB destination, freight prepaid.

11 Company D paid freight of USD 1,200.

14 Company C received an allowance of USD 4,000 from the gross selling price because of damaged goods.

23 Company C returned USD 8,000 of goods purchased because they were not the quality ordered.

30 Company D received payment in full from Company C.

a. Journalize the transactions for Company C.

b. Journalize the transactions for Company D.

### Solution to demonstration problem

a.

General Journal					
Date		Account Titles and Explanation	Post. Ref.	Debit	Credit
2010 June	1 0	<b>Company C</b> Purchases Accounts Payable  Purchased merchandise from Company D; terms 2/10/EOM, n/60		8 0 0 0 0	8 0 0 0 0
	1 4	Accounts Payable Purchase Return and Allowances  Received an allowance from Company D for damaged goods.		4 0 0 0	4 0 0 0
	2 3	Accounts Payable Purchase Returns and Allowances  Returned merchandise to Company D because of improper quality		8 0 0 0	8 0 0 0
	3 0	Accounts Payable (\$80,000 - \$4,000 - \$8,000) Purchase Discounts (\$68,000 x 0.02) Cash (\$68,000 - \$1,360)  Paid the amount due to Company D.		6 8 0 0 0	1 3 6 0 6 6 6 4 0

b.

General Journal					
Date		Account Titles and Explanation	Post. Ref.	Debit	Credit
2010 June	1 0	<b>Company D</b> Accounts Receivable Sales  Sold merchandise to Company C; terms 2/10/EOM, n/60		8 0 0 0 0	8 0 0 0 0
	1	Delivery Expense		1 2 0 0	

1	Cash		1 2 0 0
	Paid freight on sale of merchandise shipped FOB destination, freight prepaid.		
1	Sales Returns and Allowances	4 0 0 0	
4	Accounts Receivable		4 0 0 0
	Granted an allowance to Company C for damaged goods.		
2	Sales Returns and Allowances	8 0 0 0	
3	Accounts Receivable		8 0 0 0
	Merchandise returned from Company C due to improper quality.		
3	Cash (\$68,000 - \$1,360)	6 6 6 4 0	
0	Sales Discounts (\$68,000 x 0.02)	1 3 6 0	
	Accounts Receivable (\$80,000 - \$4,000 - \$8,000)		6 8 0 0 0
	Received the amount due from Company C.		

## Key terms

**Adjunct account** Closely related to another account; its balance is added to the balance of the related account in the financial statements.

**Administrative expenses** Expenses a company incurs in the overall management of a business.

**Cash discount** A deduction from the invoice price that can be taken only if the invoice is paid within a specified time. To the seller, it is a sales discount; to the buyer, it is a purchase discount.

**Chain discount** Occurs when the list price of a product is subject to a series of trade discounts.

**Classified income statement** Divides both revenues and expenses into operating and nonoperating items. The statement also separates operating expenses into selling and administrative expenses. Also called the multiple-step income statement.

**Consigned goods** Goods delivered to another party who attempts to sell the goods for the owner at a commission.

**Cost of goods available for sale** Equal to beginning inventory plus net cost of purchases.

**Cost of goods sold** Shows the cost to the seller of the goods sold to customers; under periodic inventory procedure, cost of goods sold is computed as Beginning inventory + Net cost of purchases - Ending inventory.

**Delivery expense** A selling expense recorded by the seller for freight costs incurred when terms are FOB destination.

**FOB destination** Means free on board at destination; goods are shipped to their destination without charge to the buyer; the seller is responsible for paying the freight charges.

**FOB shipping point** Means free on board at shipping point; buyer incurs all transportation costs after the merchandise is loaded on a railroad car or truck at the point of shipment.

**Freight collect** Terms that require the buyer to pay the freight bill on arrival of the goods.

**Freight prepaid** Terms that indicate the seller has paid the freight bill at the time of shipment.

**Gross margin or gross profit** Net sales - Cost of goods sold; identifies the number of dollars available to cover expenses other than cost of goods sold.

**Gross margin percentage** Gross margin divided by net sales.

**Gross selling price** (also called the invoice price) The list price less all trade discounts.

**Income from operations** Gross margin - Operating (selling and administrative) expenses.

**Invoice** A document prepared by the seller of merchandise and sent to the buyer. It contains the details of a sale, such as the number of units sold, unit price, total price billed, terms of sale, and manner of shipment. It is a purchase invoice from the buyer's point of view and a sales invoice from the seller's point of view.

## 6. Merchandising transactions

**Manufacturers** Companies that produce goods from raw materials and normally sell them to wholesalers.

**Merchandise in transit** Merchandise in the hands of a freight company on the date of a physical inventory.

**Merchandise inventory** The quantity of goods available for sale at any given time.

**Net cost of purchases** Net purchases + Transportation-in.

**Net income** Income from operations + Nonoperating revenues - Nonoperating expenses.

**Net purchases** Purchases - (Purchase discounts + Purchase returns and allowances).

**Net sales** Gross sales - (Sales discounts + Sales returns and allowances).

**Nonoperating expenses** (other expenses) Expenses incurred by a business that are not related to the acquisition and sale of the products or services regularly offered for sale.

**Nonoperating revenues** (other revenues) Revenues not related to the sale of products or services regularly offered for sale by a business.

**Operating expenses** Those expenses other than cost of goods sold incurred in the normal business functions of a company.

**Operating revenues** Those revenues generated by the major activities of a business.

**Passage of title** A legal term used to indicate transfer of legal ownership of goods.

**Periodic inventory procedure** A method of accounting for merchandise acquired for sale to customers wherein the cost of merchandise sold and the cost of merchandise on hand are determined only at the end of the accounting period by taking a physical inventory.

**Perpetual inventory procedure** A method of accounting for merchandise acquired for sale to customers wherein the Merchandise Inventory account is continuously updated to reflect items on hand; this account is debited for each purchase and credited for each sale so that the current balance is shown in the account at all times.

**Physical inventory** Consists of counting physical units of each type of merchandise on hand.

**Purchase discount** See Cash discount.

**Purchase Discounts account** A contra account to Purchases that reduces the recorded gross invoice cost of the purchase to the price actually paid.

**Purchase Returns and Allowances account** An account used under periodic inventory procedure to record the cost of merchandise returned to a seller and to record reductions in selling prices granted by a seller because merchandise was not satisfactory to a buyer; viewed as a reduction in the recorded cost of purchases.

**Purchases account** An account used under periodic inventory procedure to record the cost of goods or merchandise bought for resale during the current accounting period.

**Retailers** Companies that sell goods to final consumers.

**Sales allowance** A deduction from original invoiced sales price granted to a customer when the customer keeps the merchandise but is dissatisfied for any of a number of reasons, including inferior quality, damage, or deterioration in transit.

**Sales discount** See Cash discount.

**Sales Discounts account** A contra revenue account to Sales; it is shown as a deduction from gross sales in the income statement.

**Sales return** From the seller's point of view, merchandise returned by a buyer for any of a variety of reasons; to the buyer, a purchase return.

**Sales Returns and Allowances account** A contra revenue account to Sales used to record the selling price of merchandise returned by buyers or reductions in selling prices granted.

**Selling expenses** Expenses a company incurs in selling and marketing efforts.

**Trade discount** A percentage deduction, or discount, from the specified list price or catalog price of merchandise to arrive at the gross invoice price; granted to particular categories of customers (e.g. retailers and wholesalers). Also see Chain discount.

**Transportation-In account** An account used under periodic inventory procedure to record inward freight costs incurred in the acquisition of merchandise; a part of cost of goods sold.

**Unclassified income statement** Shows only major categories for revenues and expenses. Also called the single-step income statement.



**Wholesalers** Companies that normally sell goods to other companies (retailers) for resale.

**Self-test**

**True-false**

Indicate whether each of the following statements is true or false.

To compute net sales, sales discounts are added to, and sales returns and allowances are deducted from, gross sales.

Under perpetual inventory procedure, the Merchandise Inventory account is debited for each purchase and credited for each sale.

Purchase discounts and purchase returns and allowances are recorded in contra accounts to the Purchases account.

In taking a physical inventory, consigned goods delivered to another party who attempts to sell the goods are not included in the ending inventory of the company that sent the goods.

A classified income statement consists of only two categories of items, revenues and expenses.

**Multiple-choice**

Select the best answer for each of the following questions.

A seller sold merchandise which has a list price of USD 4,000 on account, giving a trade discount of 20 per cent.

The entry on the books of the seller is:

- |    |                     |       |       |
|----|---------------------|-------|-------|
| a. | Accounts Receivable | 3,200 |       |
|    | Trade Discounts     | 800   |       |
|    | Sales               |       | 4,000 |
| b. | Accounts Receivable | 4,000 |       |
|    | Sales               |       | 4,000 |
| c. | Accounts Receivable | 3,200 |       |
|    | Trade Discounts     | 800   |       |
|    | Sales               |       | 4,000 |
| d. | Accounts Receivable | 3,200 |       |
|    | Sales               |       | 3,200 |

X Company began the accounting period with USD 60,000 of merchandise, and net cost of purchases was USD 240,000. A physical inventory showed USD 72,000 of merchandise unsold at the end of the period. The cost of goods sold of Y Company for the period is:

- a. USD 300,000.
- b. USD 228,000.
- c. USD 252,000.
- d. USD 168,000.
- e. None of the above.

A business purchased merchandise for USD 12,000 on account; terms are 2/10, n/30. If USD 2,000 of the merchandise was returned and the remaining amount due was paid within the discount period, the purchase discount would be:

- a. USD 240.
- b. USD 200.
- c. USD 1,200.

## 6. Merchandising transactions

- d. USD 1,000.
- e. USD 3,600.

A classified income statement consists of all of the following major sections except for:

- a. Operating revenues.
- b. Cost of goods sold.
- c. Operating expenses.
- d. Nonoperating revenues and expenses.
- e. Current assets.

(Appendix) Closing entries for merchandise-related accounts include all of the following except for:

- a. A credit to Sales Discounts.
- b. A credit to Merchandise Inventory for the cost of ending inventory.
- c. A debit to Purchase Discounts.
- d. A credit to Transportation-In.
- e. A debit to Sales.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- Which account titles are likely to appear in a merchandising company's ledger that do not appear in the ledger of a service enterprise?
- What entry is made to record a sale of merchandise on account under periodic inventory procedure?
- Describe trade discounts and chain discounts.
- Sales discounts and sales returns and allowances are deducted from sales on the income statement to arrive at net sales. Why not deduct these directly from the Sales account by debiting Sales each time a sales discount, return, or allowance occurs?
- What are the two basic procedures for accounting for inventory? How do these two procedures differ?
- What useful purpose does the Purchases account serve?
- What do the letters FOB stand for? When terms are FOB destination, who incurs the cost of freight?
- What type of an expense is delivery expense? Where is this expense reported in the income statement?
- Periodic inventory procedure is said to afford little control over inventory. Explain why.
- How does the accountant arrive at the total dollar amount of the inventory after taking a physical inventory?
- How is cost of goods sold determined under periodic inventory procedure?
- If the cost of goods available for sale and the cost of the ending inventory are known, what other amount appearing on the income statement can be calculated?
- What are the major sections in a classified income statement for a merchandising company, and in what order do these sections appear?
- What is gross margin? Why might management be interested in the percentage of gross margin to net sales?

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- (Appendix) After closing entries are posted to the ledger, which types of accounts have balances? Why?
- **The Limited, Inc.** Based on the financial statements of The Limited in the Annual Report Appendix, what were the 2000 operating expenses? For each of the three years shown, what percentage of net sales were these expenses? Is the trend favorable or unfavorable?
- **The Limited, Inc.** Based on the financial statements of The Limited, Inc., in the Annual Report Appendix, what were the 2000 cost of goods sold, occupancy, and buying costs? For each of the three years shown, what percentage of net sales were these expenses? Is the trend favorable or unfavorable?

### Exercises

**Exercise A** In the following table, indicate how to increase or decrease (debit or credit) each account, and indicate its normal balance (debit or credit).

Title of Account	Increased by (debit or credit)	Decreased by (debit or credit)	Normal Balance (debit or credit)
Merchandise Inventory			
Sales			
Sales Returns and Allowances			
Sales Discounts			
Accounts Receivable			
Purchases			
Purchase Returns and Allowances			
Purchase Discounts			
Accounts Payable			
Transportation-In			

**Exercise B** a. Silver Company purchased USD 56,000 of merchandise from Milton Company on account. Before paying its account, Silver Company returned damaged merchandise with an invoice price of USD 11,680. Assuming use of periodic inventory procedure, prepare entries on both companies' books to record both the purchase/sale and the return.

b. Show how any of the required entries would change assuming that Milton Company granted an allowance of USD 3,360 on the damaged goods instead of giving permission to return the merchandise.

**Exercise C** What is the last payment date on which the cash discount can be taken on goods sold on March 5 for USD 51,200; terms 3/10/EOM, n/60? Assume that the bill is paid on this date and prepare the correct entries on both the buyer's and seller's books to record the payment.

**Exercise D** You have purchased merchandise with a list price of USD 36,000. Because you are a wholesaler, you are granted a trade discount of 49.6 per cent. The cash discount terms are 2/EOM, n/60. How much will you remit if you pay the invoice by the end of the month of purchase? How much will discounts on payment you remit if you do not pay the invoice until the following month?

**Exercise E** Lasky Company sold merchandise with a list price of USD 60,000 on July 1. For each of the following independent assumptions, calculate (1) the gross selling price used to record the sale and (2) the amount that the buyer would have to remit when paying the invoice.

Trade Discount	Credit	Date
----------------	--------	------

## 6. Merchandising transactions

Granted	Terms	Paid
a. 30%, 20%	2/10, n/30	July 10
b. 40%, 10%	2/EOM, n/60	August 10
c. 30%, 10%, 5%	3/10/EOM, n/60	August 10
d. 40%	1/10, n/30	July 12

**Exercise F** Raiser Company purchased goods at a gross selling price of USD 2,400 on August 1. Discount terms of 2/10, n/30 were available. For each of the following independent situations, determine (1) the cash discount available on the final payment and (2) the amount paid if payment is made within the discount period.

Transportation Terms	Freight Paid (by)	Purchase Allowance Granted
a. FOB shipping point	\$240 (buyer)	\$480
b. FOB destination	120 (seller)	240
c. FOB shipping point	180 (seller)	720
d. FOB destination	192 (buyer)	120

**Exercise G** Stuart Company purchased goods for USD 84,000 on June 14, under the following terms: 3/10, n/30; FOB shipping point, freight collect. The bill for the freight was paid on June 15, USD 1,200.

- Assume that the invoice was paid on June 24, and prepare all entries required on Stuart Company's books.
- Assume that the invoice was paid on July 11. Prepare the entry to record the payment made on that date.

**Exercise H** Cramer Company uses periodic inventory procedure. Determine the cost of goods sold for the company assuming purchases during the period were USD 40,000, transportation-in was USD 300, purchase returns and allowances were USD 1,000, beginning inventory was USD 25,000, purchase discounts were USD 2,000, and ending inventory was USD 13,000.

**Exercise I** In each case, use the following information to calculate the missing information:

	Case 1	Case 2	Case 3
Gross sales	\$ 640,000	\$ ?	\$ ?
Sales discounts	?	25,600	19,200
Sales returns and allowances	19,200	44,800	32,000
Net sales	608,000	1,209,600	
Merchandise inventory, January 1	256,000		384,000
Purchases	384,000	768,000	
Purchase discounts	7,680	13,440	12,800
Purchase returns and allowances	24,320	31,360	32,000
Net purchases	352,000		672,000
Transportation-in	25,600	38,400	32,000
Net cost of purchases	377,600	761,600	?
Cost of goods available for sale	?	1,081,600	1,088,000
Merchandise inventory, December 31	?	384,000	448,000
Cost of goods sold	320,000	?	640,000
Gross margin		512,000	320,000

**Exercise J** In each of the following equations supply the missing term(s):

- Net sales = Gross sales - ( \_\_\_\_\_ + Sales returns and allowances).
- Cost of goods sold = Beginning inventory + Net cost of purchases - \_\_\_\_\_.
- Gross margin = \_\_\_\_\_ - Cost of goods sold.
- Income from operations = \_\_\_\_\_ - Operating expenses.
- Net income = Income from operations + \_\_\_\_\_ - \_\_\_\_\_.

**Exercise K** Given the balances in this partial trial balance, indicate how the balances would be treated in the work sheet. The ending inventory is USD 96. (The amounts are unusually small for ease in rewriting the numbers. We purposely left out the Statement of Retained Earnings columns since they are not used.)

Accounts Titles	Trial Balance		Adjustments		Adjusted Trial Balance		Income Statement		Balance Sheet	
	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit

Merchandise	
Inventory	120
Sales	540
Sales Discounts	18
Sales Returns	
and Allowances	45
Purchases	600
Purchase	
Discounts	12
Purchase Returns	
and Allowances	24
Transportation-In	36

**Exercise L** Using the data in the previous exercise prepare closing entries for the preceding accounts. Do not close the Income Summary account.

### Problems

**Problem A** a. Spencer Sporting Goods Company engaged in the following transactions in April 2010

Apr. 1 Sold merchandise on account for USD 288,000; terms 2/10, n/30, FOB shipping point, freight collect.

5 USD 43,200 of the goods sold on account on April 1 were returned for a full credit. Payment for these goods had not yet been received.

8 A sales allowance of USD 5,760 was granted on the merchandise sold on April 1 because the merchandise was damaged in shipment.

10 Payment was received for the net amount due from the sale of April 1.

b. High Stereo Company engaged in the following transactions in July 2010.

July 2 Purchased stereo merchandise on account at a cost of USD 43,200; terms 2/10, n/30, FOB destination, freight prepaid.

15 Sold merchandise for USD 64,800, terms 2/10, n/30, FOB destination, freight prepaid.

16 Paid freight costs on the merchandise sold, USD 2,160.

20 High Stereo Company was granted an allowance of USD 2,880 on the purchase of July 2 because of damaged merchandise.

31 Paid the amount due on the purchase of July 2.

Prepare journal entries to record the transactions.

**Problem B** Mars Musical Instrument Company and Tiger Company engaged in the following transactions with each other during July 2010:

July 2 Mars Musical Instrument Company purchased merchandise on account with a list price of USD 48,000 from Tiger Company. The terms were 3/EOM, n/60, FOB shipping point, freight collect. Trade discounts of 15 per cent, 10 per cent, and 5 per cent were granted by Tiger Company.

5 The buyer paid the freight bill on the purchase of July 2, USD 1,104.

6 The buyer returned damaged merchandise with an invoice price of USD 2,790 to the seller and received full credit.

On the last day of the discount period, the buyer paid the seller for the merchandise.

Prepare all the necessary journal entries for the buyer and the seller.

## 6. Merchandising transactions

**Problem C** The following data for June 2010 are for Rusk Company's first month of operations:

June 1 Rusk Company was organized, and the stockholders invested USD 1,008,000 cash, USD 336,000 of merchandise inventory, and a USD 288,000 plot of land in exchange for capital stock.

4 Merchandise was purchased for cash, USD 432,000; FOB shipping point, freight collect.

9 Cash of USD 10,080 was paid to a trucking company for delivery of the merchandise purchased June 4.

13 The company sold merchandise on account, USD 288,000; terms 2/10, n/ 30.

15 The company sold merchandise on account, USD 230,400; terms 2/10, n/30.

16 Of the merchandise sold June 13, USD 31,680 was returned for credit.

20 Salaries for services received were paid as follows: to office employees, USD 31,680; to salespersons, USD 83,520.

22 The company collected the amount due on the remaining USD 256,320 of accounts receivable arising from the sale of June 13.

24 The company purchased merchandise on account at a cost of USD 345,600; terms 2/10, n/30, FOB shipping point, freight collect.

26 The company returned USD 57,600 of the merchandise purchased June 24 to the vendor for credit.

27 A trucking company was paid USD 7,200 for delivery to Rusk Company of the goods purchased June 24.

29 The company sold merchandise on account, USD 384,000; terms 2/10, n/30.

30 Sold merchandise for cash, USD 172,800.

30 Payment was received for the sale of June 15.

30 Paid store rent for June, USD 43,200.

30 Paid the amount due on the purchase of June 24.

The inventory on hand at the close of business June 30 was USD 672,000 at cost.

a. Prepare journal entries for the transactions.

b. Post the journal entries to the proper ledger accounts. Use the account numbers in the chart of accounts shown in a separate file at the end of the text. Assume that all postings are from page 20 of the general journal.

c. Prepare a trial balance as of 2010 June 30.

d. Prepare a classified income statement for the month ended 2010 June 30. No adjusting entries are needed.

**Problem D** The Western Wear Company, a wholesaler of western wear clothing, sells to retailers. The company entered into the following transactions in May 2010:

May 1 The Western Wear Company was organized as a corporation. The stockholders purchased stock at par for the following assets in the business: USD 462,000 cash, USD 168,000 merchandise, and USD 105,000 land.

1 Paid rent on administrative offices for May, USD 25,200.

5 The company purchased merchandise from Carl Company on account, USD 189,000; terms 2/10, n/30. Freight terms were FOB shipping point, freight collect.

8 Cash of USD 8,400 was paid to a trucking company for delivery of the merchandise purchased May 5.

14 The company sold merchandise on account, USD 315,000; terms 2/10, n/30.

15 Paid Carl Company the amount due on the purchase of May 5.

16 Of the merchandise sold May 14, USD 13,860 was returned for credit.

19 Salaries for services received were paid for May as follows: office employees, USD 16,800; salespersons, USD 33,600.

24 The company collected the amount due on USD 126,000 of the accounts receivable arising from the sale of May 14.

25 The company purchased merchandise on account from Bond Company, USD 151,200; terms 2/10, n/30. Freight terms were FOB shipping point, freight collect.

27 Of the merchandise purchased May 25, USD 25,200 was returned to the vendor.

28 A trucking company was paid USD 2,100 for delivery to The Western Wear Company of the goods purchased May 25.

29 The company sold merchandise on open account, USD 15,120; terms 2/10, n/30.

30 Cash sales were USD 74,088.

30 Cash of USD 100,800 was received from the sale of May 14.

31 Paid Bond Company for the merchandise purchased on May 25, taking into consideration the merchandise returned on May 27.

The inventory on hand at the close of business on May 31 is USD 299,040.

From the data given for The Western Wear Company:

- a. Prepare journal entries for the transactions.
- b. Post the journal entries to the proper ledger accounts. Use the account numbers in the chart of accounts shown in a separate file at the end of the text. Assume that all postings are from page 15 of the general journal.

(There were no adjusting journal entries.)

- c. Prepare a trial balance.
- d. Prepare a classified income statement for the month ended 2010 May 31.
- e. Prepare a classified balance sheet as of 2010 May 31.

**Problem E** The following data are for Leone Lumber Company:

<b>LEONE LUMBER COMPANY</b>				
Trial Balance				
2010 December 31				
Acct. No.	Account Title	Debits	Credits	
100	Cash	\$ 70,640		
103	Accounts Receivable	159,520		
105	Merchandise Inventory, 2010 January 1	285,200		
107	Supplies on Hand	5,360		
108	Prepaid Insurance	4,800	\$ 17,600	
112	Prepaid Rent	57,600	102,800	
170	Equipment	88,000	200,000	
171	Accumulated Depreciation—Equipment		219,640	
200	Accounts Payable		1,122,360	
300	Capital Stock			
310	Retained Earnings, 2010 January 1	5,160	1,000	
410	Sales			
412	Sales Returns and Allowances	500,840	4,040	
418	Interest Revenue			
500	Purchases	7,840		
502	Purchases Returns and Allowances	78,000		
503	Transportation-In	138,400		
505	Advertising Expense	80,800		
508	Sales Salaries Expense	160,000		
509	Office Salaries Expense	4,800		
510	Officers' Salaries Expense	10,000		
511	Utilities Expense	600		
536	Legal and Accounting Expense	9,880		
540	Interest Expense			
567	Miscellaneous Administrative Expense			
		\$1,667,440	\$1,667,440	

- A total of USD 3,400 of the prepaid insurance has expired.
- An inventory of supplies showed that USD 1,700 are still on hand.

## 6. Merchandising transactions

- Prepaid rent expired during the year is USD 50,600.
- Depreciation expense on store equipment is USD 8,800.
- Accrued sales salaries are USD 4,000.
- Accrued office salaries are USD 3,000.
- Merchandise inventory on hand is USD 350,000.

Prepare the following:

- a. A work sheet for the year ended 2010 December 31. Refer to the chart of accounts shown in a separate file at the end of the text for any other account numbers you need.
- b. A classified income statement. The only selling expenses are sales salaries, advertising, supplies, and depreciation expense—equipment.
- c. A statement of retained earnings.
- d. A classified balance sheet.
- e. Required closing entries.

### Alternate problems

**Alternate problem A** a. Candle Carpet Company engaged in the following transactions in August 2010:

Aug. 2 Sold merchandise on account for USD 300,000; terms 2/10, n/30, FOB shipping point, freight collect.

18 Received payment for the sale of August 2.

20 A total of USD 10,000 of the merchandise sold on August 2 was returned, and a full refund was made because it was the wrong merchandise.

28 An allowance of USD 16,000 was granted on the sale of August 2 because some merchandise was found to be damaged; USD 16,000 cash was returned to the customer.

b. Lee Furniture Company engaged in the following transactions in August 2010:

Aug. 4 Purchased merchandise on account at a cost of USD 140,000; terms 2/10, n/30, FOB shipping point, freight collect.

6 Paid freight of USD 2,000 on the purchase of August 4.

10 Sold goods for USD 100,000; terms 2/10, n/30.

12 Returned USD 24,000 of the merchandise purchased on August 4.

14 Paid the amount due on the purchase of August 4.

Prepare journal entries for the transactions.

**Alternate problem B** Edwardo Auto Parts Company and Spoon Company engaged in the following transactions with each other during August 2010:

Aug.15 Edwardo Auto Parts Company purchased merchandise on account with a list price of USD 192,000 from Spoon Company. Trade discounts of 20 per cent and 10 per cent were allowed. Terms were 2/10, n/30, FOB destination, freight prepaid.

16 The seller paid the freight charges, USD 2,400.

17 The buyer requested an allowance of USD 4,512 against the amount due because the goods were damaged in transit.

20 The seller granted the allowance requested on August 17.



The buyer paid the amount due on the last day of the discount period. Record all of the entries required on the books of both the buyer and the seller.

**Alternate problem C** Gardner Company engaged in the following transactions in June 2010, the company's first month of operations:

June 1 Stockholders invested USD 384,000 cash and USD 144,000 of merchandise inventory in the business in exchange for capital stock.

3 Merchandise was purchased on account, USD 192,000; terms 2/10, n/30, FOB shipping point, freight collect.

4 Paid freight on the June 3 purchase, USD 5,280.

7 Merchandise was purchased on account, USD 96,000; terms 2/10, n/30, FOB destination, freight prepaid.

10 Sold merchandise on account, USD 230,400; terms 2/10, n/30, FOB shipping point, freight collect.

11 Returned USD 28,800 of the merchandise purchased on June 3.

12 Paid the amount due on the purchase of June 3.

13 Sold merchandise on account, USD 240,000; terms 2/10, n/30, FOB destination, freight prepaid.

14 Paid freight on sale of June 13, USD 14,400.

20 Paid the amount due on the purchase of June 7.

21 USD 48,000 of the goods sold on June 13 were returned for credit.

22 Received the amount due on sale of June 13.

25 Received the amount due on sale of June 10.

29 Paid rent for the administration building for June, USD 19,200.

30 Paid sales salaries of USD 57,600 for June.

30 Purchased merchandise on account, USD 48,000; terms 2/10, n/30, FOB destination, freight prepaid.

The inventory on hand on June 30 was USD 288,000.

- a. Prepare journal entries for the transactions.
- b. Post the journal entries to the proper ledger accounts. Use the account numbers in the chart of accounts shown in a separate file at the end of the text. Assume that all postings are from page 10 of the general journal.
- c. Prepare a trial balance as of 2010 June 30.
- d. Prepare a classified income statement for the month ended 2010 June 30. No adjusting entries are needed.

**Alternate problem D** Organized on 2010 May 1, Noah Cabinet Company engaged in the following transactions:

May 1 The stockholders invested USD 900,000 in this new business by purchasing capital stock.

1 Purchased merchandise on account from String Company, USD 46,800; terms n/60, FOB shipping point, freight collect.

3 Sold merchandise for cash, USD 28,800.

6 Paid transportation charges on May 1 purchase, USD 1,440 cash.

7 Returned USD 3,600 of merchandise to String Company due to improper size.

10 Requested and received an allowance of USD 1,800 from String Company for improper quality of certain items.

14 Sold merchandise on account to Texas Company, USD 18,000; terms 2/20, n/30, FOB shipping point, freight collect.

16 Issued cash refund for return of merchandise relating to sale made on May 3, USD 180.

## 6. Merchandising transactions

18 Purchased merchandise on account from Tan Company invoiced at USD 28,800; terms 2/15, n/30, FOB shipping point, freight collect.

18 Received a bill for freight charges of USD 900 from Ball Trucking Company on the purchase from Tan Company.

19 Texas Company returned USD 360 of merchandise purchased on May 14.

24 Returned USD 2,880 of defective merchandise to Tan Company. Received full credit.

28 Texas Company remitted balance due on sale of May 14.

31 Paid Tan Company for the purchase of May 18 after adjusting for transaction of May 24.

31 Paid miscellaneous selling expenses of USD 7,200.

31 Paid miscellaneous administrative expenses of USD 10,800.

The May 31st inventory is USD 57,600. From the data for Noah Cabinet Company:

a. Journalize the transactions. Round all amounts to the nearest dollar.

b. Post the entries to the proper ledger accounts. Use the account numbers appearing in the chart of account shown in a separate file at the end of the text. Assume all postings are from page 5 of the general journal.

(There were no adjusting journal entries.)

c. Prepare a trial balance.

d. Prepare a classified income statement for the month ended 2010 May 31.

**Alternate problem E** The following data are for Bayer Lamp Company:

**Bayer Lamp Company  
Trial Balance  
2010 December 31**

Acct. No.	Account Title	Debits	Credits
100	Cash	\$ 228,800	
103	Accounts Receivable	193,200	
105	Merchandise Inventory, 2010 January 1	166,400	
108	Prepaid Insurance	11,600	
130	Land	240,000	
140	Building	440,000	
141	Accumulated Depreciation – Building		\$ 132,000
174	Store Fixtures	222,400	
175	Accumulated Depreciation – Store Fixtures		44,480
200	Accounts Payable		151,600
300	Capital Stock		400,000
310	Retained Earnings, 2010 January 1		480,720
410	Sales		2,206,000
411	Sales Discounts	14,800	
412	Sales Returns and Allowances	8,000	
418	Interest Revenue		1,600
500	Purchases	1,251,600	
501	Purchases Discounts		10,400
502	Purchases Returns and Allowances		5,600
503	Transportation-In	29,200	
505	Advertising Expense	48,000	
508	Sales Salaries Expense	256,000	
509	Office Salaries Expense	296,000	
519	Delivery Expense	18,400	

540	Interest Expense	8,000	
		\$ 3,432,400	\$ 3,432,400

- Depreciation expense on the store building is USD 8,800.
- Depreciation expense on the store fixtures is USD 22,240.
- Accrued sales salaries are USD 5,600.
- Insurance expired in 2010 is USD 10,000.
- Cost of merchandise inventory on hand 2010 December 31, is USD 222,000.

Prepare the following:

- A work sheet for the year ended 2010 December 31. Refer to the chart of accounts shown in a separate file at the end of the text for any other account numbers you need.
- A classified income statement. The only administrative expenses are office salaries and insurance. The building depreciation is on the store building.
- A statement of retained earnings.
- A classified balance sheet.
- The required closing entries.

#### Beyond the numbers—Critical thinking

**Business decision case A** Candy's Shirts, Inc., has an opportunity to purchase 40,000 shirts with the logo of her favorite school in January 2009. Candy, who is not currently in business, is considering buying these shirts and then renting a display cart from which to sell these shirts (called a kiosk) in a shopping mall. Based on the following information and estimates, Candy needs to decide if the business would be profitable:

- Cost of the 40,000 shirts, all of which must be purchased in January 2009, is USD 440,000.
- Candy thinks it would take two years to sell all of the shirts. She estimates her sales at 25,000 shirts in 2009 and 15,000 shirts in 2010.
- Rent of the kiosk would be USD 1,500 per month in 2009 and USD 1,600 per month in 2010.
- Candy can buy some counters on which to display the merchandise for USD 4,000. She could sell the counters for USD 500 at the end of the second year.
- Candy estimates the cost to decorate her kiosk would be USD 2,500.
- Candy would hire employees and pay them USD 1 per shirt sold.
- Candy plans to sell the shirts for USD 17 each.
- Candy and her husband purchased USD 100,000 of capital stock in the business. Therefore, she plans to borrow USD 400,000 from their family banker. Interest expense on this loan will be USD 52,000 in 2009 and USD 6,500 in 2010. Candy plans to repay USD 300,000 on 2010 January 2, and the remaining USD 100,000 on 2010 July 1
- Candy needs to rent some storage space because all 40,000 shirts cannot be stored at the kiosk. Storage space costs USD 2,500 per year.

- Prepare estimated income statements for 2009 and 2010 for Candy's business. Does it appear that the business will be profitable?
- Will Candy have the cash available to pay the bank loan as she planned?

## 6. Merchandising transactions

**Business decision case B** In the Annual report appendix, refer to the consolidated statements of earnings for The Limited's most recent three years. Calculate the gross margin percentage and write an explanation of what the results mean for each of the three years.

**Annual report analysis C** Refer to the consolidated statements of income of The Limited in the Annual report appendix. Identify the 2000, 1999, and 1998 net sales; cost of goods sold; gross profit; selling, administrative, and general expenses; and operating income. Do the results present a favorable trend? Comment on the results.

**Ethics case – Writing experience D** Based on the ethics case related to World Auto Parts Corporation, respond in writing to the following questions:

- a. Do you agree that the total impact of this practice could be as much as USD 10 million?
- b. Are the small suppliers probably better off going along with the practice?
- c. Is this practice ethical?

**Group project E** In teams of two or three students, go to the library (or find an annual report at [www.sec.gov/edgar.shtml](http://www.sec.gov/edgar.shtml)) to locate one merchandising company's annual report for the most recent year. Calculate the company's gross margin percentage for each of the most recent three years. As a team, write a memorandum to the instructor showing your calculations and commenting on the results. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project F** In a team of two or three students, contact a variety of businesses in your area and inquire as to the types of sales discount terms they offer to credit customers and the types of purchase discount terms they are offered by their suppliers. Calculate the approximate annual rate of interest implied in several of the more common discount terms. For instance, the book states that the implied annual rate of interest on terms of 2/10, n/30 is 36 per cent, assuming we use a 360-day year. Present your findings in a written report to your instructor.

**Group project G** In a team of two or three students, obtain access to several annual reports of companies in different industries (see [www.sec.gov/edgar.shtml](http://www.sec.gov/edgar.shtml).) Examine their income statements and identify differences in their formats. Discuss these differences within your group and then present your findings in a report to your instructor.

### Using the Internet—A view of the real world

Visit the Fat Brains Toys website at:

<http://fatbraintoy.com> website

Browse around the site for interesting information. What products do they sell? What journal entries would they make to record sales of these products? Write a report to your instructor summarizing your experience at this site.

### Answers to self-test

#### True-false

**False.** Sales discounts, as well as sales returns and allowances, are deducted from gross sales.

**True.** Under perpetual inventory procedure, the Merchandise Inventory account is debited for each purchase and credited for each sale.

**True.** Purchase Discounts and Purchase Returns and Allowances are contra accounts to the Purchases account. The balances of those accounts are deducted from purchases to arrive at net purchases.

**False.** Consigned goods delivered to another party for attempted sale are included in the ending inventory of the company that sent the goods.

**False.** An unclassified income statement, not a classified income statement, has only two categories of items.

**Multiple-choice**

**d.** Trade discounts are not recorded on the books of either a buyer or a seller. In other words, the invoice price of sales (purchases) is recorded:  $\text{USD } 4,000 \times 0.8 = \text{USD } 3,200$

**b.** The cost of goods sold is computed as follows:

Beginning inventory	\$60,000
Net cost of purchases	240,000
Cost of goods available for sale	\$ 300,000
Ending inventory	72,000
Cost of goods sold	\$228,000

**b.** Purchase discounts are based on invoice prices less purchase returns and allowances, if any.  
 $\text{Purchase discount} = (\text{USD } 12,000 - \text{USD } 2,000) \times 0.02 = \text{USD } 200$

**e.** All of the sections mentioned in (a-d) appear in a classified income statement. Current assets appear on a classified balance sheet.

**b.** Merchandise Inventory is debited for the cost of ending inventory.

You may close debit balanced accounts (in the income statement) before credit balanced accounts. This practice does not affect the balance of the Income Summary account or the amount of net income.

# 7. Measuring and reporting inventories

## Learning objectives

After studying this chapter, you should be able to:

- Explain and calculate the effects of inventory errors on certain financial statement items.
- Indicate which costs are properly included in inventory.
- Calculate cost of ending inventory and cost of goods sold under the four major inventory costing methods using periodic and perpetual inventory procedures.
- Explain the advantages and disadvantages of the four major inventory costing methods.
- Record merchandise transactions under perpetual inventory procedure.
- Apply net realizable value and the lower-of-cost-or-market method of inventory.
- Estimate cost of ending inventory using the gross margin and retail inventory methods.
- Analyze and use the financial results- inventory turnover ratio.

## Choosing an accounting career

Chapter 7 discusses how companies have a choice in inventory cost methods between specific identification, FIFO, LIFO, and weighted-average. Similarly, one of the greatest benefits of obtaining an accounting degree is the broad range of career choices available. There are over 40 different types of accounting jobs available in public accounting, private industry, and governmental accounting. For example, check out the list of accounting jobs at: [http://www.uncwil.edu/stuaff/career/Majors/accounting.htm#related\\_careertitles](http://www.uncwil.edu/stuaff/career/Majors/accounting.htm#related_careertitles).

One of the primary reasons many students go into accounting is successful job placement. Accounting majors have been better able to find positions than majors in any of the other business options, with the possible exception of management information systems (MIS). Even the relative demand for MIS majors has diminished recently, while the demand for accounting majors remains strong. We are currently experiencing a shortage of accounting majors across the nation. Another important factor to keep in mind regarding job placement is where you would like to be three to five years from now. Accounting offers an excellent foundation with opportunities for advancement, whereby many accounting graduates make double their entry-level salary in only five years.

Many students pursue an accounting degree because it does not restrict their career opportunities as much as having a different business degree. For example, with an accounting degree, a student can apply for positions in management, marketing, and finance, as well as accounting. In fact, many recruiters in business favor accounting graduates because they recognize an accounting degree as a more difficult business degree to obtain. However, management, marketing, and finance students cannot apply for accounting positions because they lack necessary accounting coursework. In fact, with some additional courses in systems, an accounting major is well equipped to pursue a career in any business field including information systems.

## 7. Measuring and reporting inventories

Have you ever taken advantage of a pre-inventory sale at your favorite retail store? Many stores offer bargain prices to reduce the merchandise on hand and to minimize the time and expense of taking the inventory. A smaller inventory also enhances the probability of taking an accurate inventory since the store has less merchandise to count. From Chapter 6 you know that companies use inventory amounts to determine the cost of goods sold; this major expense affects a merchandising company's net income. In this chapter, you learn how important inventories are in preparing an accurate income statement, statement of retained earnings, and balance sheet.

This chapter discusses merchandise inventory carried by merchandising retailers and wholesalers. **Merchandise inventory** is the quantity of goods held by a merchandising company for resale to customers. Merchandising companies determine the quantity of inventory items by a physical count.

The merchandise inventory figure used by accountants depends on the quantity of inventory items and the cost of the items. This chapter discusses four accepted methods of costing the items: (1) specific identification; (2) first-in, first-out (FIFO); (3) last-in, first-out (LIFO); and (4) weighted-average. Each method has advantages and disadvantages.

This chapter stresses the importance of having accurate inventory figures and the serious consequences of using inaccurate inventory figures. When you finish this chapter, you should understand how taking inventory connects with the cost of goods sold figure on the store's income statement, the retained earnings amount on the statement of retained earnings, and both the inventory figure and the retained earnings amount on the store's balance sheet.

### Inventories and cost of goods sold

Inventory is often the largest and most important asset owned by a merchandising business. The inventory of some companies, like car dealerships or jewelry stores, may cost several times more than any other asset the company owns. As an asset, the inventory figure has a direct impact on reporting the solvency of the company in the balance sheet. As a factor in determining cost of goods sold, the inventory figure has a direct impact on the profitability of the company's operations as reported in the income statement. Thus, the importance of the inventory figure should not be underestimated.

### Importance of proper inventory valuation

A merchandising company can prepare accurate income statements, statements of retained earnings, and balance sheets only if its inventory is correctly valued. On the income statement, a company using periodic inventory procedure takes a physical inventory to determine the cost of goods sold. Since the cost of goods sold figure affects the company's net income, it also affects the balance of retained earnings on the statement of retained earnings. On the balance sheet, incorrect inventory amounts affect both the reported ending inventory and retained earnings. Inventories appear on the balance sheet under the heading "Current Assets", which reports current assets in a descending order of liquidity. Because inventories are consumed or converted into cash within a year or one operating cycle, whichever is longer, inventories usually follow cash and receivables on the balance sheet.

Recall that under periodic inventory procedure we determine the cost of goods sold figure by adding the beginning inventory to the net cost of purchases and deducting the ending inventory. In each accounting period, the appropriate expenses must be matched with the revenues of that period to determine the net income. Applied to inventory, matching involves determining (1) how much of the cost of goods available for sale during the period should be deducted from current revenues and (2) how much should be allocated to goods on hand and thus carried forward as an asset (merchandise inventory) in the balance sheet to be matched against future revenues. Because

we determine the cost of goods sold by deducting the ending inventory from the cost of goods available for sale, a highly significant relationship exists: Net income for an accounting period depends directly on the valuation of ending inventory. This relationship involves three items:

First, a merchandising company must be sure that it has properly valued its ending inventory. If the ending inventory is overstated, cost of goods sold is understated, resulting in an overstatement of gross margin and net income. Also, overstatement of ending inventory causes current assets, total assets, and retained earnings to be overstated. Thus, any change in the calculation of ending inventory is reflected, dollar for dollar (ignoring any income tax effects), in net income, current assets, total assets, and retained earnings.

Second, when a company misstates its ending inventory in the current year, the company carries forward that misstatement into the next year. This misstatement occurs because the ending inventory amount of the current year is the beginning inventory amount for the next year.

Third, an error in one period's ending inventory automatically causes an error in net income in the opposite direction in the next period. After two years, however, the error washes out, and assets and retained earnings are properly stated.

Exhibit 44 and Exhibit 45 prove that net income for an accounting period depends directly on the valuation of the inventory. Allen Company's income statements and the statements of retained earnings for years 2009 and 2010 show this relationship.

**ALLEN COMPANY**

	<b>For Year Ended 2009 December 31</b>	
	<b>Ending Inventory Correctly Stated</b>	<b>Ending Inventory Overstated By \$5,000</b>
<b>Income Statement</b>		
Sales	\$400,000	\$400,000
Cost of goods available for sale	\$300,000	\$300,000
Ending inventory	35,000	40,000
Cost of goods sold	265,000	260,000
Gross margin	\$135,000	\$140,000
Other expenses	\$85,000	85,000
Net income	\$ 50,000	\$55,000
<b>Statement of Retained Earnings</b>		
Beginning retained earnings	\$120,000	\$120,000
Net income	50,000	55,000
Ending retained earnings	\$170,000	\$175,000

Exhibit 44: Effects of an overstated ending inventory

**ALLEN COMPANY**

	<b>For Year Ended 2010 December 31</b>	
	<b>Beginning Inventory Correctly Stated</b>	<b>Beginning Inventory Overstated By \$5,000</b>
<b>Income Statement</b>		
Sales	\$425,000	\$425,000
Beginning inventory	\$ 35,000	\$40,000
Purchases	290,000	290,000
Cost of goods available for sale	\$325,000	\$330,000
Ending inventory	45,000	45,000
Cost of goods sold	280,000	285,000
Gross margin	\$145,000	\$140,000
Other expenses	53,500	53,500
Net income	\$ 91,500	\$ 86,500
<b>Statement of Retained Earnings</b>		
Beginning retained earnings	\$170,000	\$175,000
Net income	91,500	86,500
Ending retained earnings	\$261,500	\$261,500

Exhibit 45: Effects of an overstated beginning inventory



## 7. Measuring and reporting inventories

In Exhibit 44 the correctly stated ending inventory for the year 2009 is USD 35,000. As a result, Allen has a gross margin of USD 135,000 and net income of USD 50,000. The statement of retained earnings shows a beginning retained earnings of USD 120,000 and an ending retained earnings of USD 170,000. When the ending inventory is overstated by USD 5,000, as shown on the right in Exhibit 44, the gross margin is USD 140,000, and net income is USD 55,000. The statement of retained earnings then has an ending retained earnings of USD 175,000. The ending inventory overstatement of USD 5,000 causes a USD 5,000 overstatement of net income and a USD 5,000 overstatement of retained earnings. The balance sheet would show both an overstated inventory and an overstated retained earnings. Due to the error in ending inventory, both the stockholders and creditors may overestimate the profitability of the business.

Exhibit 45 is a continuation of Exhibit 44 and contains Allen's operating results for the year ended 2010 December 31. Note that the ending inventory in Exhibit 44 now becomes the beginning inventory of Exhibit 45. However, Allen's inventory at 2010 December 31, is now an accurate inventory of USD 45,000. As a result, the gross margin in the income statement with the beginning inventory correctly stated is USD 145,000, and Allen Company has net income of USD 91,500 and an ending retained earnings of USD 261,500. In the income statement columns at the right, in which the beginning inventory is overstated by USD 5,000, the gross margin is USD 140,000 and net income is USD 86,500, with the ending retained earnings also at USD 261,500.

Thus, in contrast to an overstated ending inventory, resulting in an overstatement of net income, an overstated beginning inventory results in an understatement of net income. If the beginning inventory is overstated, then cost of goods available for sale and cost of goods sold also are overstated. Consequently, gross margin and net income are understated. Note, however, that when net income in the second year is closed to retained earnings, the retained earnings account is stated at its proper amount. The overstatement of net income in the first year is offset by the understatement of net income in the second year. For the two years combined the net income is correct. At the end of the second year, the balance sheet contains the correct amounts for both inventory and retained earnings. Exhibit 46 summarizes the effects of errors of inventory valuation:

	Ending Inventory		Beginning Inventory	
	Understated	Overstated	Understated	Overstated
Cost of good sold	Overstated	Understated	Understated	Overstated
Net income	Understated	Overstated	Overstated	Understated

Exhibit 46: Inventory errors

### Determining inventory cost

To place the proper valuation on inventory, a business must answer the question: Which costs should be included in inventory cost? Then, when the business purchases identical goods at different costs, it must answer the question: Which cost should be assigned to the items sold? In this section, you learn how accountants answer these questions.

The costs included in inventory depend on two variables: quantity and price. To arrive at a current inventory figure, companies must begin with an accurate physical count of inventory items. They multiply the quantity of inventory by the unit cost to compute the cost of ending inventory. This section discusses the taking of a physical inventory and the methods of costing the physical inventory under both perpetual and periodic inventory procedures. The remainder of the chapter discusses departures from the cost basis of inventory measurement.

As briefly described in Chapter 6, to take a physical inventory, a company must count, weigh, measure, or estimate the physical quantities of the goods on hand. For example, a clothing store may count its suits; a hardware store may weigh bolts, washers, and nails; a gasoline company may measure gasoline in storage tanks; and a lumberyard may estimate quantities of lumber, coal, or other bulky materials. Throughout the taking of a physical inventory, the goal should be accuracy.

Taking a physical inventory may disrupt the normal operations of a business. Thus, the count should be administered as quickly and as efficiently as possible. The actual taking of the inventory is not an accounting function; however, accountants often plan and coordinate the count. Proper forms are required to record accurate counts and determine totals. Identification names or symbols must be chosen, and those persons who count, weigh, or measure the inventory items must know these symbols.

<b>Inventory Tag</b>	
<b>JMA Corp.</b>	
Inventory Tag No. <b>281</b>	Date
Description	
Location	
Quantity Counted	
Counted by	
Checked by	
<b>Duplicate Inventory Tag</b>	
Inventory Tag No. <b>281</b>	Date
Description	
Location	
Quantity Counted	
Counted by	
Checked by	

Exhibit 47: Inventory tag

Taking a physical inventory often involves using inventory tags, such as that in Exhibit 47. These tags are consecutively numbered for control purposes. A tag usually consists of a stub and a detachable duplicate section. The duplicate section facilitates checking discrepancies. The format of the tags can vary. However, the tag usually provides space for (1) a detailed description and identification of inventory items by product, class, and model; (2) location of items; (3) quantity of items on hand; and (4) initials of the counters and checkers.

The descriptive information and count may be entered on one copy of the tag by one team of counters. Another team of counters may record its count on the duplicate copy of the tag. Discrepancies between counts of the same items by different teams are reconciled by supervisors, and the correct counts are assembled on intermediate inventory sheets. Only when the inventory counts are completed and checked does management send the final sheets to the accounting department for pricing and extensions (quantity X price). The tabulated result is the dollar amount of the physical inventory. Later in the chapter we explain the different methods accountants use to cost inventory.

## 7. Measuring and reporting inventories

Usually, inventory cost includes all the necessary outlays to obtain the goods, get the goods ready to sell, and have the goods in the desired location for sale to customers. Thus, inventory cost includes:

- Seller's invoice price less any purchase discount.
- Cost of the buyer's insurance to cover the goods while in transit.
- Transportation charges when borne by the buyer.
- Handling costs, such as the cost of pressing clothes wrinkled during shipment.

In theory, the cost of each unit of inventory should include its net invoice price plus its share of other costs incurred in shipment. The 1986 Tax Reform Act requires companies to assign these costs to inventory for tax purposes. For accounting purposes, these cost assignments are recommended but not required.

Practical difficulties arise in allocating some of these costs to inventory items. Assume, for example, that the freight bill on a shipment of clothes does not separate out the cost of shipping one shirt. Also, assume that the company wants to include the freight cost as part of the inventory cost of the shirt. Then, the freight cost would have to be allocated to each unit because it cannot be measured directly. In practice, allocations of freight, insurance, and handling costs to the individual units of inventory purchased are often not worth the additional cost. Consequently, in the past many companies have not assigned the costs of freight, insurance, and handling to inventory. Instead, they have expensed these costs as incurred. When companies omit these costs from both beginning and ending inventories, they minimize the effect of expensing these costs on net income. The required allocation for tax purposes has probably resulted in many companies using the same inventory amounts in their financial statements.

Even if a company derives a cost for each unit in inventory, the inventory valuation problem is not solved. Management must consider two other aspects of the problem:

- If goods were purchased at varying unit costs, how should the cost of goods available for sale be allocated between the units sold and those that remain in inventory? For example, assume Hi-Fi Buys, Inc., purchased two identical DVD players for resale. One cost USD 250 and the other, USD 200. If one was sold during the period, should Hi-Fi Buys assign it a cost of USD 250, USD 200, or an average cost of USD 225?
- Does the fact that current replacement costs are less than the costs of some units in inventory have any bearing on the amount at which inventory should be carried? Using the same example, if Hi-Fi Buys can currently buy all DVD players for USD 200, is it reasonable to carry some units in inventory at USD 250 rather than USD 200?

We answer these questions in the next section.

Generally companies should account for inventories at historical cost; that is, the cost at which the items were purchased. However, this rule does not indicate how to assign costs to ending inventory and to cost of goods sold when the goods have been purchased at different unit costs. For example, suppose a retailer has three shirts on hand. One costs USD 20; another, USD 22; and a third, USD 24. If the retailer sells two shirts for USD 30 each, what is the cost of the two shirts sold?

Accountants developed these four inventory costing methods to solve costing problems: (1) specific identification; (2) first-in, first-out (FIFO); (3) last-in, first-out (LIFO); and (4) weighted-average. Before explaining the inventory costing methods, we briefly introduce perpetual inventory procedure and compare periodic and perpetual inventory procedures.

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In Chapter 6, the emphasis was on periodic inventory procedure. Under periodic inventory procedure, firms debit the Purchases account when goods are acquired; they use other accounts, such as Purchase Discounts, Purchase Returns and Allowances, and Transportation-In, for purchase-related transactions. Companies determine cost of goods sold only at the end of the period as the difference between cost of goods available for sale and ending inventory. They keep no records of the cost of items as they are sold, and have no information on possible inventory shortages. They assume any goods not in ending inventory have been sold.

Item	TV-96874	Maximum	26
Location		Minimum	6

2008 Date	Purchased			Sold			Balance		
	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost
Beg. inv.							8	\$300	\$2,400
July 5	10	\$300	\$3,000				18	300	5,400
7				12	\$300	\$3,600	6	300	1,800
12	10	315	3,150				6	300	1,800
22				6	300	1,800	10	315	3,150
				2	315	630			
24	8	320	2,560				8	315	2,520
								315	2,520
							8	320	2,560

Exhibit 48: Perpetual inventory record (FIFO method)

The availability of inventory management software packages is causing more and more businesses to change from periodic to perpetual inventory procedure. Under perpetual inventory procedure, companies have no Purchases and purchase-related accounts. Instead, they make all entries involving merchandise purchased for sale to customers directly in the Merchandise Inventory account. Thus, they debit or credit Merchandise Inventory in place of debiting or crediting Purchases, Purchase Discounts, Purchase Returns and Allowances, and Transportation-In. At the time of each sale, firms make two entries: the first debits Accounts Receivable or Cash and credits Sales at the retail selling price. The second debits Cost of Goods Sold and credits Merchandise Inventory at cost. Therefore, at the end of the period the Merchandise Inventory account shows the cost of the inventory that should be on hand. Comparison of this amount with the cost obtained by taking and pricing a physical inventory may reveal inventory shortages. Thus, perpetual inventory procedure is an important element in providing internal control over goods in inventory.

**Perpetual inventory records** Even though companies could apply perpetual inventory procedure manually, tracking units and dollars in and out of inventory is much easier using a computer. Both manual and computer processing maintain a record for each item in inventory. Look at Exhibit 48, an inventory record for Entertainment World, a firm that sells many different brands of television sets. This inventory record shows the information on one particular brand and model of television set carried in inventory. Other information on the record includes (1) the maximum and minimum number of units the company wishes to stock at any time, (2) when and how many units were acquired and at what cost, and (3) when and how many units were sold and what cost was assigned to cost of goods sold. The number of units on hand and their cost are readily available also. Entertainment World assumes that the first units acquired are the first units sold. This assumption is the first-in, first-out (FIFO) method of inventory costing; we will discuss it later.

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## An accounting perspective:

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### Uses of technology

Keeping track of inventories under a perpetual inventory system is much more cost-effective with computers. Under a manual system, the cost of an up-to-date inventory for stores with high turnover would outweigh the benefit. Most retail stores use scanning devices to read the inventory numbers of products purchased at the cash register. These bar codes not only provide accurate sales prices but also record the merchandise sold so that the total cost of the store's inventory is up to date.

The following comparison reveals several differences between accounting for inventories under periodic and perpetual procedures. We explain these differences by using data from Exhibit 48 and making additional assumptions. Later, we discuss other journal entries under perpetual inventory procedure.

These entries record the purchase on July 5 under each of the methods:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Purchases (+A)	3,000	Merchandise Inventory (+A)	3,000
Accounts Payable (+L)	3,000	Accounts Payable (+L)	3,000

Assuming the merchandise sold on July 7 was priced at USD 4,800, these entries record the sale:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Accounts Receivable (+A)	4,800	Accounts Receivable (+A)	4,800
Sales (+SE)	4,800	Sales (+SE)	4,800
		Cost of Goods Sold (-SE)	3,600
		Merchandise Inventory(-A)	3,600

Several other transactions not included in Exhibit 48 could occur:

- Assume that two of the units purchased on July 5 were returned to the supplier because they were defective.

The entries would be:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Accounts Payable	600	Accounts Payable	600
Purchase		Merchandise	
Returns and		Inventory	600
Allowances	600		

- Assume that the supplier instead granted an allowance of USD 600 to the company because of the defective merchandise. The entries would be:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Accounts Payable (-L)	600	Accounts Payable (-L)	600
Purchase		Merchandise	
Returns and		Inventory (-A)	600
Allowances (-A)	600		

- Assume that the company incurred and paid freight charges of USD 100 on the purchase of July 5. The entries would be:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Transportation-In (+A)	100	Merchandise Inventory	100
Cash (-A)	100	(+A)	100
		Cash (-A)	

In these entries, notice that under perpetual inventory procedure the Merchandise Inventory account records purchases, purchase returns and allowances, purchase discounts, and transportation-in. Also, when goods are sold, the seller debits (increases) Cost of Goods Sold and credits or reduces Merchandise Inventory.

At the end of the accounting period, under perpetual inventory procedure, the only merchandise-related expense account to be closed is Cost of Goods Sold. The Purchases, Purchase Returns and Allowances, Purchase Discounts, and Transportation-In accounts do not even exist.

Beginning Inventory and Purchases				Sales			
Date	Units	Unit Cost	Total Cost	Date	Units	Price	Total
Beginning inventory	10	\$8.00	\$ 80	March 10	10	\$12.00	\$120
March 2	10	8.50	85	July 14	20	12.00	240
May 28	20	8.40	168	September 7	10	14.00	140
August 12	10	9.00	90	November 22	20	14.00	280
October 12	20	8.80	176				
December 21	10	9.10	91				
	<u>80</u>		<u>\$690</u>		<u>60</u>		<u>\$780</u>

Ending inventory = 20 units, determined By taking a physical inventory.

Exhibit 49: Beginning inventory, purchases and sales

### An accounting perspective:

#### Business insight

When you buy a box of breakfast cereal at the supermarket, the cashier scans the bar code on the box. The name of the item and the price appear on a video display that you can see. The information is also printed on the sales slip so that you can later compare the items paid for with the items received. But this is not the end of the story. The information is also fed to the store's computer to update the inventory records. The information is included with other information and is used to order more merchandise from the warehouse so the items can be replenished in the store. At a certain point, the company also uses the reduced inventory levels to order more merchandise from suppliers, such as wholesalers that supply the region with breakfast cereals and other goods. The paperwork for the purchase and payment are often handled electronically through a process called electronic data interchange (EDI) and electronic funds transfer (EFT).

Using the data for purchases, sales, and beginning inventory in Exhibit 49, next we explain the four inventory costing methods. Except for the specific identification method, we first present all of the methods using periodic inventory procedure and then present all of the methods using perpetual inventory procedure. Total goods available for sale consist of 80 units with a total cost of USD 690. A physical inventory determined that 20 units are on hand at the end of the period. Sales revenue for the 60 units sold was USD 780. The questions to be answered are: What is the cost of the 20 units in inventory? What is the cost of the 60 units sold?

**Specific identification** The **specific identification method** of inventory costing attaches the actual cost to an identifiable unit of product. Firms find this method easy to apply when purchasing and selling large inventory items such as autos. Under the specific identification method, the firm must identify each unit in inventory, unless it is unique, with a serial number or identification tag.

To illustrate, assume that the company in Exhibit 49 can identify the 20 units on hand at year-end as 10 units from the August 12 purchase and 10 units from the December 21 purchase. The company computes the ending inventory as shown in Exhibit 50; it subtracts the USD 181 ending inventory cost from the USD 690 cost of goods



## 7. Measuring and reporting inventories

available for sale to obtain the USD 509 cost of goods sold. Note that you can also determine the cost of goods sold for the year by recording the cost of each unit sold. The USD 509 cost of goods sold is an expense on the income statement, and the USD 181 ending inventory is a current asset on the balance sheet.

The specific identification costing method attaches cost to an identifiable unit of inventory. The method does not involve any assumptions about the flow of the costs as in the other inventory costing methods. Conceptually, the method matches the cost to the physical flow of the inventory and eliminates the emphasis on the timing of the cost determination. Therefore, periodic and perpetual inventory procedures produce the same results for the specific identification method.

	Units	Unit Cost	Total Cost
Ending inventory composed of purchases made on:			
August 12	10	\$ 9.00	\$ 90
December 21	10	9.10	91
Ending inventory	20		\$181
Cost of goods sold composed of:			
Beginning inventory	10	8.00	\$ 80
Purchases made on:			
March 2	10	8.50	85
May 28	20	8.40	168
October 12	20	8.80	176
			\$509
Cost of goods available for sale			\$690
Ending inventory			181
Cost of goods sold			\$509

Exhibit 50: Determining ending inventory under specific identification

**FIFO (first-in, first-out) under periodic inventory procedure** The **FIFO (first-in, first-out)** method of inventory costing assumes that the costs of the first goods purchased are those charged to cost of goods sold when the company actually sells goods. This method assumes the first goods purchased are the first goods sold. In some companies, the first units in (bought) must be the first units out (sold) to avoid large losses from spoilage. Such items as fresh dairy products, fruits, and vegetables should be sold on a FIFO basis. In these cases, an assumed first-in, first-out flow corresponds with the actual physical flow of goods.

Because a company using FIFO assumes the older units are sold first and the newer units are still on hand, the ending inventory consists of the most recent purchases. When using periodic inventory procedure, to determine the cost of the ending inventory at the end of the period under FIFO, you would begin by listing the cost of the most recent purchase. If the ending inventory contains more units than acquired in the most recent purchase, it also includes units from the next-to-the-latest purchase at the unit cost incurred, and so on. You would list these units from the latest purchases until that number agrees with the units in the ending inventory.

In Exhibit 51, you can see how to determine the cost of ending inventory under FIFO using periodic inventory procedure. The company assumes that the 20 units in inventory consist of 10 units purchased December 21 and 10 units purchased October 12. The total cost of ending inventory is USD 179, and the cost of goods sold is USD 511.

We show the relationship between the cost of goods sold and the cost of ending inventory under FIFO using periodic inventory procedure in Exhibit 52. The 80 units in cost of goods available for sale consists of the beginning inventory and all of the purchases during the period. Under FIFO, the ending inventory of 20 units consists of the most recent purchases—10 units of the December 21 purchase and 10 units of the October 12 purchase—costing USD 179. We assume the beginning inventory and other earlier purchases have been sold during the period, representing the cost of goods sold of USD 511.

## 7. Measuring and reporting inventories

	Units	Unit Cost	Total Cost	
Ending inventory composed of purchases made on:				
December 21	10	\$9.10	\$ 91	
October 12	10	8.80	88	
Ending inventory	20		\$179	
Cost of goods sold composed of:				
Beginning inventory	10	8.00	\$ 80	
Purchases made on:				
March 2	10	8.50	85	
May 28	20	8.40	168	
August 12	10	9.00	90	
October 12	10	8.80	88	
			\$511	
Cost of goods available for sale				\$690
Ending inventory				179
Cost of goods sold				\$511

Exhibit 51: Determining FIFO cost of ending inventory under periodic inventory procedure

Illustration 7.9 FIFO Flow of Costs

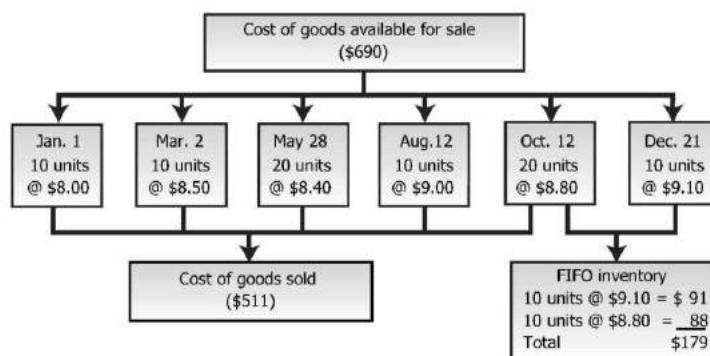


Exhibit 52: FIFO flow of costs

**LIFO (last-in, first-out) under periodic inventory procedure** The **LIFO (last-in, first-out)** method of inventory costing assumes that the costs of the most recent purchases are the first costs charged to cost of goods sold when the company actually sells the goods.

In Exhibit 53, we show the use of LIFO under periodic inventory procedure. Since the company charges the latest costs to cost of goods sold under periodic inventory procedure, the ending inventory always consists of the oldest costs. Therefore, when determining the cost of inventory under periodic inventory procedure, the company lists the oldest units and their costs. The first units listed are those in beginning inventory, then the first purchase, and so on, until the number listed agrees with the units in ending inventory. Thus, ending inventory in Exhibit 53 consists of the 10 units from beginning inventory and the 10 units purchased on March 2. The total cost of these 20 units, USD 165, is the ending inventory cost; the cost of goods sold is USD 525. Exhibit 54 is a graphic representation of the LIFO flow of costs under periodic inventory procedure.

	Units	Unit Cost	Total Cost
Ending inventory composed of:			
Beginning inventory	10	\$8.00	\$ 80
March 2 purchase	10	8.50	85
Ending inventory	20		\$165
Cost of goods sold composed of purchases made on:			
December 21	10	9.10	\$ 91
October 12	20	8.80	176
August 12	10	9.00	90
May 28	20	8.40	168
			\$525
Cost of goods available for sale			\$690
Ending inventory			165
Cost of goods sold			\$525

Exhibit 53: Determining LIFO cost of ending inventory under periodic inventory procedure

Illustration 7.11 LIFO Flow of Costs under Periodic Inventory Procedure

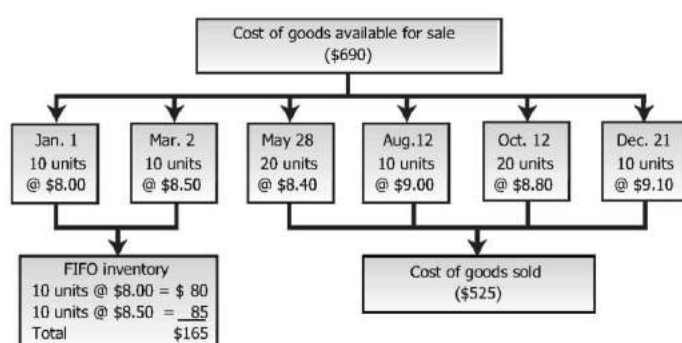


Exhibit 54: LIFO flow of costs under periodic inventory procedure

**Weighted-average under periodic inventory procedure** The **weighted-average method** of inventory costing is a means of costing ending inventory using a weighted-average unit cost. Companies most often use the weighted-average method to determine a cost for units that are basically the same, such as identical games in a toy store or identical electrical tools in a hardware store. Since the units are alike, firms can assign the same unit cost to them.

Under periodic inventory procedure, a company determines the average cost at the end of the accounting period by dividing the total units purchased plus those in beginning inventory into total cost of goods available for sale. The ending inventory is carried at this per unit cost. To see how a company uses the weighted-average method to determine inventory costs using periodic inventory procedure, look at Exhibit 55. Note that we compute weighted-average cost per unit by dividing the cost of units available for sale, USD 690, by the total number of units available for sale, 80. Thus, the weighted-average cost per unit is USD 8.625, meaning that each unit sold or remaining in inventory is valued at USD 8.625.

## 7. Measuring and reporting inventories

	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
Beginning inventory	10	\$8.00	\$ 80.00
<b>Purchases</b>			
March 2	10	8.50	85.00
May 28	20	8.40	168.00
August 12	10	9.00	90.00
October 12	20	8.80	176.00
December 21	10	9.10	91.00
Total	80		\$690.00
Weighted-average unit cost is \$690 / 80, or \$8.625			
Ending inventory then is \$8.625 x 20			172.50
Cost of goods sold: \$8.625 x 60			\$517.50

Exhibit 55: Determining ending inventory under weighted-average method using periodic inventory procedure

<b>Date</b>	<b>Purchased</b>		<b>Sold</b>			<b>Balance</b>			
	<b>Units</b>	<b>Unit Cost</b>	<b>Unit</b>	<b>Total Cost</b>	<b>Unit</b>	<b>Cost</b>	<b>Cost</b>		
Beg. inv.					10	\$8.00	80		
Mar. 2	10	\$8.50		\$85	10(A)	8.00	80		
					10	8.50	85		
Mar. 10			10	\$8.00	(A)\$80	10	8.50	85	
May 28	20	8.40		168		10(B)	8.50	85	Sales are assumed to be from the oldest units on hand
						20(C)	8.40	168	
July 14			10	8.50	(B)85				
			10	8.40	(C)85	10	8.40	84	
Aug. 12	10	9.00		90		10(D)	8.40	84	
						10	9.00	90	
Sept. 7			10	8.40	(D)84	10	9.00	90	
Oct. 12	20	8.80		176		10(E)	9.00	90	
						20(F)	8.80	176	
Nov. 22			10	9.00	(E)90				
			10	8.80	(F)88	10	8.80	88	
Dec 21	10	9.10		91		10	8.80	88	Total of \$179 would agree with balance already existing in Merchandise Inventory account.
						10	9.10	91	
Total cost of ending inventory =								\$179	

Exhibit 56: Determining FIFO cost of ending inventory under perpetual inventory procedure

**FIFO under perpetual inventory procedure** Under perpetual inventory procedure, the ending balance in the Merchandise Inventory account reflects the most recent purchases as a result of making the required entries during the period. Also, the firm has already recorded the cost of goods sold in the Cost of Goods Sold account. Exhibit 56 shows how to determine the cost of ending inventory under FIFO using perpetual inventory procedure. This illustration uses the same format as the earlier perpetual inventory record in Exhibit 48. The company keeps a record of the balance in the inventory account as it makes purchases and sells items from inventory.

Date	Purchased			Sold			Balance			
	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	
Beg. inv.								\$8.00	80	
Mar. 2	10	\$8.50	\$85				10	8.00	80	
							10	8.50	85	
Mar. 10				10	\$8.50	85	10	8.00	80	
May 28	20	8.40	168				10	8.00	80	Sales are assumed to be from most recent purchases
							20	8.40	168	
July 14				20	8.40	168	10	8.00	80	
Aug. 12	10	9.00	90				10	8.00	80	
							10	9.00	90	
Sept. 7				10	9.00	90	10	8.00	80	
Oct. 12	20	8.80	176				10	8.00	80	
							20	8.80	176	
Nov. 22				20	8.80	176	10	8.00	80	
Dec. 21	10	9.10	91				10	8.00	80	Total of \$171 would agree with balance already existing in Merchandise Inventory account.
							10	9.10	91	
Total cost of ending inventory =									\$171	

#### Exhibit 57: Determining LIFO cost of ending inventory under perpetual inventory procedure

Notice in Exhibit 56 that each time a sale occurs, the company assumes the items sold are the oldest on hand. Thus, after each transaction, it can readily determine the balance in the Merchandise Inventory account from the perpetual inventory record. The balance after the December 21 purchase represents the 20 units from the most recent purchases. The total cost of ending inventory is USD 179, which the company reports as a current asset on the balance sheet. During the accounting period, as sales occurred the firm would have debited a total of USD 511 to Cost of Goods Sold. Adding this USD 511 to the ending inventory of USD 179 accounts for the USD 690 cost of goods available for sale. Under FIFO, using either perpetual or periodic inventory procedures results in the same total amounts for ending inventory and for cost of goods sold.

**LIFO under perpetual inventory procedure** Look at Exhibit 57 to see the LIFO method using perpetual inventory procedure. Under this procedure, the inventory composition and balance are updated with each purchase and sale. Notice in Exhibit 57 that each time a sale occurs, the items sold are assumed to be the most recent ones acquired. Despite numerous purchases and sales during the year, the ending inventory still includes the 10 units from beginning inventory in our example. The remainder of the ending inventory consists of the last purchase because no sale occurred after the December 21 purchase. The total cost of the 20 units in ending inventory is USD 171; the cost of goods sold is USD 519. Exhibit 58 shows graphically the LIFO flow of costs under perpetual inventory procedure.

Applying LIFO on a perpetual basis during the accounting period, as shown in Exhibit 57, results in different ending inventory and cost of goods sold figures than applying LIFO only at year-end using periodic inventory procedure. (Compare Exhibit 57 and Exhibit 53 to verify that ending inventory and cost of goods sold are different under the two procedures.) For this reason, if LIFO is applied on a perpetual basis during the period, special adjustments are sometimes necessary at year-end to take full advantage of using LIFO for tax purposes.

## 7. Measuring and reporting inventories

Complicated applications of LIFO perpetual inventory procedures that require such adjustments are beyond the scope of this text.

**Illustration 7.15** LIFO Flow of Costs under Perpetual Inventory Procedure

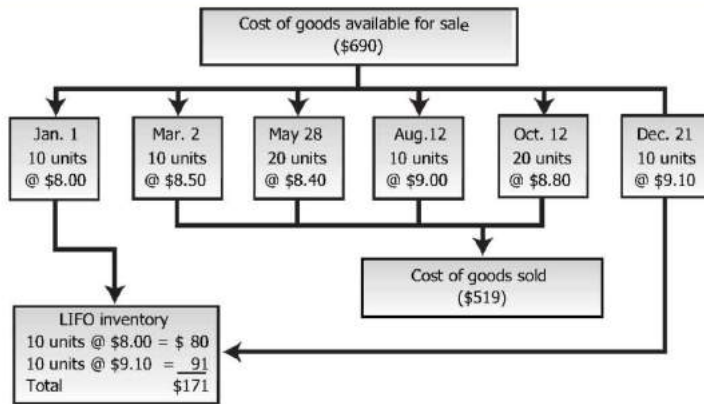


Exhibit 58: LIFO flow of costs under perpetual inventory procedure

Date	Purchased			Sold			Balance		
	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost
Beg. inv.							10	\$8.00	80.00
Mar. 2	10	\$8.50	\$85				20	8.25 <sup>a</sup>	165.00
Mar. 10				10	\$8.25 <sup>b</sup>	\$82.50	10	8.25	82.80
May 28	20	8.40	168				30	8.35 <sup>b</sup>	250.50
July 14				20	8.35	167.00	10	8.35	83.50
Aug. 12	10	9.00	90				20	8.675 <sup>c</sup>	173.50
Sept. 7				10	8.675	86.75	10	8.675	86.75
Oct. 12	20	8.80	176				30	8.758 <sup>c</sup>	262.75
Nov. 22					8.758	175.17	10	8.758	87.58
Dec 21	10	9.10	91				20	\$8.929 <sup>e</sup>	\$178.58 <sup>c</sup>

<sup>a</sup>\$165.00/2 = \$8.25. <sup>b</sup>\$250.50/30 = \$8.35. <sup>c</sup>\$173.50/20 = \$8.675. <sup>d</sup>\$262.75/30 = \$8.758.  
<sup>e</sup>\$175.58/20 = \$8.929 \* rounding difference.

<sup>a</sup> A new unit cost is calculated after each purchase. <sup>b</sup>The unit cost of sales is the most recently calculated cost. <sup>c</sup> Balance of \$178.58 would agree with balance already existing in the Merchandise Inventory account.

Exhibit 59: Determining ending inventory under weighted-average method using perpetual inventory procedure

Look at Exhibit 58 and Exhibit 54, the flow of inventory costs under LIFO using both the perpetual and periodic inventory procedures. Note that ending inventory and cost of goods sold are different under the two procedures.

**Weighted-average under perpetual inventory procedure** Under perpetual inventory procedure, firms compute a new weighted-average unit cost after each purchase by dividing total cost of goods available for sale by total units available for sale. The unit cost is a moving weighted-average because it changes after each purchase. In Exhibit 59, you can see how to compute the moving weighted-average using perpetual inventory procedure. The new weighted-average unit cost computed after each purchase is the unit cost for inventory items sold until a new purchase is made. The unit cost of the 20 units in ending inventory is USD 8.929 for a total inventory cost of USD 178.58. Cost of goods sold under this procedure is USD 690 minus the USD 178.58, or USD 511.42.

**Advantages and disadvantages of specific identification** Companies that use the specific identification method of inventory costing state their cost of goods sold and ending inventory at the actual cost of specific units sold and on hand. Some accountants argue that this method provides the most precise matching of costs and revenues and is, therefore, the most theoretically sound method. This statement is true for some one-of-a-kind items, such as autos or real estate. For these items, use of any other method would seem illogical.

One disadvantage of the specific identification method is that it permits the manipulation of income. For example, assume that a company bought three identical units of a given product at different prices. One unit cost USD 2,000, the second cost USD 2,100, and the third cost USD 2,200. The company sold one unit for USD 2,800. The units are alike, so the customer does not care which of the identical units the company ships. However, the gross margin on the sale could be either USD 800, USD 700, or USD 600, depending on which unit the company ships.

**Advantages and disadvantages of FIFO** The FIFO method has four major advantages: (1) it is easy to apply, (2) the assumed flow of costs corresponds with the normal physical flow of goods, (3) no manipulation of



## 7. Measuring and reporting inventories

income is possible, and (4) the balance sheet amount for inventory is likely to approximate the current market value. All the advantages of FIFO occur because when a company sells goods, the first costs it removes from inventory are the oldest unit costs. A company cannot manipulate income by choosing which unit to ship because the cost of a unit sold is not determined by a serial number. Instead, the cost attached to the unit sold is always the oldest cost. Under FIFO, purchases at the end of the period have no effect on cost of goods sold or net income.

The disadvantages of FIFO include (1) the recognition of paper profits and (2) a heavier tax burden if used for tax purposes in periods of inflation. We discuss these disadvantages later as advantages of LIFO.

**Advantages and disadvantages of LIFO** The advantages of the LIFO method are based on the fact that prices have risen almost constantly for decades. LIFO supporters claim this upward trend in prices leads to inventory, or paper, profits if the FIFO method is used. **Inventory, or paper, profits** are equal to the current replacement cost of a unit of inventory at the time of sale minus the unit's historical cost.

For example, assume a company has three units of a product on hand, each purchased at a different cost: USD 12, USD 15, and USD 20 (the most recent cost). The sales price of the unit normally rises because the unit's replacement cost is rising. Assume that the company sells one unit for USD 30. FIFO gross margin would be USD 18 (USD 30 – USD 12), while LIFO would show a gross margin of USD 10 (USD 30 – USD 20). LIFO supporters would say that the extra USD 8 gross margin shown under FIFO represents inventory (paper) profit; it is merely the additional amount that the company must spend over cost of goods sold to purchase another unit of inventory (USD 8 + USD 12 = USD 20). Thus, the profit is not real; it exists only on paper. The company cannot distribute the USD 8 to owners, but must retain it to continue handling that particular product. LIFO shows the actual profits that the company can distribute to the owners while still replenishing inventory.

During periods of inflation, LIFO shows the largest cost of goods sold of any of the costing methods because the newest costs charged to cost of goods sold are also the highest costs. The larger the cost of goods sold, the smaller the net income.

Those who favor LIFO argue that its use leads to a better matching of costs and revenues than the other methods. When a company uses LIFO, the income statement reports both sales revenue and cost of goods sold in current dollars. The resulting gross margin is a better indicator of management's ability to generate income than gross margin computed using FIFO, which may include substantial inventory (paper) profits.

Supporters of FIFO argue that LIFO (1) matches the cost of goods not sold against revenues, (2) grossly understates inventory, and (3) permits income manipulation.

The first criticism—that LIFO matches the cost of goods not sold against revenues—is an extension of the debate over whether the assumed flow of costs should agree with the physical flow of goods. LIFO supporters contend that it makes more sense to match current costs against current revenues than to worry about matching costs for the physical flow of goods.

The second criticism—that LIFO grossly understates inventory—is valid. A company may report LIFO inventory at a fraction of its current replacement cost, especially if the historical costs are from several decades ago. LIFO supporters contend that the increased usefulness of the income statement more than offsets the negative effect of this undervaluation of inventory on the balance sheet.

The third criticism—that LIFO permits income manipulation—is also valid. Income manipulation is possible under LIFO. For example, assume that management wishes to reduce income. The company could purchase an abnormal amount of goods at current high prices near the end of the current period, with the purpose of selling the

goods in the next period. Under LIFO, these higher costs are charged to cost of goods sold in the current period, resulting in a substantial decline in reported net income. To obtain higher income, management could delay making the normal amount of purchases until the next period and thus include some of the older, lower costs in cost of goods sold.

**Tax benefit of LIFO** The LIFO method results in the lowest taxable income, and thus the lowest income taxes, when prices are rising. The Internal Revenue Service allows companies to use LIFO for tax purposes only if they use LIFO for financial reporting purposes. Companies may also report an alternative inventory amount in the notes to their financial statements for comparison purposes. Because of high inflation during the 1970s, many companies switched from FIFO to LIFO for tax advantages.

**Advantages and disadvantages of weighted-average** When a company uses the weighted-average method and prices are rising, its cost of goods sold is less than that obtained under LIFO, but more than that obtained under FIFO. Inventory is not as badly understated as under LIFO, but it is not as up-to-date as under FIFO. Weighted-average costing takes a middle-of-the-road approach. A company can manipulate income under the weighted-average costing method by buying or failing to buy goods near year-end. However, the averaging process reduces the effects of buying or not buying.

The four inventory costing methods, specific identification, FIFO, LIFO, and weighted-average, involve assumptions about how costs flow through a business. In some instances, assumed cost flows may correspond with the actual physical flow of goods. For example, fresh meats and dairy products must flow in a FIFO manner to avoid spoilage losses. In contrast, firms use coal stacked in a pile in a LIFO manner because the newest units purchased are unloaded on top of the pile and sold first. Gasoline held in a tank is a good example of an inventory that has an average physical flow. As the tank is refilled, the new gasoline mixes with the old. Thus, any amount used is a blend of the old gas with the new.

Although physical flows are sometimes cited as support for an inventory method, accountants now recognize that an inventory method's assumed cost flows need not necessarily correspond with the actual physical flow of the goods. In fact, good reasons exist for simply ignoring physical flows and choosing an inventory method based on other criteria.

In Exhibit 60 and Exhibit 61, we use data from Exhibit 49 to show the cost of goods sold, inventory cost, and gross margin for each of the four basic costing methods using perpetual and periodic inventory procedures. The differences for the four methods occur because the company paid different prices for goods purchased. No differences would occur if purchase prices were constant. Since a company's purchase prices are seldom constant, inventory costing method affects cost of goods sold, inventory cost, gross margin, and net income. Therefore, companies must disclose on their financial statements which inventory costing methods were used.

**Which is the correct method?** All four methods of inventory costing are acceptable; no single method is the only correct method. Different methods are attractive under different conditions.

If a company wants to match sales revenue with current cost of goods sold, it would use LIFO. If a company seeks to reduce its income taxes in a period of rising prices, it would also use LIFO. On the other hand, LIFO often charges against revenues the cost of goods not actually sold. Also, LIFO may allow the company to manipulate net income by changing the timing of additional purchases.

The FIFO and specific identification methods result in a more precise matching of historical cost with revenue. However, FIFO can give rise to paper profits, while specific identification can give rise to income manipulation. The

## 7. Measuring and reporting inventories

weighted-average method also allows manipulation of income. Only under FIFO is the manipulation of net income not possible.

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### An accounting perspective:

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#### Business insight

Management decides which inventory costing method or methods (LIFO, FIFO, etc.) to use. Also, management must determine which method is the most meaningful and useful in representing economic results. Then, it must use the selected method consistently.

The principal business of Kellwood Company is the marketing, merchandising, and manufacturing of apparel, primarily for women. Note in the following footnote from Kellwood's financial statements that it, like other companies, uses several costing methods within the same enterprise:

Summary of significant accounting policies

#### **3. Inventories and revenue recognition**

*Inventories are stated at the lower of cost or market. The first-in, first-out (FIFO) method is used to determine the value of 46 per cent of the domestic inventories, and the last-in, first-out (LIFO) method is used to value the remaining domestic inventories. Inventories of foreign subsidiaries are valued using the specific identification method. Sales are recognized when goods are shipped.*

Generally, companies use the inventory method that best fits their individual circumstances. However, this freedom of choice does not include changing inventory methods every year or so, especially if the goal is to report higher income. Continuous switching of methods violates the accounting principle of consistency, which requires using the same accounting methods from period to period in preparing financial statements. Consistency of methods in preparing financial statements enables financial statement users to compare statements of a company from period to period and determine trends.

	Specific		Weighted	
	Identification	FIFO	LIFO	Average
Sales	\$780.00	\$780.00	\$780.00	\$780.00
Cost of goods sold:				
Beginning inventory	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00
Purchases	610.00	610.00	610.00	610.00
Cost of goods available for sale	\$690.00	\$690.00	\$690.00	\$690.00
Ending inventory	181.00	179.00	171.00	178.58
Cost of goods sold	\$509.00	\$511.00	\$519.00	\$511.42
Gross Margin	\$271.00	\$269.00	\$261.00	\$268.58

Exhibit 60: Effects of different inventory costing methods using perpetual inventory procedure

	Specific		Weighted-	
	Identification	FIFO	LIFO	Average
Sales	\$780.00	\$780.00	\$780.00	\$780.00
Cost of goods sold:				
Beginning inventory	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00
Purchases	610.00	610.00	610.00	610.00
Cost of goods available for sale	\$690.00	\$690.00	\$690.00	\$690.00
Ending inventory	181.00	179.00	165.00	172.50
Cost of goods sold	\$509.00	\$511.00	\$525.00	\$517.50
Gross Margin	\$271.00	\$269.00	\$255.00	\$262.50

Exhibit 61: Effects of different inventory costing methods using periodic inventory procedure

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### An accounting perspective:

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#### Business insight

Sometimes, companies change inventory methods in spite of the principle of consistency. Improved financial reporting is the only justification for a change in inventory method. A company that changes its inventory method must make a full disclosure of the change. Usually, the company makes a full disclosure in a footnote to the financial statements. The footnote consists of a complete description of the change, the reasons why the change was made, and, if possible, the effect of the change on net income.

J. M. Tull Industries, Inc., sells a diverse range of metals (aluminum, brass, copper, steel, stainless steel, and nickel alloys) for severe corrosion conditions and high-temperature applications. For example, when J. M. Tull changed from lower of average cost or market to LIFO, the following footnote appeared in its annual report:

**Note B. Change in accounting method for inventory**

*The company changed its method of determining inventory cost from the lower of average cost or market method to the last-in, first-out (LIFO) method for substantially all inventory. This change was made because management believes LIFO more clearly reflects income by providing a closer matching of current cost against current revenue.*

Now we illustrate in more detail the journal entries made when using perpetual inventory procedure. Data from Exhibit 56 serves as the basis for some of the entries.

You would debit the Merchandise Inventory account to record the increases in the asset due to purchase costs and transportation-in costs. You would credit Merchandise Inventory to record the decreases in the asset brought about by purchase returns and allowances, purchase discounts, and cost of goods sold to customers. The balance in

## 7. Measuring and reporting inventories

the account is the cost of the inventory that should be on hand at any date. This entry records the purchase of 10 units on March 2 in Exhibit 56:

Mar.	2	Merchandise Inventory (+A)	85	
		Accounts Payable (+L)		85
		To record purchases of 10 units at \$8.50 on account.		

You would also record the 10 units sold on the perpetual inventory record in Exhibit 56. Perpetual inventory procedure requires two journal entries for each sale. One entry is at selling price—a debit to Accounts Receivable (or Cash) and a credit to Sales. The other entry is at cost—a debit to Cost of Goods Sold and a credit to Merchandise Inventory. Assuming that the 10 units sold on March 10 in Exhibit 56 had a retail price of USD 13 each, you would record the following entries:

Mar.	10	Accounts Receivable (+A)	130	
		Sales (+SE)		130
		To record 10 units sold at \$13 each on account.		
	10	Cost of Goods Sold (-SE)	80	
		Merchandise Inventory (-A)		80
		To record cost of \$8 on each of the 10 units sold.		

When a company sells merchandise to customers, it transfers the cost of the merchandise from an asset account (Merchandise Inventory) to an expense account (Cost of Goods Sold). The company makes this transfer because the sale reduces the asset, and the cost of the goods sold is one of the expenses of making the sale. Thus, the Cost of Goods Sold account accumulates the cost of all the merchandise that the company sells during a period.

A sales return also requires two entries, one at selling price and one at cost. Assume that a customer returned merchandise that cost USD 20 and originally sold for USD 32. The entry to reduce the accounts receivable and to record the sales return of USD 32 is:

Mar.	17	Sales Return and Allowances (-SE)	32	
		Accounts Receivable (-A)		32
		To record the reduction in amount owed by a customer upon return of goods.		

The entry that increases the Merchandise Inventory account and decreases the Cost of Goods Sold account by USD 20 is as follows:

Mar.	17	Merchandise Inventory (+A)	20	
		Cost of Goods Sold (+SE)		20
		To record replacement of goods returned to inventory.		

Sales returns affect both revenues and cost of goods sold because the goods charged to cost of goods sold are actually returned to the seller. In contrast, sales allowances granted to customers affect only revenues because the customers do not have to return goods. Thus, if the company had granted a sales allowance of USD 32 on March 17, only the first entry would be required.

The balance of the Merchandise Inventory account is the cost of the inventory that should be on hand. This fact is a major reason some companies choose to use perpetual inventory procedure. The cost of inventory that should be on hand is readily available. A physical inventory determines the accuracy of the account balance. Management may investigate any major discrepancies between the balance in the account and the cost based on the physical count. It thereby achieves greater control over inventory. When a shortage is discovered, an adjusting entry is required. Assuming a USD 15 shortage (at cost) is discovered, the entry is:

Dec.	31	Loss from Inventory Shortage (-SE)	15	
		Merchandise Inventory (-A)		15
		To record inventory shortage		

Assume that the Cost of Goods Sold account had a balance of USD 200,000 by year-end when it is closed to Income Summary. There are no other purchase-related accounts to be closed. The entry to close the Cost of Goods Sold account is:

Dec. 31	Income Summary	200,000	
	Cost of Goods Sold		200,000
	To close Cost of Goods Sold account to Income Summary at the end of the year.		

## Departures from cost basis of inventory measurement

Generally, companies should use historical cost to value inventories and cost of goods sold. However, some circumstances justify departures from historical cost. One of these circumstances is when the utility or value of inventory items is less than their cost. A decline in the selling price of the goods or their replacement cost may indicate such a loss of utility. This section explains how accountants handle some of these departures from the cost basis of inventory measurement.

Companies should not carry goods in inventory at more than their net realizable value. **Net realizable value** is the estimated selling price of an item less the estimated costs that the company incurs in preparing the item for sale and selling it. Damaged, obsolete, or shopworn goods often have a net realizable value lower than their historical cost and must be written down to their net realizable value. However, goods do not have to be damaged, obsolete, or shopworn for this situation to occur. Technological changes and increased competition have caused significant reductions in selling prices for such products as computers, TVs, DVD players, and digital cameras.

To illustrate a necessary write-down in the cost of inventory, assume that an automobile dealer has a demonstrator on hand. The dealer acquired the auto at a cost of USD 18,000. The auto had an original selling price of USD 19,600. Since the dealer used the auto as a demonstrator and the new models are coming in, the auto now has an estimated selling price of only USD 18,100. However, the dealer can get the USD 18,100 only if the demonstrator receives some scheduled maintenance, including a tune-up and some paint damage repairs. This work and the sales commission cost USD 300. The net realizable value of the demonstrator, then, is USD 17,800 (selling price of USD 18,100 less costs of USD 300). For inventory purposes, the required journal entry is:

Loss Due to the Decline in Market Value of Inventory (-SE)	200	
Merchandise Inventory (-A)		200
To write down inventory to net realizable value (\$18,000 - \$17,800)		

This entry treats the USD 200 inventory decline as a loss in the period in which the decline in utility occurred. Such an entry is necessary only when the net realizable value is less than cost. If net realizable value declines but still exceeds cost, the dealer would continue to carry the item at cost.

The **lower-of-cost-or-market (LCM) method** is an inventory costing method that values inventory at the lower of its historical cost or its current market (replacement) cost. The term cost refers to historical cost of inventory as determined under the specific identification, FIFO, LIFO, or weighted-average inventory method. Market generally refers to a merchandise item's replacement cost in the quantity usually purchased. The basic assumption of the LCM method is that if the purchase price of an item has fallen, its selling price also has fallen or will fall. The LCM method has long been accepted in accounting.

Under LCM, inventory items are written down to market value when the market value is less than the cost of the items. For example, assume that the market value of the inventory is USD 39,600 and its cost is USD 40,000. Then, the company would record a USD 400 loss because the inventory has lost some of its revenue-generating ability.

## 7. Measuring and reporting inventories

The company must recognize the loss in the period the loss occurred. On the other hand, if ending inventory has a market value of USD 45,000 and a cost of USD 40,000, the company would not recognize this increase in value. To do so would recognize revenue before the time of sale.

**LCM applied** A company may apply LCM to each inventory item (such as Monopoly), each inventory class (such as games), or total inventory. To see how the company would apply the method to individual items and total inventory, look at Exhibit 62.

If LCM is applied on an item-by-item basis, ending inventory would be USD 5,000. The company would deduct the USD 5,000 ending inventory from cost of goods available for sale on the income statement and report this inventory in the current assets section of the balance sheet. Under the class method, a company applies LCM to the total cost and total market for each class of items compared. One class might be games; another might be toys. Then, the company values each class at the lower of its cost or market amount. If LCM is applied on a total inventory basis, ending inventory would be USD 5,100, since total cost of USD 5,100 is lower than total market of USD 5,150.

An annual report of Du Pont contains an actual example of applying LCM. The report states that "substantially all inventories are valued at cost as determined by the last-in, first-out (LIFO) method; in the aggregate, such valuations are not in excess of market". The term in the aggregate means that Du Pont applied LCM to total inventory.

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### An accounting perspective:

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#### Business insight

Procter & Gamble markets a broad range of laundry, cleaning, paper, beauty care, health care, food, and beverage products around the world. Procter & Gamble's footnote in its Notes to Consolidated Financial Statements in its annual report illustrates that companies often disclose LCM in their notes to financial statements.

*Inventories are valued at cost, which is not in excess of current market price. Cost is primarily determined by either the average cost or the first-in, first-out method. The replacement cost of last-in, first-out inventories exceeds carrying value by approximately USD 169 [million].*

Item	Quantity	Unit Cost	Unit Market	Total Cost	Total Market	LCM on Item-by-Item Basis
1	100 units	\$10	\$9.00	\$1,000	\$ 900	\$ 900
2	200 units	8	8.75	1,600	1,750	1,600
3	500 units	5	5.00	2,500	2,500	2,500
				\$5,100	\$5,150	\$5,000

Exhibit 62: Application of lower-of-cost-or-market method

Merchandise inventory, 2010 January	\$ 40,000
Net cost of purchases	480,000
Cost of goods available for sale	\$520,000
Less estimated cost of goods sold:	
Net sales	\$700,000
Gross margin (30% of \$700,000)	210,000
Estimated cost of goods sold	490,000
Estimated inventory, 2010 December 31	\$ 30,000

Exhibit 63: Inventory estimation using gross margin method

A company using periodic inventory procedure may estimate its inventory for any of the following reasons:

- To obtain an inventory cost for use in monthly or quarterly financial statements without taking a physical inventory. The effort of taking a physical inventory can be very expensive and disrupts normal business operations; once a year is often enough.
- To compare with physical inventories to determine whether shortages exist.
- To determine the amount recoverable from an insurance company when fire has destroyed inventory or the inventory has been stolen.

Next, we introduce two recognized methods of estimating the cost of ending inventory when a company has not taken a physical inventory—the gross margin method and the retail inventory method.

**Gross margin method** The steps in calculating ending inventory under the gross margin method are:

- Estimate gross margin (based on net sales) using the same gross margin rate experienced in prior accounting periods.
- Determine estimated cost of goods sold by deducting estimated gross margin from net sales.
- Determine estimated ending inventory by deducting estimated cost of goods sold from cost of goods available for sale.

Thus, the **gross margin method** estimates ending inventory by deducting estimated cost of goods sold from cost of goods available for sale.

The gross margin method assumes that a fairly stable relationship exists between gross margin and net sales. In other words, gross margin has been a fairly constant percentage of net sales, and this relationship has continued into the current period. If this percentage relationship has changed, the gross margin method does not yield satisfactory results.

To illustrate the gross margin method of computing inventory, assume that for several years Field Company has maintained a 30 per cent gross margin on net sales. The following data for 2010 are available: The January 1 inventory was USD 40,000; net cost of purchases of merchandise was USD 480,000; and net sales of merchandise were USD 700,000. As shown in Exhibit 63, Field can estimate the inventory for 2010 December 31, by deducting the estimated cost of goods sold from the actual cost of goods available for sale.



## 7. Measuring and reporting inventories

An alternative format for calculating estimated ending inventory uses the standard income statement format and solves for the one unknown (ending inventory):

Net sales		\$700,000	
Less cost of goods sold:			
Merchandise inventory, 2010 January 1	\$ 40,000		
Net cost of purchases	480,000		
Cost of goods available for sale	\$520,000		
Less estimated inventory, 2010 December 31			
Estimated cost of goods sold	490,000	(70% of net sales)	
Estimated gross margin	\$210,000	(30% of net sales)	

We know that:

Costs of goods available for sale – Ending inventory = Cost of goods sold

Therefore (let X = Ending inventory):

USD 520,000 - X = USD 490,000

X = USD 30,000

The gross margin method is not precise enough to be used for year-end financial statements. At year-end, a physical inventory must be taken and valued by either the specific identification, FIFO, LIFO, or weighted-average methods.

**Retail inventory method** Retail stores frequently use the retail inventory method to estimate ending inventory at times other than year-end. Taking a physical inventory during an accounting period (such as monthly or quarterly) is too time consuming and significantly interferes with business operations. The **retail inventory method** estimates the cost of the ending inventory by applying a cost/retail price ratio to ending inventory stated at retail prices. The advantage of this method is that companies can estimate ending inventory (at cost) without taking a physical inventory. Thus, the use of this estimate permits the preparation of interim financial statements (monthly or quarterly) without taking a physical inventory. The steps for finding the ending inventory by the retail inventory method are:

- Total the beginning inventory and the net amount of goods purchased during the period at both cost and retail prices.
- Divide the cost of goods available for sale by the retail price of the goods available for sale to find the cost/retail price ratio.
- Deduct the retail sales from the retail price of the goods available for sale to determine ending inventory at retail.
- Multiply the cost/retail price ratio or percentage by the ending inventory at retail prices to reduce it to the ending inventory at cost.

	<b>Cost</b>	<b>Retail</b>
Merchandise inventory, 2010 January 1	\$ 22,000	\$ 40,000
Purchases	182,000	303,000
Purchase returns	(2,000)	(3,000)
Purchase allowances	(3,000)	
Transportation-in	5,000	
Goods available for sale	\$204,000	\$340,000
Cost/retail price ratio: \$204,000/\$340,000=60%		
Sales		280,000
Ending inventory at retail prices		\$ 60,000
Times cost/retail price ratio		x 60%
Ending inventory at cost, 2010 March 31	\$ 36,000	

#### Exhibit 64: Inventory estimation

In Exhibit 64, we show the retail inventory method. In the exhibit, the cost (USD 22,000) and retail (USD 40,000) amounts for beginning inventory are available from the preceding period's computation. The amounts for the first quarter purchases, purchase returns, purchase allowances, and transportation-in came from the accounting records. The amounts for purchase allowances and transportation-in appear only in the cost column. The first quarter sales amount (USD 280,000) is from the Sales account and stated at retail (sales) prices. The difference between what was available for sale at retail prices and what was sold at retail prices (which is sales) equals what should be on hand (March 31 inventory of USD 60,000) expressed in retail prices. The retail price of the March 31 inventory needs to be converted into cost for use in the financial statements. We do this by multiplying it times the cost/retail price ratio. In the example, the cost/retail price ratio is 60 per cent, which means that on the average, 60 cents of each sales dollar is cost of goods sold. To find the 2010 March 31, inventory at cost (USD 36,000), we multiplied the ending inventory at retail (USD 60,000) by 60 per cent.

Once the March 31 inventory has been estimated at cost (USD 36,000), we deduct the cost of the inventory from cost of goods available for sale (USD 204,000) to determine cost of goods sold (USD 168,000). We can also find the cost of goods sold by multiplying the cost/retail price ratio of 60 per cent by sales of USD 280,000.

For the next quarterly period, the USD 36,000 and USD 60,000 amounts would appear on the schedule as beginning inventory at cost and retail, respectively. We would include other quarterly data regarding purchases, purchase returns, purchase allowances, and transportation-in to determine goods available for sale at cost and at retail. From these amounts, we could compute a new cost/retail price ratio for the second quarter.

At the end of each year, merchandisers usually take a physical inventory at retail prices. Since the retail prices are on the individual items (while the cost is not), taking an inventory at retail prices is more convenient than taking an inventory at cost. Accountants can then compare the results of the physical inventory to the calculation of inventory at retail under the retail inventory method for the fourth quarter to determine whether a shortage exists.

Both the gross margin and the retail inventory methods can help you detect inventory shortages. To illustrate how you can determine inventory shortages using the retail method, assume that a physical inventory taken at year end, showed only USD 62,000 of retail-priced goods in the store. Assume that use of the retail method for the fourth quarter showed that USD 66,000 of goods should be on hand, thus indicating a USD 4,000 inventory shortage at retail. After converting the USD 4,000 to USD 2,400 of cost (USD 4,000 X 0.60) you would report this as a "Loss from inventory shortage" in the income statement. Knowledge of such shortages may lead management to reduce or prevent them, by increasing security or improving the training of employees.

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**An ethical perspective:  
Dorsey hardware**

Terry Dorsey started Dorsey Hardware, a small hardware store, two years ago and has struggled to make it successful. The first year of operations resulted in a substantial loss; in the second year, there was a small net income. His initial cash investment was almost depleted because he had to withdraw money for living expenses. The current year of operations looked much better. His customer base was growing and seemed to be loyal. To increase sales, however, Terry had to invest his remaining funds and the proceeds of a USD 40,000 bank loan into doubling the size of his inventory and purchasing some new display shelves and a new truck.

At the end of the third year, Terry's accountant asked him for his ending inventory figure and later told him that initial estimates indicated that net income (and taxable income) for the year would be approximately USD 80,000. Terry was delighted until he learned that the federal income taxes on that income would be about USD 17,250. He told the accountant that he did not have enough cash to pay the taxes and could not even borrow it, since he already had an outstanding loan at the bank. Terry asked the accountant for a copy of the income statement figures so he could see if any items had been overlooked that might reduce his net income. He noticed that ending inventory of USD 160,000 had been deducted from cost of goods available for sale of USD 640,000 to arrive at cost of goods sold of USD 480,000. Net sales of USD 720,000 and expenses of USD 160,000 could not be changed. But Terry hit on a scheme to reduce his net income. The next day he told his accountant that he had made an error in determining ending inventory and that its correct amount was USD 120,000. This lower inventory amount would increase cost of goods sold by USD 40,000 and reduce net income by that same amount. The resulting income taxes would be about USD 6,000, which was just about what Terry had paid in estimated taxes.

To justify his action in his own mind, Terry used the following arguments: (1) federal taxes are too high, and the federal government seems to be taxing the little guy out of existence; (2) no harm is really done because, when the business becomes more profitable, I will use correct inventory amounts, and this loan from the government will be paid back; (3) since I am the only one who knows the correct ending inventory I will not get caught; and (4) I bet a lot of other people do the same thing.

### **Analyzing and using financial results—inventory turnover ratio**

An important ratio for managers, investors, and creditors to consider when analyzing a company's inventory is the inventory turnover ratio. This ratio tests whether a company is generating a sufficient volume of business based on its inventory. To calculate the **inventory turnover ratio**:

$$\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

Inventory turnover measures the efficiency of the firm in managing and selling inventory: thus, it gauges the liquidity of the firm's inventory. A high inventory turnover is generally a sign of efficient inventory management and profit for the firm; the faster inventory sells, the less time funds are tied up in inventory. A relatively low

turnover could be the result of a company carrying too much inventory or stocking inventory that is obsolete, slow-moving, or inferior.

In assessing inventory turnover, analysts also consider the type of industry. When making comparisons among firms, they check the cost-flow assumption used to value inventory and cost of products sold.

Abercrombie & Fitch reported the following financial data for 2000 (in thousands):

Cost of goods sold.....	\$728,229
Beginning inventory.....	75,262
Ending inventory.....	120,997

Their inventory turnover is:

$$\text{USD } 728,229 / [(\text{USD } 75,262 + \text{USD } 120,997) / 2] = 7.4 \text{ times}$$

You should now understand the importance of taking an accurate physical inventory and knowing how to value this inventory. In the next chapter, you will learn the general principles of internal control and how to control cash. Cash is one of a company's most important and mobile assets.

### Understanding the learning objectives

- Net income for an accounting period depends directly on the valuation of ending inventory.
- If ending inventory is overstated, cost of goods sold is understated, resulting in an overstatement of gross margin, net income, and retained earnings.
- When ending inventory is misstated in the current year, companies carry that misstatement forward into the next year.
- An error in the net income of one year caused by misstated ending inventory automatically causes an error in net income in the opposite direction in the next period because of the misstated beginning inventory.
- Inventory cost includes all necessary outlays to obtain the goods, get the goods ready to sell, and have the goods in the desired location for sale to customers.
- Inventory cost includes:
  - a. Seller's gross selling price less purchase discount.
  - b. Cost of insurance on the goods while in transit.
  - c. Transportation charges when borne by the buyer.
  - d. Handling costs, such as the cost of pressing clothes wrinkled during shipment.
- **Specific identification:** Attaches actual cost of each unit of product to units in ending inventory and cost of goods sold. Specific identification creates precise matching in determining net income.
- **FIFO (first-in, first-out):** Ending inventory consists of the most recent purchases. FIFO assumes that the costs of the first goods purchased are those charged to cost of goods sold when goods are sold. During periods of rising prices, FIFO creates higher net income since the costs charged to cost of goods sold are lower.
- **LIFO (last-in, first-out):** Ending inventory consists of the oldest costs. LIFO assumes that the costs of the most recent purchases are the first costs charged to cost of goods sold. Net income is usually lower under LIFO since the costs charged to cost of goods sold are higher due to inflation. The ending inventory may differ between perpetual and periodic inventory procedures.
- **Weighted-average:** Ending inventory is priced using a weighted-average unit cost. Under perpetual inventory procedure, a new weighted-average is determined after each purchase. Under periodic procedure, the average is determined at the end of the accounting period by dividing the total number of units purchased plus those in beginning inventory into total cost of goods available for sale. In determining cost of goods sold,

## 7. Measuring and reporting inventories

this average unit cost is applied to each item. Under the weighted-average method, in a period of rising prices net income is usually higher than income under LIFO and lower than income under FIFO.

- **Specific identification:** Advantages: (1) States cost of goods sold and ending inventory at the actual cost of specific units sold and on hand, and (2) provides the most precise matching of costs and revenues. Disadvantage: Income manipulation is possible.

- **FIFO:** Advantages: (1) FIFO is easy to apply, (2) the assumed flow of costs often corresponds with the normal physical flow of goods, (3) no manipulation of income is possible, and (4) the balance sheet amount for inventory is likely to approximate the current market value. Disadvantages: (1) Recognizes paper profits, and (2) tax burden is heavier if used for tax purposes when prices are rising.

- **LIFO:** Advantages: (1) LIFO reports both sales revenue and cost of goods sold in current dollars, and (2) lower income taxes result if used for tax purposes when prices are rising. Disadvantages: (1) Often matches the cost of goods not sold against revenues, (2) grossly understates inventory, and (3) permits income manipulation.

- **Weighted-average:** Advantages: Due to the averaging process, the effects of year-end buying or not buying are lessened. Disadvantage: Manipulation of income is possible.

- Perpetual inventory procedure requires an entry to Merchandise Inventory whenever goods are purchased, returned, sold, or otherwise adjusted, so that inventory records reflect actual units on hand at all times. Thus, an entry is required to record cost of goods sold for each sale.

- Companies should not carry goods in inventory at more than their net realizable value. Net realizable value is the estimated selling price of an item less the estimated costs incurred in preparing the item for sale and selling it. Inventory items are written down to market value when the market value is less than the cost of the items. If market value is greater than cost, the increase in value is not recognized. LCM may be applied to each inventory item, each inventory class, or total inventory.

- The steps in calculating ending inventory under the gross margin method are:

- a. Estimate gross margin (based on net sales) using the same gross margin rate experienced in prior accounting periods.

- b. Determine estimated cost of goods sold by deducting estimated gross margin from net sales.

- c. Determine estimated ending inventory by deducting estimated cost of goods sold from cost of goods available for sale.

- The retail inventory method estimates the cost of the ending inventory by applying a cost/retail price ratio to ending inventory stated at retail prices. To find the cost/retail price ratio, divide the cost of goods available for sale by the retail price of the goods available for sale.

- Inventory turnover ratio =  $\frac{(\text{Cost of goods sold})}{(\text{Average inventory})}$

- Inventory turnover measures the efficiency of the firm in managing and selling inventory. It gauges the liquidity of the firm's inventory.

### Demonstration problem

**Demonstration problem A** Following are data related to Adler Company's beginning inventory, purchases, and sales:

**Beginning Inventory**

**Sales**

**and Purchases**

<b>Units</b>	<b>Unit Cost</b>	<b>Units</b>
Beginning inventory 6,250	@ \$3.00	February 3 5,250
March 15 5,000	@ 3.12	May 4 4,500
May 10 8,750	@ 3.30	September 16 8,000
August 12 6,250	@ 3.48	October 9 7,250
November 20 3,750	@ 3.72	
30,000		25,000

a. Compute the ending inventory under each of the following methods:  
 Specific identification (assume ending inventory is taken equally from the August 12 and November 20 purchases).

FIFO: (a) Assume use of perpetual inventory procedure.

(b) Assume use of periodic inventory procedure.

LIFO: (a) Assume use of perpetual inventory procedure.

(b) Assume use of periodic inventory procedure.

Weighted-average: (a) Assume use of perpetual inventory procedure.

(b) Assume use of periodic inventory procedure.

(Carry unit cost to four decimal places and round total cost to nearest dollar.)

b. Give the journal entries to record the individual purchases and sales (Cost of Goods Sold entry only) under the LIFO method and perpetual procedure.

**Demonstration problem B** a. Joel Company reported annual net income as follows:

2007.... USD 27,200

2008.... USD 28,400

2009.... USD 24,000

Analysis of the inventories shows that certain clerical errors were made with the following results:

	<b>Incorrect inventory amount</b>	<b>Correct inventory amount</b>
2007 December 31	\$4,800	\$5,680
2008 December 31	5,600	4,680

What is the corrected net income for 2007, 2008, and 2009?

b. The records of Little Corporation show the following account balances on the day a fire destroyed the company's inventory:

Merchandise inventory, January 1 USD 40,000

Net cost of purchases (to date) USD 200,000

Sales (to date) USD 300,000

Average rate of gross margin for the past five years 30 per cent of net sales.

Compute an estimated value of the ending inventory using the gross margin method.

c. The records of Draper Company show the following account balances at year-end:

	<b>Cost</b>	<b>Retail</b>
Merchandise inventory, January 1	.\$17,600	\$25,000
Purchases	68,000	100,000
Transportation-in	1,900	
Sales		101,000

Compute the estimated ending inventory at cost using the retail inventory method.

## 7. Measuring and reporting inventories

### Solution to demonstration problem

**Solution to demonstration problem A** a. The ending inventory is 5,000 units, calculated as follows:

	<b>Units</b>
Beginning inventory	6,250
Purchases	23,750
Goods available	30,000
Sales	25,000
Ending inventory	5,000

Ending inventory under specific identification:

<b>Purchased</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
November 20	2,500	\$3.72	\$ 9,300
August 12	2,500	3.48	8,700
			\$ 18,000

2. Ending inventory under FIFO:

(a) Perpetual:

Date	Purchased			Units	Sold		Units	Balance	
	Units	Unit Cost	Total Cost		Unit Cost	Total Cost		Unit	Unit
Beg. inv.							6,250	\$3.00	\$18,750
Feb. 3				5,250	\$3.00	\$15,750	1,000	3.00	3,000
Mar. 15	5,000	\$3.12	\$15,600				1,000	3.00	3,000
							5,000	3.12	15,600
May 4				1,000	3.00	3,000	1,500	3.12	4,680
				3,500	3.12	10,920			
May 10	8,750	3.30	28,875				1,500	3.12	4,680
							8,750	3.30	28,875
Aug. 12	6,250	3.48	21,750				1,500	3.12	4,680
							8,750	3.30	28,875
							6,250	3.48	21,750
Sept. 16				1,500	3.12	4,680	2,250	3.30	7,425
				6,500	3.30	21,450	6,250	3.48	21,750
Oct. 9				2,250	3.30	7,425	1,250	3.48	4,350
				5,000	3.48	17,400			
Nov. 20	3,750	3.72	13,950				1,250	3.48	4,350
							3,750	3.72	13,950

Ending inventory = (1,250 X \$3.48) + (3,750 X \$3.72) = \$18,300

(b) Periodic:

Purchased	Units	Unit Cost	Total Cost
November 20	3,750	\$3.72	\$ 13,950
August 12	1,250	3.48	4,350
	5,000		\$ 18,300 *

\*Note that the cost of ending inventory is the same as under perpetual.

3. Ending inventory under LIFO:

(a) Perpetual:

Date	Purchased			Units	Sold		Units	Balance	
	Units	Unit Cost	Total Cost		Unit Cost	Total Cost		Unit	Unit
Beg. inv.							6,250	\$3.00	\$18,750
Feb. 3				5,250	\$3.00	\$15,750	1,000	3.00	3,000
Mar. 15	5,000	\$3.12	\$15,600				1,000	3.00	3,000
							5,000	3.12	15,600
May 4				4,500	3.12	14,040	1,000	3.00	3,000
							500	3.12	1,560
May 10	8,750	3.30	28,875				1,000	3.00	3,000
							500	3.12	1,560
Aug. 12	6,250	3.48	21,750				8,750	3.30	28,875
							1,000	3.00	3,000
							500	3.12	1,560
							8,750	3.30	28,875
Sept. 16				6,250	3.48	21,750	6,250	3.48	21,750
				1,750	3.30	5,775	1,000	3.00	3,000
							500	3.12	1,560
Oct. 9				7,000	3.30	23,100	7,000	3.30	23,100
				250	3.12	780	1,000	3.00	3,000
Nov. 20	3,750	3.72	13,950				250	3.12	780
							1,000	3.00	3,000
							3,750	3.72	13,950
Ending inventory =	(1,000 X \$3.00) + (250 X \$3.12) + (3,750 X \$3.72) =								\$17,730

(b) Periodic:



## 7. Measuring and reporting inventories

	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
Merchandise Inventory, January 1	5,000	\$3.00	\$ 15,000

### 4. Ending inventory under weighted-average:

#### (a) Perpetual:

Date	Purchased		Units	Sold		Total Cost	Balance		
	Units	Unit Cost		Unit Cost	Unit Cost		Units	Unit Cost	Total Cost
Beg. inv.							6,250	\$3.0000	\$18,750
Feb. 3			5,250	3.00	\$15,750	1,000	3.0000	3,000	
Mar. 15	5,000	3.12	\$15,600			6,000	3.1000	18,600	
May 4			4,500	3.10	13,950	1,500	3.1000	4,650	
May 10	8,750	3.30	28,875			10,250	3.2707	33,525	
Aug. 12	6,250	3.48	21,750			16,500	3.3500	55,275	
Sept. 16			8,000	3.35	26,800	8,500	3.3500	28,475 *	
Oct. 9			7,250	3.35	24,288	1,250	3.3500	4,187 *	
Nov. 20	3,750	3.72	13,950			5,000	3.6274	18,137	

Ending inventory = (5,000 X \$3.6274) = \$18,137

<sup>a</sup> \$18,600 = \$3.100 × 6,000   <sup>b</sup> \$33,525 = \$3.2707 × 10,250   <sup>c</sup> \$55,275 = \$3.3500 × 16,500   <sup>d</sup> \$18,137 = \$3.6274 × 5,000

\* Rounding difference.

#### (b) Periodic

Purchased	Units	Unit Cost	Total Cost
Merchandise Inventory, January 1	6,250	\$3.00	\$ 18,750
March 15	5,000	3.12	15,600
May 10	8,750	3.30	28,875
August 12	6,250	3.48	21,750
November 20	3,750	3.72	13,950
	30,000		\$ 98,925

Weighted-average unit cost = \$98,925/30,000 = \$3.2975

Ending inventory cost = \$3.2975 × 5,000 = \$16,488\*

\*Rounding difference

#### b. Journal entries under LIFO perpetual:

Feb.	3	Cost of Goods Sold (-SE) Merchandise Inventory (-A) To record cost of \$3 on 5,200 units sold	15,750	15,750
Mar.	15	Merchandise Inventory (+A) Accounts Payable (+L) To record purchase of 5,000 units at \$3.12 on Account.	15,600	15,600
May	4	Cost of Goods Sold (-SE) Merchandise Inventory (-A) To record cost of \$3.12 on 4,500 units sold.	14,040	14,040
	10	Merchandise Inventory (+A) Accounts Payable (+L) To record purchase of 8,750 units at \$3.30 on account.	28,875	28,875
Aug.	12	Merchandise Inventory (+A) Accounts Payable (+L) To record purchase of 6,250 units at \$3.48 on account	21,750	21,750
Sept.	16	Cost of Goods Sold (-SE) Merchandise Inventory (-A) To record costs of \$3.48 and \$3.30 on 6,250 units at 1,750 units sold, respectively.	27,525	27,525
Oct.	9	Cost of Goods Sold (-SE) Merchandise Inventory (-A) To record costs of \$3.30 and \$3.12 on 7,000 units and 250 units sold, respectively.	23,880	23,880
Nov.	20	Merchandise Inventory (+A) Accounts Payable (+L) To record purchase of 3,750 units at \$3.72 on account.	13,950	13,950

**Solution to demonstration problem B a. Corrected net income:**

	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Total</b>
Net income as reported	\$ 27,200	28,400	24,000	\$ 79,600
Adjustments				
(1)	880			
(2)		(880)		
		(920)		
(3)			920	
Corrected net income	\$ 28,080	26,600	24,920	\$ 79,600
(1) Ending inventory understated (\$ 5,680 - \$ 4,800 = \$ 880)				
(2) Beginning inventory understated (5,680 - 4,800 = 880)				
Ending inventory overstated (5,600 - 4,680 = 920)				
(3) Beginning inventory overstated (5,600 - 4,680 = 920)				

**b. Computation of inventory:**

Merchandise Inventory, January 1	\$	
	40,000	
Net cost of purchases	200,000	
Cost of goods available for sale	\$	
	240,000	
Less estimated cost of goods sold:		
Net Sales	\$ 300,000	
Gross margin (\$300,000 X 0.30)	90,000	
Estimated cost of goods sold		210,000
Inventory at cost, estimated by gross margin method.	\$	
	30,000	

**c. Computation of inventory:**

	<b>Cost</b>	<b>Retail</b>
Merchandise Inventory, January 1	\$ 17,600	\$ 25,000
Purchases	68,000	100,000
Transportation-in	1,900	—
Goods available for sale	\$ 87,500	\$ 125,000
\$		
Cost/retail price ratio:		
\$87,500/\$125,000 = 70%		
Sales		101,000

## 7. Measuring and reporting inventories

Ending inventory at retail price		\$24,000
Times cost/retail price ratio		X 70%
Ending inventory at cost, December 31.	\$ 16,800	

### Key terms

**FIFO (first-in, first-out)** A method of costing inventory that assumes the costs of the first goods purchased are those charged to cost of goods sold when the company actually sells goods.

**Gross margin method** A procedure for estimating inventory cost in which estimated cost of goods sold (determined using an estimated gross margin) is deducted from the cost of goods available for sale to determine estimated ending inventory. The estimated gross margin is calculated using gross margin rates (in relation to net sales) of prior periods.

**Inventory, or paper, profits** Equal to the current replacement cost to purchase a unit of inventory at time of sale minus the unit's historical cost.

**Inventory turnover ratio** Cost of goods sold/Average inventory.

**LIFO (last-in, first-out)** A method of costing inventory that assumes the costs of the most recent purchases are the first costs charged to cost of goods sold when the company actually sells the goods.

**Lower-of-cost-or-market (LCM) method** An inventory costing method that values inventory at the lower of its historical cost or its current market (replacement) cost.

**Merchandise inventory** The quantity of goods held by a merchandising company for resale to customers.

**Net realizable value** Estimated selling price of an item less the estimated costs incurred in preparing the item for sale and selling it.

**Retail inventory method** A procedure for estimating the cost of the ending inventory by applying a cost/retail price ratio to ending inventory stated at retail prices.

**Specific identification method** An inventory costing method that attaches the actual cost to an identifiable unit of product.

**Weighted-average method** A method of costing ending inventory using a weighted-average unit cost. Under perpetual inventory procedure, a new weighted-average is calculated after each purchase. Under periodic procedure, the weighted-average is determined by dividing the total number of units purchased plus those in beginning inventory into total cost of goods available for sale. Units in the ending inventory are carried at this per unit cost.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

Overstated ending inventory results in an overstatement of cost of goods sold and an understatement of gross margin and net income.

In a period of rising prices, FIFO results in the lowest cost of goods sold.

Under LCM, inventory is written down to market value when the market value is less than the cost, and inventory is written up to market value when the market value is greater than the cost.

Under the gross margin method, an estimate must be made of gross margin to determine estimated cost of goods sold and estimated ending inventory.

To use the retail inventory method, both cost and retail prices must be known for the goods available for sale.

Under perpetual procedure, cost of goods sold is determined as a result of the closing entries made at the end of the period.

#### Multiple-choice

Select the best answer for each of the following questions.

Jack Company began the accounting period with inventory of 3,000 units at USD 30 each. During the period, the company purchased an additional 5,000 units at USD 36 each and sold 4,600 units. Assume the use of periodic inventory procedure for the following six questions.

Cost of ending inventory using FIFO is:

- a. USD 104,400.
- b. USD 122,400.
- c. USD 120,000.
- d. USD 147,600.
- e. None of the above.

Cost of goods sold using FIFO is:

- a. USD 165,600.
- b. USD 150,000.
- c. USD 147,600.
- d. USD 122,400.
- e. None of the above.

Cost of ending inventory using LIFO is:

- a. USD 104,400.
- b. USD 114,750.
- c. USD 156,000.
- d. USD 122,400.
- e. None of the above.

Cost of goods sold using LIFO is:

- a. USD 155,250.
- b. USD 114,000.
- c. USD 147,600.
- d. USD 165,600.
- e. None of the above.

Cost of ending inventory using weighted-average is:

- a. USD 114,750.
- b. USD 157,600.
- c. USD 122,400.
- d. USD 109,650.
- e. None of the above.

Cost of goods sold using weighted-average is:

- a. USD 147,200.
- b. USD 160,350.
- c. USD 155,250.
- d. USD 114,000.
- e. None of the above.

During a period of rising prices, which inventory method might be expected to give the highest net income?

- a. Weighted-average.
- b. FIFO.
- c. LIFO.

## 7. Measuring and reporting inventories

d. Specific identification.

e. Cannot determine.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- Why is proper inventory valuation so important?
- Why does an understated ending inventory understate net income for the period by the same amount?
- Why does an error in ending inventory affect two accounting periods?
- What is the meaning of taking a physical inventory?
- What is the accountant's responsibility regarding taking a physical inventory?
- Which cost elements are included in inventory? What practical problems arise by including the costs of such elements?
- Which accounts that are used under periodic inventory procedure are not used under perpetual inventory procedure?
- What entries are necessary under perpetual inventory procedure when goods are sold?
- Why is there closer control over inventory under perpetual inventory procedure than under periodic inventory procedure?
- Why is perpetual inventory procedure being used increasingly in business?
- What is the cost flow assumption? What is meant by the physical flow of goods? Does a relationship between cost flows and the physical flow of goods exist, or should such a relationship exist?
- Indicate how a company can manipulate its net income if it uses LIFO. Is the same opportunity available under FIFO? Why or why not?
- What are the main advantages of using FIFO and LIFO?
- Which inventory method is the correct one? Can a company change inventory methods?
- Why are ending inventory and cost of goods sold the same under FIFO perpetual and FIFO periodic?
- Would you agree with the following statement? Reducing the amount of taxes payable currently is a valid objective of business management and, since LIFO results in such a reduction, all businesses should use LIFO.
- What is net realizable value, and how is it used?
- Why is it acceptable accounting practice to recognize a loss by writing down an item in inventory to market, but unacceptable to recognize a gain by writing up an inventory item?
- Under what conditions would the gross margin method of computing an estimated inventory yield approximately correct amounts?
- What are the main reasons for estimating ending inventory?
- Should a company rely exclusively on the gross margin method to determine the ending inventory and cost of goods sold for the end-of-year financial statements?
- How can the retail method be used to estimate inventory?
- **The Limited** Based on the notes to the financial statements of The Limited contained in the Annual Report Appendix, what inventory methods were used?

## Exercises

**Exercise A** Crocker Company reported annual net income as follows:

2008	\$484,480
2009	487,680
2010	409,984

Analysis of its inventories revealed the following incorrect inventory amounts and these correct amounts:

	<b>Incorrect Inventory Amount</b>	<b>Correct inventory amount</b>
2008 December 31	\$ 76,800	\$89,600
2009 December 31	86,400	77,600

Compute the annual net income for each of the three years assuming the correct inventories had been used.

**Exercise B** Slate Truck Company manufactures trucks and identifies each truck with a unique serial plate. On December 31, a customer ordered 5 trucks from the company, which currently has 20 trucks in its inventory. Ten of these trucks cost USD 20,000 each, and the other 10 cost USD 25,000 each. If Slate wished to minimize its net income, which trucks would it ship? By how much could Slate reduce net income by selecting units from one group versus the other group?

**Exercise C** Miami Discount Company inventory records show:

	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
Beginning inventory	3,000	\$38.00	\$114,000
Purchases:			
February 14	900	39.00	35,100
March 18	2,400	40.00	96,000
July 21	1,800	40.30	72,540
September 27	1,800	40.60	73,080
November 27	600	41.00	24,600
Sales:			
April 15	2,800		
August 20	2,000		
October 3	1,500		

The December 31 inventory was 4,200 units. Miami Discount Company uses perpetual inventory procedure. Present a schedule showing the measurement of the ending inventory using FIFO perpetual inventory procedure.

**Exercise D** Using the data in the previous exercise for Miami Discount Company, present a schedule showing the measurement of the ending inventory using LIFO perpetual inventory procedure.

**Exercise E** London Company had a beginning inventory of 160 units at USD 24 (total = USD 3,840) and the following inventory transactions during the year:

January 8, sold 40 units.

January 11, purchased 80 units at USD 30.00.

January 15, purchased 80 units at USD 32.00.

January 22, sold 80 units.

Using the preceding information, price the ending inventory at its weighted-average cost, assuming perpetual inventory procedure.

**Exercise F** Kettle Company made the following purchases of Product A in its first year of operations:

	<b>Units</b>	<b>Unit Cost</b>
January 2	1,400	@ \$7.40
March 31	1,200	@ 7.00
July 5	2,400	@ 7.60
November 1	1,800	@ 8.00

## 7. Measuring and reporting inventories

The ending inventory that year consisted of 2,400 units. Kettle uses periodic inventory procedure.

a. Compute the cost of the ending inventory using each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average.

b. Which method would yield the highest amount of gross margin? Explain why it does.

**Exercise G** The following are selected transactions and other data of the Custer Company:

Purchased 20 units at USD 360 per unit on account on 2010 September 18.

Sold 6 units on account for USD 576 per unit on 2010 September 20.

Discovered a shortage of USD 2,640 at year-end after a physical inventory.

Prepare journal entries for these transactions using FIFO perpetual inventory procedure. Assume the beginning inventory consists of 20 units at USD 336 per unit.

**Exercise H** Following are selected transactions of Gamble Company:

Purchased 100 units of merchandise at USD 240 each; terms 2/10, n/30.

Paid the invoice in transaction 1 within the discount period.

Sold 80 units at USD 384 each for cash.

Purchased 100 units at USD 360; terms 2/10, n/30.

Paid the invoice in transaction 4 within the discount period.

Sold 60 units at USD 552 each for cash.

Prepare journal entries for the six preceding items. Assume Gamble uses FIFO perpetual inventory procedure.

**Exercise I** Wells Company had the following transactions during February:

Purchased 135 units at USD 65 on account.

Sold 108 units at USD 90 on account.

Purchased 170 units at USD 75 on account.

Sold 122 units at USD 95 on account.

Sold 67 units at USD 100 on account.

The beginning inventory consisted of 67 units purchased at a cost of USD 55.

Prepare the journal entries relating to inventory for these five transactions, assuming Wells accounts for inventory using perpetual inventory procedure and the LIFO inventory method. Do not record the entries for sales.

**Exercise J** Following are inventory data for Kintech Company:

January 1 inventory on hand, 400 units at USD 28.80.

January sales were 80 units.

February sales totaled 120 units.

March 1, purchased 200 units at USD 30.24.

Sales for March through August were 160 units.

September 1, purchased 40 units at USD 33.12.

September through December sales were 180 units.

**Exercise K** A company purchased 1,000 units of a product at USD 12.00 and 2,000 units at USD 13.20. It sold all of these units at USD 18.00 each at a time when the current cost to replace the units sold was USD 13.80. Compute the amount of gross margin under FIFO that LIFO supporters would call inventory, or paper, profits.

**Exercise L** Clayton Company's inventory was 12,000 units with a cost of USD 160 each on 2010 January 1. During 2010, numerous units were purchased and sold. Also during 2010, the purchase price of this product fell

steadily until at year-end it was USD 120. The inventory at year-end was 18,000 units. State which method of inventory measurement, LIFO or FIFO, would have resulted in higher reported net income, and explain briefly.

**Exercise M** Levi Motor Company owns a luxury automobile that it has used as a demonstrator for eight months. The auto has a list or sticker price of USD 85,000 and cost Levi USD 75,000. At the end of the fiscal year, the auto is on hand and has an expected selling price of USD 80,000. Costs expected to be incurred to sell the auto include tune-up and maintenance costs of USD 3,000, advertising of USD 1,000, and a commission of 5 per cent of the selling price to the employee selling the auto. Compute the amount at which the auto should be carried in inventory.

**Exercise N** Pure Sound Systems used one sound system as a floor model. It cost USD 3,600 and had an original selling price of USD 4,800. After six months, the sound system was damaged and replaced by a newer model. The sound system had an estimated selling price of USD 2,880, but when the company performed USD 480 in repairs, it could be sold for USD 3,840. Prepare the journal entry, if any, that must be made on Pure Sound's books to record the decline in market value.

**Exercise O** Your assistant has compiled the following data:

Item	Quantity (units)	Unit Cost	Unit Market	Total Cost	Total Market
A	300	\$ 57.60	\$ 55.20	\$17,280	\$16,560
B	300	28.80	33.60	8,640	10,080
C	900	21.60	21.60	19,440	19,440
D	500	12.00	13.20	6,000	6,600

Calculate the dollar amount of the ending inventory using the LCM method, applied on an item-by-item basis, and the amount of the decline from cost to lower-of-cost-or-market.

**Exercise P** Use the data in the previous exercise to compute the cost of the ending inventory using the LCM method applied to the total inventory.

**Exercise Q** Tilley-Mill Company takes a physical inventory at the end of each calendar-year accounting period to establish the ending inventory amount for financial statement purposes. Its financial statements for the past few years indicate an average gross margin on net sales of 25 per cent. On July 18, a fire destroyed the entire store building and its contents. The records in a fireproof vault were intact. Through July 17, these records show:

Merchandise inventory, January 1 USD 672,000

Merchandise purchases USD 9,408,000

Purchase returns USD 134,400

Transportation-in USD 504,000

Sales USD 14,336,000

Sales returns USD 672,000

The company was fully covered by insurance and asks you to determine the amount of its claim for loss of merchandise.

**Exercise R** Ryan Company takes a physical inventory at the end of each calendar-year accounting period. Its financial statements for the past few years indicate an average gross margin on net sales of 30 per cent.

On June 12, a fire destroyed the entire store building and the inventory. The records in a fireproof vault were intact. Through June 11, these records show:

Merchandise inventory, January 1	\$120,000
Merchandise purchases	\$3,000,000
Purchase returns	\$36,000



## 7. Measuring and reporting inventories

Transportation -in	\$204,000
Sales	\$3,720,000

The company was fully covered by insurance and asks you to determine the amount of its claim for loss of merchandise.

**Exercise S** Victoria Falls Company, Inc., records show the following account balances for the year ending 2010 December 31:

	<b>Cost</b>	<b>Retail</b>
Beginning inventory	USD 42,000	USD 57,500
Purchases	25000	37500
Transportation-in	500	
Sales		52500

Using these data, compute the estimated cost of ending inventory using the retail method of inventory valuation.

### Problems

**Problem A** Kelley Company reported net income of USD 358,050 for 2009, USD 371,400 for 2010, and USD 325,800 for 2011, using the incorrect inventory amounts shown for 2009 December 31, and 2010. Recently, Kelley corrected the inventory amounts for those dates. Kelley used the correct 2011 December 31, inventory amount in calculating 2011 net income.

	<b>Incorrect</b>	<b>Correct</b>
2009 December 31	USD 72,600	USD 86,200
2010 December 31	84000	70200

Prepare a schedule that shows: (a) the reported net income for each year, (b) the amount of correction needed for each year, and (c) the correct net income for each year.

**Problem B** An examination of the financial records of Lanal Company on 2009 December 31, disclosed the following with regard to merchandise inventory for 2009 and prior years:

2005 December 31, inventory was correct.

2006 December 31, inventory was overstated USD 200,000.

2007 December 31, inventory was overstated USD 100,000.

2008 December 31, inventory was understated USD 220,000.

2009 December 31, inventory was correct.

The reported net income for each year was:

2006	\$384,000
2007	544,000
2008	670,000
2009	846,000

- Prepare a schedule of corrected net income for each of the four years, 2006-2009.
- What error(s) would have been included in each December 31 balance sheet? Assume each year's error is independent of the other years' errors.
- Comment on the implications of your corrected net income as contrasted with reported net income.

**Problem C** Brett Company sells personal computers and uses the specific identification method to account for its inventory. On 2010 November 30, the company had 46 Orange III personal computers on hand that were acquired on the following dates and at these stated costs:

	<b>Units</b>		<b>Unit cost</b>
July 3	10	@	\$10,080
September 10	20	@	\$ 9,600
November 29	16	@	\$10,700

Brett sold 36 Orange III computers at USD 12,720 each in December. There were no purchases of this model in December.

- Compute the gross margin on December sales of Orange III computers assuming the company shipped those units that would maximize reported gross margin.
- Repeat part (a) assuming the company shipped those units that would minimize reported gross margin for December.
- In view of your answers to parts (a) and (b), what would be your reaction to an assertion that the specific identification method should not be considered an acceptable method for costing inventory?

**Problem D** The inventory records of Thimble Company show the following:

March 1 Beginning inventory consists of 10 units costing USD 40 per unit.

3 Sold 5 units at USD 94 per unit.

10 Purchased 16 units at USD 48 per unit.

12 Sold 8 units at USD 96 per unit.

20 Sold 7 units at USD 96 per unit.

25 Purchased 16 units at USD 50 per unit.

31 Sold 8 units at USD 96 per unit.

Assume all purchases and sales are made on credit.

Using FIFO perpetual inventory procedure, prepare the appropriate journal entries for March.

**Problem E** The following purchases and sales for Ripple Company are for April 2010. There was no inventory on April 1.

<b>Purchases</b>			<b>Sales</b>	
	<b>Units</b>	<b>Unit Cost</b>		<b>Units</b>
April 3	3,200	@ \$33.00	April 6	1,500
April 10	1,600	@ 34.00	April 12	1,400
April 22	2,000	@ 35.00	April 25	2,300
April 28	1,800	@ 36.00		

a. Compute the ending inventory as of 2010 April 30, using perpetual inventory procedure, under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).

b. Repeat a using periodic inventory procedure.

**Problem F** Refer to the data in problem E

a. Using LIFO perpetual inventory procedure, prepare the journal entries for the purchases and sales (Cost of Goods Sold entry only).

b. Repeat (a) using LIFO periodic inventory procedure, including closing entries. (Note: You may want to refer to the Appendix in Chapter 6 for this part.)

## 7. Measuring and reporting inventories

**Problem G** The following data relate to the beginning inventory, purchases, and sales of Braxton Company for the year 2010:

	<b>Units</b>	<b>Unit Cost</b>
Merchandise Inventory, January 1	1,400	@ \$5.04
Purchases:		
February 2	1,000	@ 4.80
April 5	2,000	@ 3.60
June 15	1,200	@ 3.00
September 30	1,400	@ 2.88
November 28	1,800	@ 4.20
Sales:		
March 10	900	
May 15	1,800	
July 6	800	
August 23	600	
December 22	2,500	

a. Assuming use of perpetual inventory procedure, compute the ending inventory and cost of goods sold under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).

b. Repeat (a) assuming use of periodic inventory procedure.

**Problem H** Welch Company accounts for a product it sells using LIFO periodic inventory procedure. Product data for the year ended 2009 December 31, are shown below. Merchandise inventory on January 1 was 3,000 units at USD 14.40 each.

<b>Purchases</b>			<b>Sales</b>		
	<b>Units</b>	<b>Unit Cost</b>		<b>Units</b>	<b>Unit Co st</b>
January 5	6,000	@ \$18.00	January 10	4,000	@ \$28.80
March 31	18,000	@ 21.60	April 2	15,000	@ 32.40
August 12	12,000	@ 27.00	August 22	16,000	@ 36.00
December 26	6,000	@ 28.80	December 24	3,000	@ 39.60

a. Compute the gross margin earned on sales of this product for 2009.

b. Repeat part (a) assuming that the December 26 purchase was made in January 2010.

c. Recompute the gross margin assuming that 10,000 rather than 6,000 units were purchased on December 26 at the same cost per unit.

d. Solve parts (a), (b), and (c) using the FIFO method.

**Problem I** The accountant for Gentry Company prepared the following schedule of the company's inventory at 2009 December 31, and used the LCM method applied to total inventory in determining cost of goods sold:

<b>Item</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Unit Market</b>
Q	4,200	\$7.20	\$7.20
R	2,400	6.00	5.76
S	5,400	4.80	4.56
T	4,800	4.20	4.32

a. State whether this approach is an acceptable method of inventory measurement and show the calculations used to determine the amounts.

b. Compute the amount of the ending inventory using the LCM method on an item-by-item basis.

c. State the effect on net income in 2009 if the method in (b) was used rather than the method referred to in (a).

**Problem J** As part of a loan agreement with a local bank, Brazos Company must present quarterly and cumulative income statements for the year 2009. The company uses periodic inventory procedure and marks its

merchandise to sell at a price yielding a gross margin of 30 per cent. Selected data for the first six months of 2009 are as follows:

	<b>First Quarter</b>	<b>Second Quarter</b>
Sales	\$248,000	\$256,000
Purchases	160,000	184,000
Purchase returns and allowances	9,600	11,200
Purchase discounts	3,200	3,520
Sales returns and allowances	8,000	4,800
Transportation-in	8,000	8,320
Miscellaneous selling expenses	25,600	24,000
Miscellaneous administrative expenses	9,600	8,000

The cost of the physical inventory taken 2008 December 31, was USD 30,400.

a. Indicate how income statements can be prepared without taking a physical inventory at the end of each of the first two quarters of 2009.

b. Prepare income statements for the first quarter, the second quarter, and the first six months of 2009.

Cobb Company records show the following information for 2010:

	<b>Cost</b>	<b>Retail</b>
Sales		\$350,400
Purchases	\$270,000	420,000
Transportation-in	26,280	—
Merchandise inventory, January 1	12,000	17,400
Purchase returns	15,120	18,600

Compute the estimated year-end inventory balance at cost using the retail method of estimating inventory.

#### **Alternate problems**

**Alternate problem A** Harris Company reported net income of USD 312,000 for 2009, USD 324,000 for 2010, and USD 348,000

Recently Harris corrected these inventory amounts. Harris used the correct 2011 December 31, inventory amount in calculating 2011 net income.

## 7. Measuring and reporting inventories

2009 December 31	\$96,000	\$108,000
2010 December 31	91,200	84,000

Prepare a schedule that shows: (a) the reported net income for each year, (b) the amount of correction needed for each year, and (c) the correct net income for each year.

**Alternate problem B** An examination of the financial records of Jersey Company on 2009 December 31, disclosed the following with regard to merchandise inventory for 2009 and prior years:

- 2008 December 31, inventory was correct.
- 2009 December 31, inventory was understated USD 50,000.
- 2010 December 31, inventory was overstated USD 35,000.
- 2011 December 31, inventory was understated USD 30,000.
- 2012 December 31, inventory was correct.

The reported net income for each year was:

2009	\$292,500
2010	\$355,000
2011	\$382,500
2012	\$350,000

- a. Prepare a schedule of corrected net income for each of the four years, 2009-2012.
- b. What errors would have been included in each December 31 balance sheet? Assume each year's error is independent of the other years' errors.
- c. Comment on the implications of the corrected net income as contrasted with reported net income.

**Alternate problem C** High Surf Company sells the Ultra-Light model wind surfer and uses the specific identification method to account for its inventory. The Ultra-Lights are identical except for identifying serial numbers. On 2009 August 1, the company had three Ultra-Lights that cost USD 14,000 each in its inventory. During the month, the company purchased the following:

	Units		Unit cost
August 3	5	@	\$13,000
August 17	6	@	\$14,500
August 28	6	@	15,000

High Surf Company sold 13 Ultra-Lights in August at USD 20,000 each.

- a. Compute the gross margin earned by the company in August if it shipped the units that would maximize gross margin.
- b. Repeat part (a) assuming the company shipped the units that would minimize gross margin.
- c. Do you think High Surf Company should be permitted to use the specific identification method of accounting for Ultra-Lights in view of the manipulation possible as shown by your calculations in (a) and (b)?

**Alternate problem D** The inventory records of Coral Company show the following:

Jan. 1 Beginning inventory consists of 12 units costing USD 48 per unit.

5 Purchased 15 units @ USD 49.92 per unit.

10 Sold 9 units @ USD 108 per unit.

12 Sold 7 units @ USD 108 per unit.

20 Purchased 20 units @ USD 50.16 per unit.

22 Purchased 5 units @ USD 48 per unit.

30 Sold 20 units @ USD 110.40 per unit.

Assume all purchases and sales are made on account.

- Using FIFO perpetual inventory procedure, compute cost of goods sold for January.
- Using FIFO perpetual inventory procedure, prepare the journal entries for January.
- Compute the cost of goods sold under FIFO periodic inventory procedure. Is there a difference between the amount computed using the two different procedures?

**Alternate problem E** Following are data for Dandy Company for the year 2010:

	<b>Units</b>	<b>Unit Cost</b>
Merchandise Inventory, January 1	700	@ \$20.40
<b>Purchases:</b>		
February 2	500	@ 21.00
April 5	1,000	@ 24.00
June 15	600	@ 27.00
September 30	700	@ 30.00
November 28	900	@ 31.20
	4,400	
<b>Sales:</b>		
March 5	400	
July 18	1,200	
August 12	800	
October 15	900	
	3,300	

- Compute the ending inventory as of 2010 December 31, assuming use of perpetual inventory procedure, under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).
- Compute the ending inventory as of 2010 December 31, assuming use of periodic inventory procedure, under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average.

**Alternate problem F** Refer to the data in alternate problem E

- Give the journal entries to record the purchases and sales (Cost of Goods Sold entry only) for the year under FIFO perpetual.
- Give the journal entries to record the purchases for the year and necessary year-end entries to charge Income Summary with the cost of goods sold for the year under FIFO periodic. (Note: You may want to refer to the Appendix in Chapter 6 for this part.)

**Alternate problem G** Following are data related to a product of Coen Company for the year 2010:

	<b>Units</b>	<b>Unit Cost</b>
Merchandise Inventory, January 1	2,100	@ \$12.60
<b>Purchases:</b>		
March 10	1,500	@ 12.00
May 24	3,000	@ 11.20
July 15	1,800	@ 10.50
September 20	2,100	@ 9.00
December 1	2,700	@ 10.00
<b>Sales:</b>		
April 5	1,400	
June 13	2,900	
October 9	2,300	
November 21	1,700	

- Assuming use of perpetual inventory procedure, compute the ending inventory and cost of goods sold under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).

## 7. Measuring and reporting inventories

b. Assuming use of periodic inventory procedure, compute the ending inventory and cost of goods sold under each of the following methods: (1) FIFO, (2), LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).

**Alternate problem H** Star Company accounts for its inventory using the LIFO method under periodic inventory procedure. Data on purchases, sales, and inventory for the year ended 2009 December 31, are:

	<b>Units</b>		<b>Unit Cost</b>
Merchandise inventory, January 1	2,000	@	\$20
Purchases:			
January /	5,000	@	24
July 7	10,000	@	28
December 21	6,000	@	32

During 2009, 16,000 units were sold for USD 1,280,000, leaving an inventory on 2009 December 31, of 7,000 units.

- Compute the gross margin earned on sales during 2009.
- Compute the change in gross margin that would have resulted if the purchase of December 21 had been delayed until 2010 January 6.
- Recompute the gross margin assuming that 9,000 units rather than 6,000 units were purchased on December 21 at the same cost per unit.
- Solve parts (a), (b), and (c) using the FIFO method.

**Alternate problem I** Data on the ending inventory of Jannis Company on 2009 December 31, are:

<b>Item</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Unit Market</b>
1	8,400	\$3.20	\$3.12
2	16,800	2.88	3.04
3	5,600	2.80	2.88
4	14,000	3.84	3.60
5	11,200	3.60	3.68
6	2,800	3.04	2.88

- Compute the ending inventory applying the LCM method to the total inventory.
- Determine the ending inventory by applying the LCM method on an item-by-item basis.

**Alternate problem J** The sales and cost of goods sold for Lively Company for the past five years were as follows:

<b>Year</b>	<b>Sales (net)</b>	<b>Cost of Goods Sold</b>
2004	\$ 9,984,960	\$ 6,240,600
2005	10,794,240	6,746,400
2006	12,346,560	7,716,600
2007	11,926,080	7,272,000
2008	12,747,840	7,920,000

The following information is for the seven months ended 2009 July 31:

Sales	\$7,748,000
Purchases	4,588,800
Purchase returns	28,800
Sales returns	173,760
Merchandise inventory, 2009 January 1	948,000

To secure a loan, Lively Company has been asked to present current financial statements. However, the company does not wish to take a complete physical inventory as of 2009 July 31.

- Indicate how financial statements can be prepared without taking a complete physical inventory.

b. From the data given, compute the estimated inventory as of 2009 July 31.

**Alternate problem K** Apple Company's records contained the following inventory information:

	<b>Cost</b>	<b>Retail</b>
Sales		\$420,000
Purchases	\$396,000	582,000
<b>Purchase returns</b>	<b>8,400</b>	<b>12,000</b>
Transportation-in	10,800	—
Merchandise inventory January 1	21,600	<b>30,000</b>

*Beyond the numbers—Critical thinking*

**Business decision case A** Susan Green and Carol Lewis, were interested in starting part-time business activities to supplement their family incomes. Both heard a presentation by the manufacturer of an exercise device and decided to become a distributor of this exerciser. Green's sales territory is Cobb County, and Lewis's sales territory is Gwinnett County. Each owns her own business.

To induce Green and Lewis to become distributors, the manufacturer made price concessions on the first 1,000 units purchased. The manufacturer sold the first 200 units at USD 15 each, the next 300 at USD 18 per unit, and the next 500 at USD 19 per unit. After that, Green and Lewis had to pay USD 20 per unit.

During the first year, each bought 1,200 units; coincidentally, both sold exactly 950 units for USD 27 each. Green had USD 2,600 of selling expenses; Lewis incurred USD 1,700 of selling expenses. (Green's expenses were considerably higher because on December 28 she distributed 4,000 sales brochures to households in her territory at a cost of USD 800. The brochures stressed that people would want to take off the extra pounds gained during the holiday season; also, these exercisers were inexpensive and could be used at home.)

At the end of the year, both had to determine their net incomes. Green received a B in the accounting course she took at State University. She remembered the FIFO inventory method and plans to use it. Lewis knows nothing about inventory costing methods. However, her husband is acquainted with the LIFO inventory method used at the company where he works. He will help her compute the cost of the ending inventory and the cost of goods using LIFO.

- Prepare income statements for Green and Lewis.
- Which business has performed better? Explain why.
- Determine the inventory turnovers for Green and Lewis.

**Business decision case B** Connie Dalton owns and operates a sporting goods store. On February 2 the store suffered extensive fire damage, and all of the inventory was destroyed. Dalton uses periodic inventory procedure and has the following information in her accounting records, which were undamaged:



Merchandise Inventory, January 1	\$ 80,000
Purchases:	
January 8	32,000
January 20	48,000
January 30	64,000
Net Sales:	
During January	240,000
February 1 and 2	16,000

Dalton's gross margin rate on net sales has been 40 per cent for the past three years. Her insurance company offered to pay USD 56,000 to settle this inventory loss unless Dalton can show that she suffered a greater loss. She has asked you, her CPA, to help her in determining her loss.

Answer these questions: Based on your analysis, should Dalton settle for USD 56,000? If not, how can she show that she suffered a greater loss? What is your estimate of her loss?

**Annual report analysis C** Refer to the financial statements of The Limited in the Annual Report Appendix. Describe how inventory values are determined (see Footnote 1). Also, determine the inventory turnover ratio for 2000.

**Ethics case – Writing experience D** Respond in writing to the following questions based on the ethics case concerning Terry Dorsey:

- Do you believe that Terry's scheme will work?
- What would you do if you were Terry's accountant?
- Comment on each of Terry's points of justification.

**Group project E** In teams of two or three students, interview the manager of a merchandising company. Inquire about inventory control methods, inventory costing methods, and any other information about the company's inventory procedures. As a team, write a memorandum to your instructor summarizing the results of the interview. The heading of the memorandum should include the date, to whom it is written, from whom, and the subject matter.

**Group project F** In a team of two or three students, locate and visit a nearby retail store that uses perpetual inventory procedure and a computerized inventory management system. Investigate how the system works by interviewing a knowledgeable person in the company. Write a report to your instructor and make a short presentation to the class on your findings.

**Group project G** With a small group of students, identify and visit a retail store that uses periodic inventory procedure and uses the retail inventory method for preparing interim (monthly or quarterly) financial reports. Discover how the retail inventory method is applied and how the end-of-year inventory amount is calculated. Write a report to your instructor summarizing your findings.

#### Using the Internet—A view of the real world

Visit the National Association of State Boards of Accountancy website at:

<http://www.nasba.org>

Find the address of the state board of accountancy in your state. Also check out some of the information provided at websites of other state boards by clicking on any sites that appear at the end of a listing for a particular state. In a report to your instructor, summarize what you learned about state boards at some of these sites.

Visit the Lexis-Nexis website at:

<http://www.lexis-nexis.com>

## 7. Measuring and reporting inventories

Determine the kinds of information that can be obtained at this site. Specifically, what kinds of products and services are available? What is the background of Lexis-Nexis? What pricing information is available for using its services? Write a report to your instructor summarizing your findings.

### Answers to self-test

#### True-false

**False.** Overstated ending inventory results in an understatement of cost of goods sold and an overstatement of gross margin and net income.

**True.** The cost of goods sold consists of the earliest purchases at the lowest costs in a period of rising prices.

**False.** Under LCM, inventory is adjusted to market value only when the market (replacement) value is less than the cost.

**True.** The first step in the gross margin method is to estimate gross margin using the gross margin rate experienced in the past.

**True.** The cost/retail ratio is computed by dividing the cost of goods available for sale by the retail price of the goods available for sale.

**False.** Under perpetual procedure, the Cost of Goods Sold account is updated as sales occur.

#### Multiple-choice

**b.** The cost of ending inventory using FIFO consists of the most recent purchase:

$$\text{Cost of ending inventory} = 3,400 \times \text{USD } 36 = \text{USD } 122,400$$

**c.** The cost of goods sold using FIFO is:

$$\text{Cost of goods available for sale} = (3,000 \times \text{USD } 30) + (5,000 \times \text{USD } 36) = \text{USD } 270,000$$

$$\text{Cost of goods sold} = \text{USD } 270,000 - \text{USD } 122,400 = \text{USD } 147,600$$

**a.** The cost of ending inventory using LIFO is:

$$(3,000 \times \text{USD } 30) + (400 \times \text{USD } 36) = \text{USD } 104,400$$

**d.** The cost of goods sold using LIFO is:

$$\text{USD } 270,000 - \text{USD } 104,400 = \text{USD } 165,600$$

**a.** The cost of ending inventory using weighted-average cost is computed:

$$\text{Unit cost} = \text{USD } 270,000 \div 8,000 = \text{USD } 33.75$$

$$\text{Cost of ending inventory} = 3,400 \times \text{USD } 33.75 = \text{USD } 114,750$$

**c.** The cost of goods sold using weighted-average cost is:

$$\text{USD } 270,000 - \text{USD } 114,750 = \text{USD } 155,250$$

**b.** During a period of rising prices, FIFO results in the lowest cost of goods sold, thus the highest net income.

# 8. Control of cash

## Learning objective

After studying this chapter, you should be able to:

- Describe the necessity for and features of internal control.
- Define cash and list the objectives sought by management in handling a company's cash.
- Identify procedures for controlling cash receipts and disbursements.
- Prepare a bank reconciliation and make necessary journal entries based on that schedule.
- Explain why a company uses a petty cash fund, describe its operations, and make the necessary journal entries.
- Analyze and use the financial results-quick ratio.

## A career in forensic accounting

This chapter emphasizes the importance of having effective internal controls in every business. Unfortunately, many smaller companies do not heed this advice. Failure to implement adequate internal controls can result in financial statement fraud (purposely misstated financial statements) or embezzlement (theft). This is when the services of a forensic accountant may be necessary. Forensic accounting is the application of accounting methodology to legal issues. It is frequently associated with the investigation of civil or criminal white-collar crime such as fraud, embezzlement, and general abuse of funds issues. Typical tools used in forensic accounting are bank records, personal financial statements, interviews, and credit reports. The forensic accountant's responsibility is to gather and analyze the evidence and deliver clear, accurate, and unbiased reports reflecting the results of the investigation. Forensic accounting is commonly performed by Certified Fraud Examiners (CFEs). CFEs have extensive training and possess special expertise in investigation and interview techniques specifically designed to detect or prevent fraud.

A well-known agency performing forensic accounting in the United States is in the Federal Bureau of Investigation (FBI). You can learn more about the FBI from their homepage at [www.fbi.gov](http://www.fbi.gov). Click on employment in the 'About Us' section and then click on special agent employment to learn more about what it takes to be an FBI special agent. Did you know that the fastest track to becoming an FBI agent is with an accounting undergraduate degree? There are four entry programs for becoming an FBI special agent: accounting, law, language, and diversified. Law requires an undergraduate degree and a law degree, language requires an undergraduate degree and proficiency in a second language, and diversified requires three years of work experience beyond an undergraduate degree. The only entry program requiring only an undergraduate degree is one with an undergraduate accounting option. Why accounting? Because an ever-increasing portion of crimes investigated by the FBI are white-collar crimes where accounting knowledge is essential.

In a small corporation the president might make all the important decisions and will usually maintain a close watch over the affairs of the business. However, as the business grows and the need arises for additional employees, officers, and managers, the president begins to lose absolute control. Realizing that precautions are necessary to protect the company's interests, the company establishes an internal control structure at this point.

## 8. Control of cash

The **internal control structure** of a company consists of "the policies and procedures established to provide reasonable assurance that specific entity objectives will be achieved".<sup>27</sup> The three elements of an internal control structure are the control environment, the accounting system, and the control procedures.

The **control environment** reflects the overall attitude, awareness, and actions of the board of directors, management, and stockholders. The **accounting system** consists of the methods and records that identify, assemble, analyze, classify, record, and report an entity's transactions to provide complete, accurate, and timely financial information. The **control procedures** of a company are additional policies and procedures that management establishes to provide reasonable assurance that the company achieves its specific objectives. These control procedures may pertain to proper authorization, segregation of duties, design and use of adequate documents and records, adequate safeguards over access to assets, and independent checks on performance.

Internal control not only prevents theft and fraud but also serves many purposes:

(1) Companies must implement policies requiring compliance with federal law; (2) personnel must perform their assigned duties to promote efficiency of operations; and (3) correct accounting records must supply accurate and reliable information in the accounting reports.

This chapter discusses the internal control structure that a company establishes to protect its assets and promote the accuracy of its accounting records.

You will learn how to establish internal control through control of cash receipts and cash disbursements, proper use of the bank checking account, preparation of the bank reconciliation, and protection of petty cash funds. The internal control structure is enhanced by hiring competent and trustworthy employees, a fact you will appreciate if you become a business owner.

### Internal control

An effective **internal control structure** includes a company's plan of organization and all the procedures and actions it takes to:

- Protect its assets against theft and waste.
- Ensure compliance with company policies and federal law.
- Evaluate the performance of all personnel to promote efficient operations.
- Ensure accurate and reliable operating data and accounting reports.

As you study the basic procedures and actions of an effective internal control structure, remember that even small companies can benefit from using some internal control measures. Preventing theft and waste is only a part of internal control.

In general terms, the purpose of internal control is to ensure the efficient operations of a business, thus enabling the business to effectively reach its goals. Since additional control procedures are necessary in a computer environment, a discussion of these controls concludes this section on internal control.

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<sup>27</sup> AICPA, *Statement on Auditing Standards No. 55*, "Consideration of the Internal Control Structure in a Financial Statement Audit" (New York, 1988), p. 4. The sixth and seventh editions of this text use the terminology (internal control structure) of the AICPA. Previous editions referred to the "internal control system."

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## An accounting perspective:

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### Business insight

When performing an audit, one of an outside auditor's first duties is to examine the internal control structure of the corporation. To understand the internal control structure, an auditor focuses mainly on management's attitude and awareness concerning controls and the accounting system's processing of transactions. To increase understanding, the auditor inspects documents in the accounting system, discusses external influences on the company with management, reads accounting manuals, and observes the happenings in the company. This understanding of the company's control environment helps the auditor to plan the audit and to determine the nature, timing, and extent of tests.

Companies protect their assets by (1) segregating employee duties, (2) assigning specific duties to each employee, (3) rotating employee job assignments, and (4) using mechanical devices.

**Segregation of employee duties** **Segregation of duties** requires that someone other than the employee responsible for safeguarding an asset must maintain the accounting records for that asset. Also, employees share responsibility for related transactions so that one employee's work serves as a check on the work of other employees.

When a company segregates the duties of employees, it minimizes the probability of an employee being able to steal assets and cover up the theft. For example, an employee could not steal cash from a company and have the theft go undetected unless someone changes the cash records to cover the shortage. To change the records, the employee stealing the cash must also maintain the cash records or be in collusion with the employee who maintains the cash records.

**Assignment of specific duties to each employee** When the responsibility for a particular work function is assigned to one employee, that employee is accountable for specific tasks. Should a problem occur, the company can quickly identify the responsible employee.

When a company gives each employee specific duties, it can trace lost documents or determine how a particular transaction was recorded. Also, the employee responsible for a given task can provide information about that task. Being responsible for specific duties gives people a sense of pride and importance that usually makes them want to perform to the best of their ability.

**Rotation of employee job assignments** Some companies rotate job assignments to discourage employees from engaging in long-term schemes to steal from them. Employees realize that if they steal from the company, the next employees assigned to their positions may discover the theft.

Frequently, companies have the policy that all employees must take an annual vacation. This policy also discourages theft because many dishonest schemes collapse when the employee does not attend to the scheme on a daily basis.

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**Use of mechanical devices** Companies use several mechanical devices to help protect their assets. Check protectors (machines that perforate the check amount into the check), cash registers, and time clocks make it difficult for employees to alter certain company documents and records.

Internal control policies are effective only when employees follow them. To ensure that they carry out its internal control policies, a company must hire competent and trustworthy employees. Thus, the execution of effective internal control begins with the time and effort a company expends in hiring employees. Once the company hires the employees, it must train those employees and clearly communicate to them company policies, such as obtaining proper authorization before making a cash disbursement. Frequently, written job descriptions establish the responsibilities and duties of employees. The initial training of employees should include a clear explanation of their duties and how to perform them.

In publicly held corporations, the company's internal control structure must satisfy the requirements of federal law. In December 1977, Congress enacted the Foreign Corrupt Practices Act (FCPA). This law requires a publicly held corporation to devise and maintain an effective internal control structure and to keep accurate accounting records. This law came about partly because company accounting records covered up bribes and kickbacks made to foreign governments or government officials. The FCPA made this specific type of bribery illegal.

To evaluate how well employees are doing their jobs, many companies use an internal auditing staff. **Internal auditing** consists of investigating and evaluating employees' compliance with the company's policies and procedures. Companies employ **internal auditors** to perform these audits. Trained in company policies and internal auditing duties, internal auditors periodically test the effectiveness of controls and procedures throughout the company.

Internal auditors encourage operating efficiency throughout the company and are alert for breakdowns in the company's internal control structure. In addition, internal auditors make recommendations for the improvement of the company's internal control structure. All companies and nonprofit organizations can benefit from internal auditing. However, internal auditing is especially necessary in large organizations because the owners (stockholders) cannot be involved personally with all aspects of the business.

Companies should maintain complete and accurate accounting records. The best method to ensure such accounting records is to hire and train competent and honest individuals. Periodically, supervisors evaluate an employee's performance to make sure the employee is following company policies. Inaccurate or inadequate accounting records serve as an invitation to theft by dishonest employees because theft can be concealed more easily.

One or more business documents support most accounting transactions. These source documents are an integral part of the internal control structure. For optimal control, source documents should be serially numbered. (Transaction documentation and related aspects of internal control are presented throughout the text.)

<b>PURCHASE REQUISITION</b>		<b>No. 2416</b>
<b>BRYAN WHOLESALE COMPANY</b>		
<b>From;</b> Automotive Supplies Department	<b>Date:</b> 2010 November 20	
<b>To:</b> Purchasing Department	<b>Suggested supplier:</b> Wilkes Radio Company	
Please purchase the following items;		
Description	Item Number	Quantity
	Model No. 5868-24393	200
		Estimated Price
		\$50 per unit
<b>Reason for request:</b>	<b>To be filled in by purchasing department:</b>	
Customer order	<b>Dated ordered</b> 2010 November 29	
Baier Company	<b>Purchase order number</b> N-MS	
	<b>Approved</b> R.S.T.	

Exhibit 65: Purchase requisition

Since source documents serve as documentation of business transactions, from time to time firms check the validity of these documents. For example, to review a purchase transaction, they check the documents used to record the transaction against the proper accounting records. When the accounting department records a purchase transaction, it should receive copies of the following four documents:

- A **purchase requisition** (Exhibit 65) is a written request from an employee inside the company to the purchasing department to purchase certain items.
- A **purchase order** (Exhibit 66) is a document sent from the purchasing department to a supplier requesting that merchandise or other items be shipped to the purchaser.
- An **invoice** (Exhibit 67) is the statement sent by the supplier to the purchaser requesting payment for the merchandise shipped.
- A **receiving report** is a document prepared by the receiving department showing the descriptions and quantities of all items received from a supplier in a particular shipment. A copy of the purchase order can serve as a receiving report if the quantity ordered is omitted. Then, because receiving department personnel do not know what quantity to expect, they will count the quantity received more accurately.

These four documents together serve as authorization to pay for merchandise and should be checked against the accounting records. Without these documents, a company might fail to pay a legitimate invoice, pay fictitious invoices, or pay an invoice more than once. Companies can accomplish proper internal control only by periodically checking the source documents of business transactions with the accounting records of those transactions. In Exhibit 68 we show the flow of documents and goods in a merchandise transaction.

<b>PURCHASE ORDER</b>		<b>No.</b>	<b>N - 145</b>
<b>BRYAN WHOLESALE COMPANY</b>			
476 Mason Street			
Detroit, Michigan 48823			
<b>To: Wilkes Radio Company</b>		<b>Date: 2010 November 21</b>	
2515 West Peachtree Street		<b>Ship by: 2010 December 20</b>	
Atlanta, Georgia 30303		<b>FOB terms requested: Destination</b>	
<b>Ship to: Above address</b>		<b>Discount terms requested: 2/10, n/30</b>	
Please send the following item;			
<b>Description</b>	<b>Item Number</b>	<b>Quantity</b>	<b>Price Per Unit</b>
<b>True-tone stereo radios</b>	<b>Model No. 5868-24393</b>	<b>200</b>	<b>\$50</b>
			<b>Total Amount</b>
			\$10,000
<b>Ordered by: Jane Knight</b>		<b>Please include order number on all invoice and shipments.</b>	

Exhibit 66: Purchase order

Unfortunately, even though a company implements all of these features in its internal control structure, theft may still occur. If employees are dishonest, they can usually figure out a way to steal from a company, thus

## 8. Control of cash

circumventing even the most effective internal control structure. Therefore, companies should carry adequate casualty insurance on assets. This insurance reimburses the company for loss of a nonmonetary asset such as specialized equipment. Companies should also have **fidelity bonds** on employees handling cash and other negotiable instruments. These bonds ensure that a company is reimbursed for losses due to theft of cash and other monetary assets. With both casualty insurance on assets and fidelity bonds on employees, a company can recover at least a portion of any loss that occurs.

According to the Committee of Sponsoring Organizations of the Treadway Commission, there are five components of an internal control structure. When these components are linked to the organization's operations, they can quickly respond to shifting conditions. The components are:

- **Control environment.** The control environment is the basis for all other elements of the internal control structure. The control environment includes many factors such as ethical values, management's philosophy, the integrity of the employees of the corporation, and the guidance provided by management or the board of directors.

- **Risk assessment.** After the entity sets objectives, the risks (such as theft and waste of assets) from external and internal sources must be assessed. Examining the risks associated with each objective allows management to develop the means to control these risks.

- **Control activities.** To address the risks associated with each objective, management establishes control activities. These activities include procedures that employees must follow. Examples include procedures to protect the assets through segregation of employee duties and the other means we discussed earlier.

- **Information and communication.** Information relevant to decision making must be collected and reported in a timely manner. The events that yield these data may come from internal or external sources. Communication throughout the entity is important to achieve management's goals. Employees must understand what is expected of them and how their responsibilities relate to the work of others. Communication with external parties such as suppliers and shareholders is also important.

- **Monitoring.** After the internal control structure is in place, the firm should monitor its effectiveness so that it can make changes before serious problems arise. In testing components of the internal control structure, companies base their thoroughness on the risk assigned to those components.

Internal control is the general responsibility of all members in an organization. However, the following three groups have specific responsibilities regarding the internal control structure.



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INVOICE

Invoice No. **1574**  
Date: **2010 Dec. 15**

WILXES RADIO COMPANY  
2515 West Peachtree Street  
Atlanta, Georgia 30303

Customer's Orders No. **N-14S**

Sold to: **Bryan Wholesale Co.**

Address: **475 Mason Street**

**Detroit, Michigan 4S823**

Terms: **2/10, n/30, FOB destination**

Date shipped: **2010 December 15**

Shipped by: **Nagel Trucking Co.**

Description	Item Number	Quantity	Price Per Unit	Total Amount
	<b>Model No. 5868-24393</b>	<b>200</b>	<b>\$50</b>	<b>\$10,000</b>
		<b>Total</b>		<b>\$10,000</b>

#### Exhibit 67: Invoice

Management holds ultimate responsibility for establishing and maintaining an effective internal control structure. Through leadership and example, management demonstrates ethical behavior and integrity within the company.

The board of directors provides guidance to management. Because board members have a working knowledge of the functions of the company, they help shield the company from managers who try to override some control procedures for dishonest purposes. Often, an efficient board that has access to the company's internal auditors can discover such fraud.

Auditors within the organization evaluate the effectiveness of the internal control structure and determine whether company policies and procedures are being followed. All employees are part of a communications network that enables an internal control structure to work effectively.

Computerized financial records require the same internal control principles of separation of duties and control over access as a manual accounting system. The exact control steps depend on whether a company is using mainframe computers and minicomputers or microcomputers.

Large corporations might use all three types of computers in their accounting environments. The size and complexity of mainframe computers and minicomputers require specially trained persons to keep these systems operating. While systems specialists operate the computer system itself, programmers develop the programs that direct the computer to perform specific tasks. In a mainframe or minicomputer environment, internal control should include the following:

- Control computer access by placing the computer in an easily secured room, and allow only persons authorized to operate the computer to enter the room.
- Restrict the access of systems specialists (who operate the computer) to software programs and the access of programmers to the computer. This policy prevents the running of unauthorized, altered programs.
- Require the use of passwords to access sensitive company data and confidential personal data. Change the passwords as necessary.

Many smaller companies use microcomputers instead of a mainframe or a minicomputer. Also, large companies might supply certain employees with personal computers. The use of personal computers changes the control

## 8. Control of cash

environment somewhat. Small companies generally do not employ systems specialists and programmers. Instead, these companies use off-the-shelf programs such as accounting, spreadsheet, database management, and word processing packages. The data created by use of these programs are valuable (e.g. the company's accounting records) and often sensitive. Thus, controls are also important. In a personal computer environment, the following controls can be useful:

**Illustration 8.4** Flow of Documents and Goods in a Merchandising Transaction

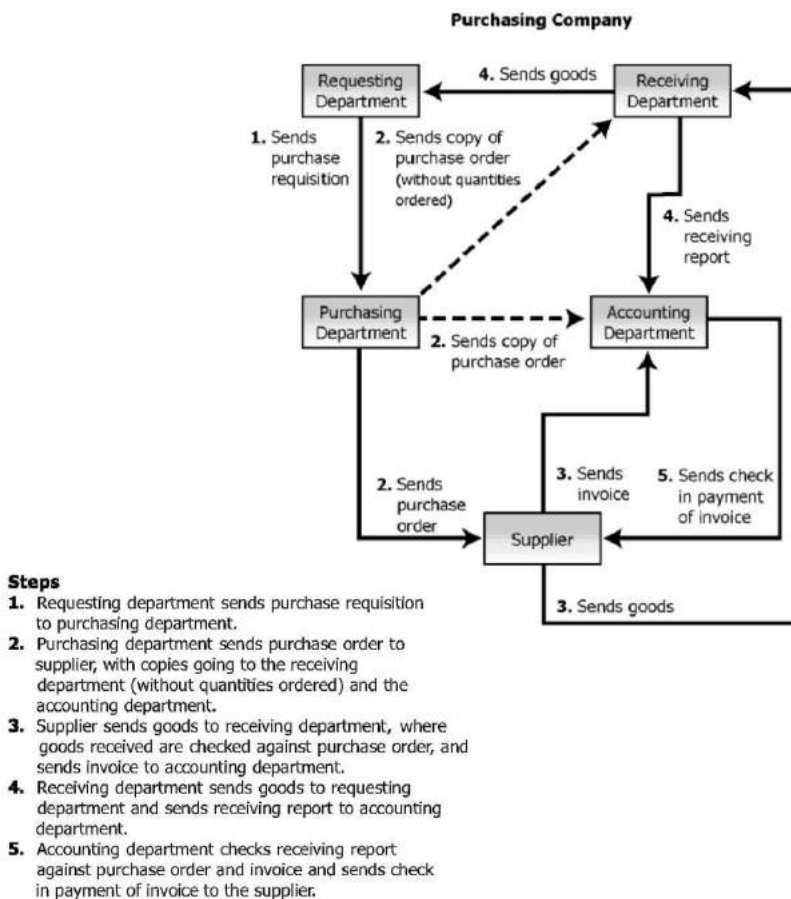


Exhibit 68: Flow of documents and goods in a merchandising transaction

- Require computer users to have tight control over storage of programs and data. Just as one person maintains custody over a certain set of records in a manual system, in a computer system one person maintains custody over certain information (such as the accounts receivable subsidiary ledger). Make backup copies that are retained in a different secured location.

- Require passwords (kept secret) to gain entry into data files maintained on the hard disk.
- In situations where a local area network (LAN) links the personal computers into one system, permit only certain computers and persons in the network to have access to some data files (the accounting records, for example).

Computerized accounting systems do not lessen the need for internal control. In fact, access to a computer by an unauthorized person could result in significant theft in less time than with a manual system.

## Controlling cash

Since cash is the most liquid of all assets, a business cannot survive and prosper if it does not have adequate control over its cash. In accounting, **cash** includes coins; currency; undeposited negotiable instruments such as checks, bank drafts, and money orders; amounts in checking and savings accounts; and demand certificates of deposit. A **certificate of deposit (CD)** is an interest-bearing deposit that can be withdrawn from a bank at will (demand CD) or at a fixed maturity date (time CD). Only demand CDs that may be withdrawn at any time without prior notice or penalty are included in cash. Cash does not include postage stamps, IOUs, time CDs, or notes receivable.

In its general ledger, a company usually maintains two cash accounts—Cash and Petty Cash. On the company's balance sheet, it combines the balances of these two accounts into one amount reported as Cash.

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### An accounting perspective:

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#### Business insight

Users of financial data must look to see the real meaning behind the numbers. Reader's Digest publishes the world's most widely read magazine as well as various other books, home entertainment products, and special interest magazines. In Reader's Digest's annual report, for example, the company defines cash and cash equivalents in this footnote:

The company considers all highly liquid debt instruments with original maturities of three months or less to be cash equivalents.

Since many business transactions involve cash, it is a vital factor in the operation of a business. Of all the company's assets, cash is the most easily mishandled either through theft or carelessness. To control and manage its cash, a company should:

- Account for all cash transactions accurately so that correct information is available regarding cash flows and balances.
- Make certain that enough cash is available to pay bills as they come due.
- Avoid holding too much idle cash because excess cash could be invested to generate income, such as interest.
- Prevent loss of cash due to theft or fraud.

The need to control cash is clearly evident and has many aspects. Without the proper timing of cash flows and the protection of idle cash, a business cannot survive. This section discusses cash receipts and cash disbursements. Later in the chapter, we explain the importance of preparing a bank reconciliation for each bank checking account and controlling the petty cash fund.

When a merchandising company sells its merchandise inventory, it may receive cash immediately or several days or weeks later. A clerk receives the cash immediately over the counter, records it, and places it in a cash register. The presence of the customer as the sale is rung up usually ensures that the cashier enters the correct amount of the sale in the cash register. At the end of each day, stores reconcile the cash in each cash register with the cash register tape or computer printout for that register. Payments received later are almost always in the form

## 8. Control of cash

of checks. Stores prepare a record of the checks received as soon as they are received. Some merchandising companies receive all their cash receipts on a delayed basis as payments on accounts receivable. (See the cash receipts cycle for merchandise transactions in Exhibit 69.)

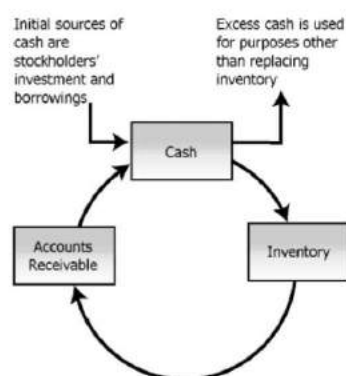
Although businesses vary their specific procedures for controlling cash receipts, they usually observe the following principles:

- Prepare a record of all cash receipts as soon as cash is received. Most thefts of cash occur before a record is made of the receipt. Once a record is made, it is easier to trace a theft.
- Deposit all cash receipts intact as soon as feasible, preferably on the day they are received or on the next business day. Undeposited cash is more susceptible to misappropriation.
- Arrange duties so that the employee who handles cash receipts does not record the receipts in the accounting records. This control feature follows the general principle of segregation of duties given earlier in the chapter, as does the next principle.
- Arrange duties so that the employee who receives the cash does not disburse the cash. This control measure is possible in all but the smallest companies.

Companies also need controls over cash disbursements. Since a company spends most of its cash by check, many of the internal controls for cash disbursements deal with checks and authorizations for cash payments. The basic principle of segregation of duties also applies in controlling cash disbursements. Following are some basic control procedures for cash disbursements:

- Make all disbursements by check or from petty cash. Obtain proper approval for all disbursements and create a permanent record of each disbursement. Many retail stores make refunds for returned merchandise from the cash register. When this practice is followed, clerks should have refund tickets approved by a supervisor before refunding cash.
- Require all checks to be serially numbered and limit access to checks to employees authorized to write checks.
- Require two signatures on each check over a material amount so that one person cannot withdraw funds from the bank account.

**Illustration 8.5** Cash Receipts Cycle for Merchandise Transactions



Cash initially comes into the business from stockholders' investment and borrowing. Cash is then invested in inventory and other assets. When inventory is sold, cash may be received immediately, or receipt may be delayed and involve accounts receivable. The inventory generally is sold at more than cost so the company can make a profit. Each time the cycle is completed, the amount of cash grows and may be used for purposes other than replacing inventory.

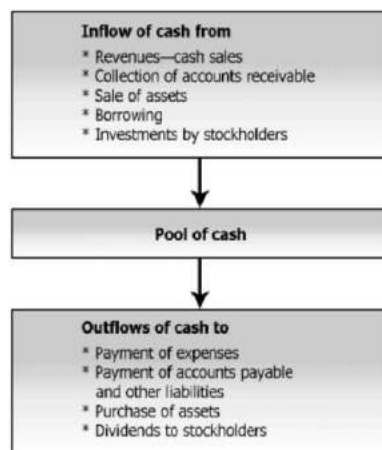
Exhibit 69: Cash receipts cycle for merchandise transactions

- Arrange duties so that the employee who authorizes payment of a bill does not sign checks. Otherwise, the checks could be written to friends in payment of fictitious invoices.
- Require approved documents to support all checks issued.
- Instruct the employee authorizing cash disbursements to make certain that payment is for a legitimate purpose and is made out for the exact amount and to the proper party.
- Stamp the supporting documents paid when liabilities are paid and indicate the date and number of the check issued. These procedures lessen the chance of paying the same debt more than once.
- Arrange duties so that those employees who sign checks neither have access to canceled checks nor prepare the bank reconciliation. This policy makes it more difficult for an employee to conceal a theft.
- Have an employee who has no other cash duties prepare the bank reconciliation each month, so that errors and shortages can be discovered quickly.
- Void all checks incorrectly prepared. Mark these checks void and retain them to prevent unauthorized use.

Exhibit 70 shows an overview of some of the internal control considerations relating to cash.

Most companies use checking accounts to handle their cash transactions. The company deposits its cash receipts in a bank checking account and writes checks to pay its bills. The bank sends the company a statement each month. The company checks this statement against its records to determine if it must make any corrections or adjustments in either the company's balance or the bank's balance. You learn how to do bank reconciliations later in this chapter. In the next section, we discuss the bank checking account. If you have a personal checking account, some of this information will be familiar to you.

**Illustration 8.6** Internal Control Considerations Regarding Cash



**Internal control considerations**

1. Are all cash receipts being properly recorded and actually going into the company's pool of cash, or are individuals siphoning off some of these receipts for their own use?
2. Is the pool of cash protected from theft? Is the cash on hand managed so as to produce income for the company and yet available when needed to make legitimate disbursements?
3. Is there close control over cash disbursements to ensure that only legitimate disbursements are made in the proper amounts and on a timely basis?

Exhibit 70: Internal control considerations regarding cash

## 8. Control of cash

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### An accounting perspective:

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#### Uses of technology

Many companies are using Electronic Data Interchange (EDI) to transmit business documents such as purchase orders, invoices, and even payments for goods and services. Instead of mailing paper copies of these documents, the entire transaction is done electronically. This procedure speeds up the transaction and eliminates the expense of sending paper copies. One concern of such procedures is the security of the transaction. Since this issue is being successfully addressed by various methods, including encrypting the data, we can expect the use of EDI to continue to increase in the future.

#### The bank checking account

Banks earn income by providing a variety of services to individuals, businesses, and other entities such as churches or libraries. One of these services is the checking account. A **checking account** is a money balance maintained in the bank; it is subject to withdrawal by the depositor, or owner of the money, on demand. To provide depositors with an accurate record of depositor funds received and disbursed, a bank uses the business documents discussed in this section.<sup>28</sup>

A bank requires a new depositor to complete a **signature card**, which provides the signatures of persons authorized to sign checks drawn on an account. The bank retains the card and uses it to identify signatures on checks it pays. The bank does not compare every check with this signature card. Usually, it makes a comparison only when the depositor disputes the validity of a check paid by the bank or when someone presents a check for an unusually large sum for payment.

When depositors make a bank deposit, they prepare a deposit ticket or slip. A **deposit ticket** is a form that shows the date and the items that make up the deposit (Exhibit 71). Often, the ticket is pre-printed to show the depositor's name, address, and account number. A depositor enters the items constituting the deposit—cash and a list of checks—on the ticket when making the deposit. The depositor receives a receipt showing the date of deposit and the amount deposited.

A **check** is a written order to a bank to pay a specific sum of money to the party designated as the payee by the party issuing the check. Thus, every check transaction involves three parties: the bank, the **payee** (party to whom the check is made payable), and the **drawer** (depositor). Most depositors use serially numbered checks pre-printed with information about the depositor, such as name, address, and telephone number. Often a business check has an attached remittance advice. A **remittance advice** informs the payee why the **drawer** (or maker) of the check is making this payment. Before cashing or depositing it, the payee detaches the remittance advice from the check (Exhibit 72).

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<sup>28</sup> Due to relaxed federal regulations, institutions other than banks—such as savings and loan associations and credit unions—now offer checking account services. All of these institutions function somewhat similarly; but, for simplicity's sake, we discuss only banks here.

<p><b>Name</b> <u>M. Miller Company</u>  <b>Acct. No.</b> <u>326-587-90</u>  <b>Date</b> <u>2007 July 7</u></p> <hr/> <p style="text-align: center;"><b>1-0463436101</b></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Currency</td> <td style="padding: 5px;">150</td> <td style="padding: 5px;">..</td> </tr> <tr> <td style="padding: 5px;">Coin</td> <td style="padding: 5px;">45</td> <td style="padding: 5px;">50</td> </tr> <tr> <td style="padding: 5px;">Williams</td> <td style="padding: 5px;">100</td> <td style="padding: 5px;">..</td> </tr> <tr> <td style="padding: 5px;">Sloams</td> <td style="padding: 5px;">200</td> <td style="padding: 5px;">..</td> </tr> <tr> <td style="padding: 5px;">Subtotal</td> <td style="padding: 5px;">495</td> <td style="padding: 5px;">50</td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;">495</td> <td style="padding: 5px;">50</td> </tr> </table>	Currency	150	..	Coin	45	50	Williams	100	..	Sloams	200	..	Subtotal	495	50					495	50
Currency	150	..																				
Coin	45	50																				
Williams	100	..																				
Sloams	200	..																				
Subtotal	495	50																				
	495	50																				

Exhibit 71: Deposit ticket

**Illustration 8.8** Check with Attached Remittance Advice

1428

JOSIAH C. SCOTT  
1234 Dawson Road  
Corvallis, OR 97330

DATE July 6, 2007

PAY TO THE ORDER OF John Doe's Company \$ 560.00

Five hundred sixty and no/100----- DOLLARS

FOR Invoice #4501 *Josiah C. Scott*

#001426# #123456789 #4 36# 3739#

DETACH AND RETAIN THIS STATEMENT  
IF NOT CORRECT PLEASE NOTIFY US PROMPTLY NO RECEIPT DESIRED.

DATE	DESCRIPTION	AMOUNT
07/06/07	P.O. No. R1230 - Payment of Invoice #4501	\$560.00

Exhibit 72: Check with attached remittance advice

JOHH DOE'S COMPANY  
P O BOX 216603  
CoRVALLIS OR 218803

6141337  
2010 September 1THRU 2010/09/29  
PAGE 1

ASK US ABOUT  
REAL ESTATE AHD CONSTRUCTION LOANS  
BUSINESS BASIC ACCOUNT 614153

DESCRIPTION	DEBITS	CREDIT	DATE	BALANCE
BALANCE LAST STATEMENT			2010/08/31	3,594.44
CHECK # 1033	68.77		2010/09/08	3,525.67
CHECK # 1031	102.41		2010/09/08	3,423.26
DEPOSIT		7,300.00	2010/09/14	10,723.25
CHECK # 1036	38.95		2010/09/18	10,684.31
CHECK # 1037	16.08		2010/09/20	10,668.23
CHECK # 1035	114.50		2010/09/21	10,553.33
CHECK # 1038	7105.00		2010/09/21	3,448.33
CHECK # 1039	137.45		2010/09/25	3,310.88

## 8. Control of cash

DEPOSIT		1,000.00	2010/09/28	4,310.88
NEF CHECK	102.00		2010/09/30	4,208.88
SERVICE CHARGE	8,00		2010/09/30	4,200.88
SAFE DEPOSIT BOX REMT	15.00		2010/09/30	4,185.38
BALANCE THIS STATEMENT			2010/09/30	4,185.38
TOTAL CREDITS (2)	S,300.00	MINIMUM BALANCE		3,195.68
TOTAL DEBITS (7)	7,708.55	AVG AVAILABLE BALANCE		5,236.31
		Average BALANCE		5,236.31

### YOUR CHECKS SEQUENCED

DATE	CHECK #	AMOUNT	DATE	CHECK #	AMOUNT	DATE	CHECK #	AMOUNT
	1031*	102.41	09/18	1036	38.95	03/25	1039	137.45
09/08	1033*	6B. 77	09/20	1037	16.08			
09/21	1035	114.90	09/21	1033	7,105.00			

### Exhibit 73: Bank statement

A **bank statement** is a statement issued (usually monthly) by a bank describing the activities in a depositor's checking account during the period. Exhibit 73 shows a bank statement that includes the following data:

- Deposits made to the checking account during the period.
- Checks paid out of the depositor's checking account by the bank during the period. These checks have cleared the bank and are canceled.
- Other deductions from the checking account for service charges, NSF (not sufficient funds) checks, safe-deposit box rent, and check printing fees. Banks assess **service charges** on the depositor to cover the cost of handling the checking account, such as check clearing charges. An **NSF (not sufficient funds)** check is Bank Statement a customer's check returned from the customer's bank to the depositor's bank because the funds in the customer's checking account balance were insufficient to cover the check. The depositor's bank deducts the amount of the returned check from the depositor's checking account. Since the customer still owes the depositor money, the depositor restores the amount of the NSF check to the account receivable for that customer in the company's books.
- Other additions to the checking account from proceeds of a note collected by the bank for the depositor and interest earned on the account.



## Debit



Account Title Josiah C. Scott Account Number 43613739

Requested by Ryan DATE 7/6/07

Phone Number 567-1234

DESCRIPTION	AMOUNT
Safe Deposit Box Rental	\$ 15.00
TOTAL	\$ 15.00

DRAWN BY AJC APPROVED BY JIC

⑆ 123456789 ⑆

## Credit



Account Title Josiah C. Scott Account Number 43613739

Requested by Ryan DATE 7/6/07

Phone Number 567-1234

DESCRIPTION	AMOUNT
Collection of John Doe Co. note from X Co.	\$ 1,225.00
TOTAL	\$ 1,225.00

DRAWN BY AJC APPROVED BY JIC

⑆ 123456789 ⑆

Exhibit 74: Debit memorandum (top) and credit memorandum (bottom)

In addition to the data in the bank statement in Exhibit 73, bank statements also can show non-routine deposits made to the depositor's checking account. Such deposits are made by a third party. For example, the bank may have received a wire transfer of funds for the depositor.

A **wire transfer** of funds is an interbank transfer of funds by telephone. Companies that operate in many widely scattered locations and have checking accounts with several different local banks often use interbank transfers of funds. These companies may set up special procedures to avoid accumulating too much idle cash in local bank accounts. One such procedure involves the use of special-instruction bank accounts. For example, a company may set up **transfer bank accounts** so local banks automatically transfer to a central bank (by wire or bank draft) all amounts on deposit in excess of a stated amount. In this way, transfers move funds not needed for local operations quickly to headquarters, where the company can use the funds or invest them.

## 8. Control of cash

Frequently, the bank returns canceled checks and original deposit tickets with the bank statement. Since it is expensive to sort, handle, and mail these items, some banks no longer return them to depositors. These banks usually store the documents on microfilm, with photocopies available if needed. Most depositors need only a detailed bank statement, as shown in Exhibit 73, and not the original documents to show what transactions occurred during a given period.

When banks debit or credit a depositor's checking account, they prepare debit and credit memoranda (memos). Banks may also return these memos with the bank statement. A **debit memo** is a form used by a bank to explain a deduction from the depositor's account; a **credit memo** explains an addition to the depositor's account. The terms debit memo and credit memo may seem reversed, but remember that the depositor's checking account is a liability—an account payable—of the bank. So, when the bank seeks to reduce a depositor's balance, it prepares a debit memo. To increase the balance, it prepares a credit memo. Exhibit 74 contains examples of debit and credit memos. Some banks no longer mail these documents to the depositor and rely instead on explanations in the bank statements.

Information that the depositor did not know before receiving the bank statement requires new journal entries on the company's books. After the entries have been made to record the new information, the balance in the Cash account is the actual cash available to the company. When the depositor has already received notice of NSF checks and other bank charges or credits, the needed journal entries may have been made earlier. In this chapter, we assume no entries have been made for these items unless stated otherwise.

When a company receives its bank statement, it must reconcile the balance shown by the bank with the cash balance in the company's books. If you have a personal checking account, you also should reconcile your bank statement with your checkbook. You can use the reconciliation form on the back of the bank statement to list your checks that have not yet been paid by the bank and your deposits not yet shown on the bank statement. Some small businesses use this form. Others prepare a separate bank reconciliation, which we discuss in the next section.

### Bank reconciliation

A **bank reconciliation** is a schedule the company (depositor) prepares to reconcile, or explain, the difference between the cash balance on the bank statement and the cash balance on the company's books. The company prepares a bank reconciliation to determine its actual cash balance and prepare the entry(ies) to correct the cash balance in the ledger.

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### An accounting perspective:

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#### Business insight

Within the internal control structure, segregation of duties is an important way to prevent fraud. One place to segregate duties is between the cash disbursement cycle and bank reconciliations. To prevent collusion among employees, the person who reconciles the bank account should not be involved in the cash disbursement cycle. Also, the bank should mail the statement directly to the person who reconciles the bank account each month. Sending the statement directly limits the number of employees who would have an opportunity to tamper with the statement.

Look at Exhibit 75; the bank reconciliation has two main sections. The top section begins with the balance on the bank statement. The bottom section begins with the balance on the company's books. After the company makes adjustments to both the bank and book balances, both adjusted balances should be the same. The steps in preparing a bank reconciliation are as follows:

**Deposits.** Compare the deposits listed on the bank statement with the deposits on the company's books. To make this comparison, place check marks in the bank statement and in the company's books by the deposits that agree. Then determine the deposits in transit. A **deposit in transit** is typically a day's cash receipts recorded in the depositor's books in one period but recorded as a deposit by the bank in the succeeding period. The most common deposit in transit is the cash receipts deposited on the last business day of the month. Normally, deposits in transit occur only near the end of the period covered by the bank statement. For example, a deposit made in a bank's night depository on May 31 would be recorded by the company on May 31 and by the bank on June 1. Thus, the deposit does not appear on a bank statement for the month ended May 31. Also check the deposits in transit listed in last month's bank reconciliation against the bank statement. Immediately investigate any deposit made during the month but missing from the bank statement (unless it involves a deposit made at the end of the period).

**Paid checks.** If canceled checks are returned with the bank statement, compare them to the statement to be sure both amounts agree. Then, sort the checks in numerical order. Next, determine which checks are outstanding. **Outstanding checks** are those issued by a depositor but not paid by the bank on which they are drawn. The party receiving the check may not have deposited it immediately. Once deposited, checks may take several days to clear the banking system. Determine the outstanding checks by comparing the check numbers that have cleared the bank with the check numbers issued by the company. Use check marks in the company's record of checks issued to identify those checks returned by the bank. Checks issued that have not yet been returned by the bank are the outstanding checks. If the bank does not return checks but only lists the cleared checks on the bank statement, determine the outstanding checks by comparing this list with the company's record of checks issued. Sometimes checks written long ago are still outstanding. Checks outstanding as of the beginning of the month appear on the prior month's bank reconciliation. Most of these have cleared during the current month; list those that have not cleared as still outstanding on the current month's reconciliation.

**Bank debit and credit memos.** Verify all debit and credit memos on the bank statement. Debit memos reflect deductions for such items as service charges, NSF checks, safe-deposit box rent, and notes paid by the bank for the depositor. Credit memos reflect additions for such items as notes collected for the depositor by the bank and wire transfers of funds from another bank in which the company sends funds to the home office bank. Check the bank debit and credit memos with the depositor's books to see if they have already been recorded. Make journal entries for any items not already recorded in the company's books.

**Errors.** List any errors. A common error by depositors is recording a check in the accounting records at an amount that differs from the actual amount. For example, a USD 47 check may be recorded as USD 74. Although the check clears the bank at the amount written on the check (USD 47), the depositor frequently does not catch the error until reviewing the bank statement or canceled checks.

Deposits in transit, outstanding checks, and bank service charges usually account for the difference between the company's Cash account balance and the bank balance. (These same items can cause a difference between your personal checkbook balance and the balance on your bank statement.) Remember that all items shown on the bank reconciliation as adjustments of the book (ledger) balance require journal entries to adjust the Cash account (items

## 8. Control of cash

4, 5, and 6 in Exhibit 75 and in the following example). Items appearing as adjustments to the balance per bank statement do not require entries by the depositor (items 2 and 3). Of course, you should call any bank errors to the bank's attention.

R.L. LEE COMPANY  
Bank Reconciliation  
2010 May 31

1	<b>Balance per bank statement, 2010 May 31</b>		<b>\$3,252</b>
2	<b>Add: Deposit in transit</b>		<b>452</b>
			<b>\$3,704</b>
3	<b>Less: Outstanding checks:</b>		
	<b>No. 9544</b>	<b>\$322</b>	
	<b>No. 9545</b>	<b>168</b>	
	<b>No. 9546</b>	<b>223</b>	<b>713</b>
	<b>Adjusted balance, 2010 May 31,</b>		<b>\$2,991</b>
1	<b>Balance per ledger, 2010 May 31</b>		<b>\$1,891</b>
4	<b>Add: Note collected (including interest of \$25)</b>		<b>1,225</b>
			<b>\$3,116</b>
5	<b>Less: NSF check (R. Johnson)</b>	<b>\$102</b>	
6	<b>Safe-deposit box rent</b>	<b>15</b>	
6	<b>Service charges</b>	<b>8</b>	<b>125</b>
	<b>Adjusted balance, 2010 May 31</b>		<b>\$2,991</b>

Exhibit 75: Bank reconciliation

To illustrate the preparation of the bank reconciliation in Exhibit 75, assume the following (these items are keyed to numbers in that illustration):

- On May 31, R. L. Lee Company showed a balance in its Cash account of USD 1,891. On June 2, Lee received its bank statement for the month ended May 31, which showed an ending balance of USD 3,252.
- A matching of debits to the Cash account on the books with deposits on the bank statement showed that the USD 452 receipts of May 31 were included in Cash but not included as a deposit on the bank statement. This deposit was in the bank's night deposit chute on May 31.
- A comparison of checks issued with checks that had cleared the bank showed three checks outstanding:

<b>No. 9544</b>	<b>\$322</b>
<b>No. 9545</b>	<b>168</b>
<b>No. 9546</b>	<b>223</b>
<b>Total</b>	<b>\$713</b>

- Included with the bank statement was a credit memo for USD 1,225 (principal of USD 1,200 + interest of USD 25) for collection of a note owed to Lee by Shipley Company.
- Included with the bank statement was a USD 102 debit memo for an NSF check written by R. Johnson and deposited by Lee.
- Charges made to Lee's account include USD 15 for safe-deposit box rent and USD 8 for service charges.

After reconciling the book and bank balances as shown in Exhibit 75, Lee Company finds that its actual cash balance is USD 2,991. The following entries record information from the bank reconciliation:

## 8. Control of cash

4	Cash	1,225	
	Notes Receivable—Shipley Company (-A)		1,200
	Interest Receivable (-A)		25
	To record note collected from Shipley Company.		
5	Accounts Receivable—R. Johnson* (Contra Account)	102	
	Cash (-A)		102
	To charge NSF check back to customer, R. Johnson.		
6	Bank Service Charge Expense (-SE)	23	
	Cash (-A)		23
	To record bank service charges.		

\*This debit would be posted to the Accounts Receivable contrae account in the general ledger and to R. Johnson's account in the Accounts Receivable subsidiary ledger.

The income statement would include the USD 23 bank service charge as an expense and the USD 25 interest as revenue. The May 31 balance sheet would show USD 2,991 cash, the actual cash balance. You could combine the preceding three entries into one compound entry as follows:

Cash (+A)	1,100	
Bank Service Charge Expense (-SE)	23	
Account Receivable—R. Johnson (+A)	102	
Note Receivable (-A)		1,200
Interest Revenue (+SE)		25
To correct the accounts for needed changes identified in the bank reconciliation.		

The bank routinely handles the deposit in transit and any outstanding checks already recorded in the depositor's books. Since these items appear on the bank balance side of the reconciliation, they require no entry in the company's books. The bank processes these items in the subsequent period.

When a company maintains more than one checking account, it must reconcile each account separately with the balance on the bank statement for that account. The depositor should also check carefully to see that the bank did not combine the transactions of the two accounts.

To make sure a check cannot bounce and become an NSF check, a payee may demand a certified or cashier's check from the maker. Both certified checks and cashier's checks are liabilities of the issuing bank rather than the depositor. As a result, payees usually accept these checks without question.

- A **certified check** is a check written, or drawn, by a depositor and taken to the depositor's bank for certification. The bank stamps certified across the face of the check and inserts the name of the bank and the date; a bank official signs the certification. The bank certifies a check only when the depositor's balance is large enough to cover the check. The bank deducts the amount of the check from the depositor's account at the time it certifies the check.

- A **cashier's check** is a check made out to either the depositor or a third party and written, or drawn, by a bank after deducting that amount from the depositor's account or receiving cash from the depositor.

In this section, you learned that all cash receipts should be deposited in the bank and all cash disbursements should be made by check. However, the next section explains the convenience of having small amounts of cash (petty cash) available for minor expenditures.

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## An accounting perspective:

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### Uses of technology

Most companies now offer to deposit employees' paychecks directly into their bank accounts. This process of transferring money by telephone, computer, or wire is called electronic fund transferring. Often companies prefer this method because it limits the number of employees involved in the payroll process. Manipulation and fraud can still occur whenever firms do not separate duties; however, limiting access to the payroll function may eliminate some of the risk associated with internal control weaknesses.

### Petty cash funds

At times, every business finds it convenient to have small amounts of cash available for immediate payment of items such as delivery charges, postage stamps, taxi fares, supper money for employees working overtime, and other small items. To permit these cash disbursements and still maintain adequate control over cash, companies frequently establish a **petty cash fund** of a round figure such as USD 100 or USD 500.

Usually one individual, called the petty cash custodian or cashier, is responsible for the control of the petty cash fund and documenting the disbursements made from the fund. By assigning the responsibility for the fund to one individual, the company has internal control over the cash in the fund.

A business establishes a petty cash fund by writing a check for, say, USD 100. It is payable to the petty cash custodian. The petty cash fund should be large enough to make disbursements for a reasonable period, such as a month. The following entry records this transaction as follows:

Petty Cash	100	
Cash		100

To establish a petty cash fund.

After the check is cashed, the petty cash custodian normally places the money in a small box that can be locked. The fund is now ready to be disbursed as needed.

One of the conveniences of the petty cash fund is that payments from the fund require no journal entries at the time of payment. Thus, using a petty cash fund avoids the need for making many entries for small amounts. Only when the fund is reimbursed, or when the end of the accounting period arrives, does the firm make an entry in the journal.

When disbursing cash from the fund, the petty cash custodian prepares a petty cash voucher, which should be signed by the person receiving the funds. A **petty cash voucher** (Exhibit 76) is a document or form that shows the amount of and reason for a petty cash disbursement. The custodian should prepare a voucher for each disbursement and staple any invoices for expenditures to the petty cash voucher. At all times, the employee responsible for petty cash is accountable for having cash and petty cash vouchers equal to the total amount of the fund.

Companies replenish the petty cash fund at the end of the accounting period, or sooner if it becomes low. The reason for replenishing the fund at the end of the accounting period is that no record of the fund expenditures is in the accounts until the check is written and a journal entry is made. (Sometimes we refer to this fund as an imprest

## 8. Control of cash

fund since it is replenished when it becomes low.) The petty cash custodian presents the vouchers to the employee having authority to order that the fund be reimbursed. After the vouchers are examined, if all is in order, that employee draws a check to restore the fund to its original amount.

To determine which accounts to debit, an employee summarizes the petty cash vouchers according to the reasons for expenditure. Next, that person stamps or defaces the petty cash vouchers to prevent reuse. The journal entry to record replenishing the fund would debit the various accounts indicated by the summary and credit Cash.



PETTY CASH VOUCHERS NO. 359  
 To Local Cartage, Inc. Date 2010 June 29

EXPLANATION	ACCT NO.	AMOUNT
Freight on parts	27	12 57

APPROVED B **A.E.C.** RECEIVED B **Ken Black**

Exhibit 76: Petty cash voucher

For example, assume the USD 100 petty cash fund currently has a money balance of USD 7.40. A summary of the vouchers shows payments of USD 22.75 for shipping, USD 50.80 for stamps, and USD 19.05 for an advance to an employee; these payments total USD 92.60. After the vouchers have been examined and approved, an employee draws a check for USD 92.60 which, when cashed, restores the cash in the fund to its USD 100 balance. The journal entry to record replenishment is:

Delivery Expense	22.75	
Postage Expense	50.80	
Receivable from Employees (or Advances t) Employees)	19.05	
Cash		92.60

To replenish a petty cash fund.

Note that the entry to record replenishing the fund does not credit the Petty Cash account. We make entries to the Petty Cash account only when the fund is established, when the end of the accounting period arrives and the fund is not replenished, or when the size of the fund is changed.

At the end of an accounting period, the firm records any petty cash disbursements for which the fund has not yet been replenished. Since the fund has not been replenished, the credit would be to Petty Cash rather than Cash. Failure to make an entry at the end of an accounting period would cause errors in both the income statement and balance sheet. The easiest way to record these disbursements is to replenish the fund.

After a time, if the petty cash custodian finds that the petty cash fund is larger than needed, the excess petty cash should be deposited in the company's checking account. The required entry to record a decrease in the fund debits Cash and credits Petty Cash for the amount returned and deposited. On the other hand, a petty cash fund may be too small, requiring replenishment every few days. The entry to record an increase in the fund debits Petty Cash and credits Cash for the amount of the increase.

To illustrate, the entry to decrease the petty cash fund by USD 50 would be:

Cash	50	
Petty Cash		50

To decrease the size of the petty cash fund by \$50.

The entry to increase the petty cash fund by USD 600 would be:

Petty Cash	600	
Cash		600

To increase the size of the petty cash fund by \$600.

The following rules summarize how the Petty Cash account is debited and credited:

- Debited to establish
- Debited to increase
- Credited to decrease
- Credited to terminate

Sometimes, the petty cash custodian makes errors in making change from the fund. These errors cause the cash in the fund to be more or less than the amount of the fund less the total vouchers. When the fund is restored to its original amount, the credit to Cash is for the difference between the established amount and the actual cash in the

## 8. Control of cash

fund. We would debit all vouchered items. Any discrepancy should be debited or credited to an account called Cash Short and Over. The Cash Short and Over account is an expense or a revenue, depending on whether it has a debit or credit balance.

To illustrate, assume in the preceding example that the balance in the fund was only USD 6.10 instead of USD 7.40. Restoring the fund to USD 100 requires a check for USD 93.90. Since the petty cash vouchers total only USD 92.60, the fund is short USD 1.30. The entry for replenishment is:

Delivery Expense	22.75	
Postage Expense	50.80	
Receivable from Employees	19.05	
Cash Short and Over	1.30	
Cash		93.90

To replenish a petty cash fund.

Entries in the Cash Short and Over account also result from other change-making activities. For example, assume that a clerk accidentally shortchanges a customer USD 1 and that total cash sales for the day are USD 740.50. At the end of the day, actual cash is USD 1 over the sum of the sales tickets or the total of the cash register tape. The journal entry to record the day's cash sales is:

Cash	741.50	
Sales		740.50
Cash Short and Over		1.00

To record cash sales for the day.

### Analyzing and using the financial results—The quick ratio

The **quick ratio** measures a company's short-term debt-paying ability. It is the ratio of quick assets (cash, marketable securities, and net receivables) to current liabilities. When computing quick assets, we do not include inventories and prepaid expenses because they might not be readily convertible into cash. A rule of thumb is that the ratio of quick assets to current liabilities should be 1:1 or higher. However, a lower quick ratio is satisfactory in companies that generate a steady flow of cash in their operations. Short-term creditors are interested in this ratio since it relates the pool of cash and immediate cash inflows to immediate cash outflows. The formula for the quick ratio is:

$$\text{Quick ratio} = \frac{\text{Quick assets}}{\text{Current liabilities}}$$

Based on the following information, we can determine that the 2010 and 2009 quick ratios are 6.85 and 6.84, respectively:

	2010	2009
Cash	\$315,064	\$283,913
Short-term investments	119,093	314,872
Net receivables	320,892	177,300
Total quick assets	\$755,049	\$776,085
Current liabilities	\$110,147	\$113,430
Total quick assets	\$755,049 = 6.85	\$776,085 = 6.84
Current liabilities	\$110,147	\$113,430

### An ethical perspective: City club restaurant

The City Club Restaurant is a member-owned entity in Carson City. For 20 years, John Blue has managed the restaurant and received only minimal salary increases. He believes he is grossly underpaid in view of the significant inflation that has occurred. A few years ago he began supplementing his income by placing phony invoices in the petty cash box, writing a petty cash

voucher for the amount of each invoice, withdrawing cash equal to the amount of each invoice for his personal use, and later approving the vouchers for reimbursement. Through this mechanism, John increased his income by about USD 12,000 per year, an amount that he considered fair. No one else knows what is happening, and the manager feels fully justified in supplementing his income in this way.

Now that you have learned how to control a company's most liquid asset, cash, in the next chapter you are ready to study receivables and payables. As you realize, the backbone of our economy is credit. In all probability, the next automobile you plan to buy will be financed. Companies are anxious to offer credit to worthy customers and prospective customers. The many offers of credit we receive from various businesses are evidence of the importance companies place on credit as a method of stimulating sales and expanding their business.

### Understanding the learning objectives

- The internal control structure of a company includes its plan of organization and all the procedures and actions taken by the company to protect its assets against theft and waste, ensure compliance with company policies and federal law, evaluate the performance of all personnel in the company to promote efficiency of operations, and ensure accurate and reliable operating data and accounting records.
- The purpose of internal control is to ensure the efficient operation of a business.
- Cash includes coins; currency; undeposited negotiable instruments such as checks, bank drafts, and money orders; amounts in checking and saving accounts; and demand certificates of deposit.
- To protect their cash, companies should account for all cash transactions accurately, make certain enough cash is available to pay bills as they come due, avoid holding too much idle cash, and prevent loss of cash due to theft or fraud.
- Procedures for controlling cash receipts include such basic principles as recording all cash receipts as soon as cash is received; depositing all cash receipts on the day they are received or on the next business day; and preventing the employee who handles cash receipts from also recording the receipts in the accounting records or from disbursing cash.
- Procedures for controlling cash disbursements include, among others, making all disbursements by check or from petty cash, using checks that are serially numbered, requiring two signatures on each check, and having a different person authorize payment of a bill than the persons allowed to sign checks.
- A bank reconciliation is prepared to reconcile, or explain, the difference between the cash balance on the bank statement and the cash balance on the company's books and to make the required entry(ies) to correct the cash balance in the ledger.
- A bank reconciliation is shown in Exhibit 75.
- Journal entries are needed for all items that appear in the bank reconciliation as adjustments to the balance per ledger to arrive at the adjusted cash balance.
- Companies establish a petty cash fund to permit minor cash disbursements and still maintain adequate control over cash.
- When the cash in the petty cash fund becomes low, the fund should be replenished. A journal entry is necessary to record the replenishment.

## 8. Control of cash

- Quick ratio equals cash, marketable securities, and net receivables divided by current liabilities.
- The quick ratio measures a company's short-term debt-paying ability.

### Demonstration problem

**Demonstration problem A** You are the manager of a restaurant that has an ice cream parlor as a separate unit. Your accountant comes in once a year to prepare financial statements and the tax return. In the current year, you have a feeling that even though business seems good, net income is going to be lower. You ask the accountant to prepare condensed statements on a monthly basis. All sales are priced to yield an estimated gross margin of 40 per cent. You, your accountant, and several of the accountant's assistants take physical inventories at the end of each of the following four months. The resulting sales, cost of goods sold, and gross margins are:

March	April		May		June			
	Ice Cream Parlor	Restaurant	Ice Cream Parlor	Restaurant	Ice Cream Parlor	Restaurant	Ice Cream Parlor	
Sales	\$36,300	\$53,000	\$39,050	\$42,750	\$38,100	\$39,000	\$41,250	\$35,500
Cost of goods sold	22,275	31,500	23,800	31,000	22,975	30,750	25,500	31,125
Gross Margin	\$13,025	\$21,500	\$15,250	\$11,750	\$15,125	\$8,250	\$15,750	\$4,375

What would you suspect after analyzing these reports? What sales control procedures would you recommend to correct the situation? All of the points in this problem were not specifically covered in the chapter, although the principles were. Use logic, common sense, and knowledge gained elsewhere in coming up with some of the control procedures.

**Demonstration problem B** The following data pertains to Carr Company:

- Balance per bank statement, dated 2010 March 31, is USD 4,450.
- Balance of the Cash account on the company's books as of 2010 March 31, is USD 4,459.
- The USD 1,300 deposit of March 31 was not on the bank statement.
- Of the checks recorded as cash disbursements in March, some checks, totaling USD 1,050, have not yet cleared the bank.
- Service and collection charges for the month were USD 10.
- The bank erroneously charged the Carr Company account for the USD 200 check of another company. The check was included with the canceled checks returned with the bank statement.
- The bank credited the company's account with the USD 1,000 proceeds of a non interest-bearing note that it collected for the company.
- A customer's USD 75 check marked NSF was returned with the bank statement.
- As directed, the bank paid and charged to the company's account a USD 507.50 non interest-bearing note of Carr Company. This payment has not been recorded by the company.
- An examination of the cash receipts and the deposit tickets revealed that the bookkeeper erroneously recorded a customer's check of USD 148.50 as USD 135.00.

The bank credited the company's checking account for USD 20 interest earned.

- Prepare a bank reconciliation as of 2010 March 31.
- Prepare the necessary journal entry or entries to adjust the Cash account.

### Solution to demonstration problem

**Solution to demonstration problem A** The gross margin percentages are as follows:

March	April	May	June
-------	-------	-----	------

Restaurant	35.88 per cent	39.05 per cent	39.70 per cent	38.18 per cent
Ice cream parlor	40.57 per cent	27.49 per cent	21.15 per cent	12.32 per cent

Either cash or inventory is being stolen or given away in the ice cream parlor. Employees or outsiders may be pocketing cash. Or the employees may be giving extra-large ice cream cones to friends, or eating the ice cream themselves. Several things could be done to improve the sales control procedures:

- The manager could hire an investigator to come in and watch the employees in action. If cash is being pocketed, the employees could be fired.
- The prices of ice cream cones could be changed to odd amounts so that employees would not be as able to make change without going to the cash register. Also, the No Sale lever could be removed from the cash register.
- The customers could be encouraged to ask for their cash register receipts by having a monthly drawing (for some prize) by cash register receipt number.
- The cash register should be placed in a prominent position so that each customer could see the amount recorded for each sale. No customer is going to be willing to pay USD 1.75 when the employee rings up USD 1.00.
- The cash register tapes should be inaccessible to the employees. The manager (and possibly assistant manager) should have the only keys to the cash registers.
- Pay the employees a competitive wage.
- Require that all sales be rung up immediately after the sale.
- The manager or assistant manager should reconcile the cash register tapes at the end of each day.

**a. Solution to demonstration problem B**

**CARR COMPANY  
Bank Reconciliation  
2010 March 31**

Balance per bank statement, 2010 March 31		\$4,450.00
Add: Deposit in transit	\$1,300.00	
Check charged in error	200.00	1,500.00
		\$5,950.00
Less: Outstanding checks		1,050.00
Adjusted balance, 2010 March 31		\$4,900.00
Balance per ledger, 2010 March 31		\$4,459.00
Add: Note collected	\$1,000.00	
<b>Interest earned on checking account</b>	20.00	
Error in recording customer's check	13.50	1,033.50
		\$5,492.50
Less: Service and collection charges	\$10.00	
NSF check	75.00	
Carr Company noted charged against account	507.50	592.50
Adjusted balance, 2010 March 31		\$4,900.00

b.

Mar. 31	Cash	441.00	
	Bank Service Charge Expense	10.00	
	Accounts Receivable	75.00	
	Notes Payable	507.50	
	Notes Receivable		1,000.00
	Interest Revenue		20.00
	Accounts Receivable		13.50
	To record adjustments to Cash account		

Alternatively:

Mar. 31	Cash	1,033.50	
	Notes Receivable		1,000.00
	Interest Revenue		20.00

## 8. Control of cash

Accounts Receivable	13.50
To record additions to Cash account.	
Bank Service Charge Expense	10.00
Accounts Receivable	75.00
Notes Payable	507.50
Cash	592.50
To record deductions from Cash account.	

### Key terms

**Accounting system** Methods and records established to identify, assemble, analyze, classify, record, and report an entity's transactions to provide complete, accurate, and timely financial information.

**Bank reconciliation** A schedule the company (depositor) prepares to reconcile, or explain, the difference between the cash balance on the bank statement and the cash balance on the company's books; often called a bank reconciliation statement or schedule.

**Bank statement** A statement issued (usually monthly) by a bank describing the activities in a depositor's checking account during the period.

**Cash** Includes coins; currency; certain undeposited negotiable instruments such as checks, bank drafts, and money orders; amounts in checking and savings accounts; and demand certificates of deposit.

**Cashier's check** A check made out to either the depositor or a third party and written, or drawn, by a bank after deducting the amount of the check from the depositor's account or receiving cash from the depositor.

**Certificate of deposit (CD)** An interest-bearing deposit that can be withdrawn from a bank at will (demand CD) or at a fixed maturity date (time CD).

**Certified check** A check written, or drawn, by a depositor and taken to the depositor's bank for certification. The check is deducted from the depositor's balance immediately and becomes a liability of the bank. Thus, it usually is accepted without question.

**Check** A written order to a bank to pay a specific sum of money to the party designated as the payee by the party issuing the check.

**Checking account** A money balance maintained in a bank that is subject to withdrawal by the depositor, or owner of the money, on demand.

**Control environment** Reflects the overall attitude, awareness, and actions of the board of directors, management, and stockholders.

**Control procedures** Policies and procedures in addition to the control environment and the accounting system that management has established to provide reasonable assurance that the company will achieve its specific objectives.

**Credit memo** A form used by a bank to explain an addition to the depositor's account.

**Debit memo** A form used by a bank to explain a deduction from the depositor's account.

**Deposit in transit** Typically, a day's cash receipts recorded in the depositor's books in one period but recorded as a deposit by the bank in the succeeding period.

**Deposit ticket** A form that shows the date and the items that make up the deposit.

**Drawer** The party (depositor) writing a check.

**Fidelity bonds** Ensure that a company is reimbursed for losses due to theft of cash and other monetary assets.

**Internal auditing** Consists of investigating and evaluating employees' compliance with the company's policies and procedures. Internal auditing is performed by company personnel.

**Internal auditors** Auditors employed by the company to perform internal audits. These auditors are trained in company policies and in internal auditing duties such as testing effectiveness of controls and procedures involving cash receipts and cash disbursements.

**Internal control structure** Policies and procedures established to provide reasonable assurance that specific entity objectives will be achieved.

**Invoice** Statement sent by the supplier to the purchaser requesting payment for the merchandise shipped.

**NSF (not sufficient funds) check** A customer's check returned from the customer's bank to the depositor's bank because the funds in the customer's checking account balance were insufficient to cover the check.

**Outstanding checks** Checks issued by a depositor that have not yet been paid by the bank on which they are drawn.

**Payee** The party to whom a check is made payable.

**Petty cash fund** A nominal sum of money established as a separate fund from which minor cash disbursements for valid business purposes are made. The cash in the fund plus the vouchers covering disbursements should always equal the balance at which the fund was established and at which it is carried in the Petty Cash account.

**Petty cash voucher** A document or form that shows the amount of, and reason for, a petty cash disbursement.

**Purchase order** A document sent from the purchasing department to a supplier requesting that merchandise or other items be shipped to the purchaser.

**Purchase requisition** A written request from an employee inside the company to the purchasing department to purchase certain items.

**Quick ratio** The ratio of quick assets (cash, marketable securities, and net receivables) to current liabilities. The quick ratio measures a company's short-term debt-paying ability.

**Receiving report** A document prepared by the receiving department showing the descriptions and quantities of all items received from a supplier in a particular shipment.

**Remittance advice** Informs the payee why the drawer (or maker) of the check is making this payment.

**Segregation of duties** Having one employee responsible for safeguarding an asset and a second employee responsible for maintaining the accounting records for that asset.

**Service charges** Charges assessed by the bank on the depositor to cover the cost of handling the checking account.

**Signature card** Provides the signatures of persons authorized to sign checks drawn on an account.

**Transfer bank accounts** Bank accounts set up so that local banks automatically transfer to a central bank (by wire or written bank draft) all amounts on deposit in excess of a stated amount.

**Wire transfer of funds** Interbank transfer of funds by telephone.

#### Self-test

##### True-false

Indicate whether each of the following statements is true or false.

Cash includes coin, currency, postdated checks, money orders, and money on deposit with banks.

To effectively manage its cash, a company should make certain that enough cash is available to pay bills as they come due.

The cash balance on the bank statement is usually equal to the cash balance in the depositor's books.

A deposit in transit requires an entry in the depositor's books after the bank reconciliation is prepared.

For control purposes, a company should issue checks for every payment, regardless of its amount.

##### Multiple-choice

Select the best answer for each of the following questions.

The objectives of the internal control structure of a company include all of the following except:

- Compliance with company policies and federal law.
- Protection of its assets.
- Increase in accuracy and reliability of accounting data.
- Guarantee of a certain level of profit.
- Evaluation of personnel performance to promote efficiency of operations.

Use the following information to answer the next three questions:

Balance per bank statement USD 1,951.20

Balance per ledger 1,869.60

Deposits in transit 271.20

## 8. Control of cash

Outstanding checks 427.80

NSF check 61.20

Service charges 13.80

The adjusted cash balance is:

- a. USD 1,794.60.
- b. USD 1,719.60.
- c. USD 1,638.00.
- d. USD 1,713.00.
- e. USD 1,876.20.

In a bank reconciliation, deposits in transit should be:

- a. Deducted from the balance per books.
- b. Deducted from the balance per bank statement.
- c. Added to the balance per ledger.
- d. Added to the balance per bank statement.
- e. Disregarded in the bank reconciliation.

After the bank reconciliation is prepared, the entry to record bank service charges would have a credit to:

- a. Bank Service Charge Expense.
- b. Cash.
- c. Petty Cash.
- d. Cash Short and Over.
- e. None of the above.

The entry to replenish the petty cash fund for disbursements made for stamps includes:

- a. A credit to Petty Cash.
- b. A credit to Postage Expense.
- c. A debit to Accounts Payable.
- d. A credit to Cash.
- e. None of the above.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- Why should a company establish an internal control structure?
- Why are mechanical devices used in an internal control structure?
- Identify some features that could strengthen an internal control structure.
- Name several control documents used in merchandise transactions.
- What are the four objectives sought in effective cash management?
- List four essential features of internal control over cash receipts.
- The bookkeeper of a given company was stealing cash received from customers in payment of their accounts. To conceal the theft, the bookkeeper made out false credit memos indicating returns and allowances made by or granted to customers. What feature of internal control would have prevented the thefts?



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- List six essential features of internal control over cash disbursements.
- What types of items cause the balance per ledger and the balance per bank statement to disagree?
- "The difference between a company's Cash account balance and the balance on its bank statement is usually a matter of timing." Do you agree or disagree? Why?
- Explain how transfer bank accounts can help bring about effective cash management.
- Describe the operation of a petty cash fund and its advantages. Indicate how control is maintained over petty cash transactions.
- When are entries made to the Petty Cash account?
- **The Limited, Inc.** Based on the financial statements of The Limited, Inc., in the Annual report appendix, what was the quick ratio for each of the two years shown?
- **The Limited, Inc.** Based on the financial statements of The Limited, Inc., in the Annual report appendix, what was the ending cash and equivalents balance? What percentage of current assets does the amount of cash and equivalents represent for each of the two years shown?

### Exercises

**Exercise A** State whether each of the following statements about internal control is true or false:

- a. Those employees responsible for safeguarding an asset should maintain the accounting records for that asset.
- b. Complete, accurate, and up-to-date accounting records should be maintained.
- c. Whenever possible, responsibilities should be assigned and duties subdivided in such a way that only one employee is responsible for a given function.
- d. Employees should be assigned to one job and should remain in that job so that skill levels will be as high as possible.
- e. The use of check protectors, cash registers, and time clocks is recommended.
- f. An internal auditing function should not be implemented because it leads the employees to believe that management does not trust them.
- g. One of the best protections against theft is to hire honest, competent employees.
- h. A foolproof internal control structure can be devised if management puts forth the effort.

**Exercise B** Concerning internal control, which one of the following statements is correct? Explain.

- a. Broadly speaking, an internal control structure is only necessary in large organizations.
- b. The purposes of internal control are to check the accuracy of accounting data, safeguard assets against theft, promote efficiency of operations, and ensure that management's policies are being followed.
- c. Once an internal control structure has been established, it should be effective as long as the formal organization remains unchanged.
- d. An example of internal control is having one employee count the day's cash receipts and compare the total with the total of the cash register tapes.

**Exercise C** The bank statement for Yarley Company at the end of August showed a balance of USD 12,862. Checks outstanding totaled USD 3,937, and deposits in transit were USD 5,990. If these amounts are the only pertinent data available to you, what was the adjusted balance of cash at the end of August?

**Exercise D** From the following data, prepare a bank reconciliation and determine the correct available cash balance for Reed Company as of 2010 October 31.

Balance per bank statement, 2010 October 31	\$13,974
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## 8. Control of cash

Ledger account balance, 2010 October 31	8,088
Proceeds of a note collected by bank not yet entered in ledger (includes \$500 of interest)	6,000
Bank service charges not yet entered by Reed Company	18
Deposit in transit	1,680
Outstanding checks:	
No. 327	654
No. 328	288
No. 329	390
No. 331	252

**Exercise E** The following is a bank reconciliation for Brian company as of August 31.

Balance per bank statement, August 31	\$ 7,470
Add: Deposit in transit	5,676
	\$13,146
Less: Outstanding checks	6,024
Adjusted balance, August 31	\$ 7,122
Balance per ledger, August 31	\$ 7,248
Add: Error correction*	54
	\$ 7,302
Less: NSF check	\$150
Service and collection charges	30
Adjusted balance, August 31	180
	\$ 7,122

Prepare the journal entry or entries needed to adjust or correct the Cash account.

**Exercise F** On March 1 of the current year, Shelbey Company had outstanding checks of USD 15,000. During March, the company issued an additional USD 57,000 of checks. As of March 31, the bank statement showed USD 48,000 of checks had cleared the bank during the month. What is the amount of outstanding checks on March 31?

**Exercise G** Matson Company's bank statement as of August 31, shows total deposits into the company's account of USD 15,000 and a total of 14 separate deposits. On July 31, deposits of USD 410 and USD 330 were in transit. The total cash receipts for August were USD 19,000, and the company's records show 13 deposits made in August. What is the amount of deposits in transit at August 31?

**Exercise H** Holder Company deposits all cash receipts intact each day and makes all payments by check. On October 31, after all posting was completed, its Cash account had a debit balance of USD 4,325. The bank statement for the month ended on October 31 showed a balance of USD 3,988. Other data are:

Outstanding checks total USD 425.

October 31 cash receipts of USD 838 were placed in the bank's night depository and do not appear on the bank statement.

Bank service charges for October are USD 14.

Check No. 772 for store supplies on hand was entered at USD 405, but paid by the bank at its actual amount of USD 315.

Prepare a bank reconciliation for Holder Company as of October 31. Also prepare any necessary journal entry or entries.

**Exercise I** On August 31, Brighton Company's petty cash fund contained coins and currency of USD 260, an IOU from an employee of USD 30, and vouchers showing expenditures of USD 120 for postage, USD 52 for taxi fare, and USD 138 to entertain a customer. The Petty Cash account shows a balance of USD 600. The fund is replenished on August 31 because financial statements are to be prepared. What journal entry is required on August 31?

**Exercise J** Use the data in the previous exercise. What entry would have been required if the amount of coin and currency had been USD 247.20? Which of the accounts debited would not appear in the income statement?

**Exercise K** Rock Company has a USD 450 petty cash fund. The following transactions occurred in December:

Dec. 2 The petty cash fund was increased to USD 1,350.

8 Petty Cash Voucher No. 318 for USD 14.20 delivery expense was prepared and paid. The fund was not replenished at this time.

20 The company decided that the fund was too large and reduced it to USD 1,120.

Prepare any necessary journal entries for these transactions.

### Problems

The following 2010 June 30, bank reconciliation pertains to Tiffany Company:

	<b>Cash Amount</b>	<b>Bank Statement</b>
Balance , June 30	\$29,143.36	\$28,644.31
Add: Deposit not credited by bank		942.60
Total		\$29,586.91
Less: Outstanding checks:		
No. 724	\$18.45	
No. 886	15.00	
No. 896	143.55	
No. 897	187.65	
No. 898	78.90	443.55
Adjusted cash balance, June 30	\$29,143.36	\$29,143.36

Tiffany's July bank statement follows:

Balance, July 1	\$28,644.31	
Deposits during July	5,441.94	\$34,086.25
Canceled checks returned:		
No. 724	\$ 18.45	
No. 896	143.55	
No. 897	187.65	
No. 898	78.90	
No. 899	18.86	
No. 900	1,349.55	
No. 902	946.92	
No. 904	44.01	\$2,787.89
NSF Check of Starr Company	139.98	2,927.87
Bank statement balance, July 31		\$31,158.38

The cash receipts deposited in July, including receipts of July 31, amounted to USD 5,178.30. Tiffany wrote these checks in July:

No. 899	\$ 18.86
No. 900	1,349.55
No. 901	27.75
No. 902	946.92
No. 903	59.70
No. 904	44.01
No. 905	1,093.50
No. 906	15.00

The cash balance per the ledger on 2010 July 31, was USD 30,766.37.

Prepare a bank reconciliation as of 2010 July 31, and any necessary journal entry or entries to correct the accounts.

**Problem B** The following information pertains to Hughes Company as of 2010 May 31:

- Balance per bank statement as of 2010 May 31, was USD 59,410.
- Balance per Hughes Company's Cash account at 2010 May 31, was USD 60,904.
- A late deposit on May 31 did not appear on the bank statement, USD 4,275.
- Outstanding checks as of May 31 totaled USD 7,614.

## 8. Control of cash

- During May, the bank credited Hughes Company with the proceeds, USD 6,795, of a note which it had collected for the company. Interest revenue was USD 45 of the total.
- Bank service and collection charges for May amounted to USD 18.
- Comparison of the canceled checks with the check register revealed that one check in the amount as USD 1,458 had been recorded in the books as USD 1,539. The check had been issued in payment of an account payable.
- A review of the deposit slips with the bank statement showed that a deposit for USD 2,250 of a company with a similar account number had been credited to the Hughes Company account in error.
- A USD 270 check received from a customer, R. Petty, was returned with the bank statement marked NSF.
- During May, the bank paid a USD 13,500 note of Hughes Company plus interest of USD 135 and charged it to the company's account per instructions received. Hughes Company had not recorded the payment of this note.
- An examination of the cash receipts and the deposit tickets revealed that the bookkeeper erroneously recorded a check from a customer, C. Parker, of USD 1,458 as USD 1,944.
- The bank statement showed a credit to the company's account for interest earned on the account balance in May of USD 450.

a. Prepare a bank reconciliation as of 2010 May 31.

b. Prepare the journal entry or entries necessary to adjust the accounts as of 2010 May 31.

**Problem C** The following transactions pertain to the petty cash fund of Carrington Company:

Nov. 2 A USD 450 check is drawn, cashed, and the cash placed in the care of the assistant office manager to be used as a petty cash fund.

Dec. 17 The fund is replenished. An analysis of the fund shows:

Coins and currency	\$147.40
Petty cash vouchers for:	
Delivery expenses	173.48
Transportation-In	111.12
Postage stamps purchased	15.00

31 The end of the accounting period falls on this date. The fund was not replenished. The fund's contents on this date consist of:

Coins and currency	\$ 352.05
Petty cash vouchers for:	
Delivery expenses	31.65
Postage stamps purchased	36.30
Employee's IOU	30.00

Present journal entries to record these transactions. Use the Cash Short and Over account for any shortage or overage in the fund.

**Problem D** The following transactions relate to the petty cash fund of Jarvis Wrecking Company

Apr. 1 The petty cash fund is set up with a USD 350 cash balance.

19 Because the money in the fund is down to USD 70.20, the fund is replenished.

Petty cash vouchers as follows:	
Flowers for hospitalized employee (miscellaneous expense)	\$84.38
Postage stamps	135.00
Office supplies	46.71

30 The cash in the fund is USD 193.07. The fund is replenished to include petty cash payments in this period's financial statements. The petty cash vouchers are for the following:

Transportation-in	\$64.12
Office supplies	92.81

May 1 The petty cash fund balance is increased to USD 400.

Prepare the journal entries to record these transactions.

### Alternate problems

**Alternate problem A** The following data pertains to England Company:

Balance per the bank statement dated 2010 June 30, is USD 30,000.

Balance of the Cash in Bank account on the company books as of 2010 June 30, is USD 8,795.

Outstanding checks as of 2010 June 30, total USD 14,300.

Bank deposit of June 30 for USD 2,735 was not included in the deposits per the bank statement.

The bank had collected proceeds of a note, USD 22,612 (of which USD 112 was interest), that it credited to the England Company account. The bank charged the company a collection fee of USD 15 on the note.

The bank erroneously charged the England Company account for a USD 10,500 debit memo of another company that has a similar name.

Bank service charges for June, exclusive of the collection fee, amounted to USD 95.

Among the canceled checks was one for USD 700 given in payment of an account. The bookkeeper had recorded the check at USD 920 in the company records.

A check of Crosby, a customer, for USD 2,447, deposited on June 20, was returned by the bank marked NSF. No entry has been made to reflect the returned check on the company records.

A check for USD 1,435 of Malcolm, a customer, which had been deposited in the bank, was erroneously recorded by the bookkeeper as USD 1,570. The check had been received as a payment on the customer's account receivable.

Prepare a bank reconciliation as of 2010 June 30, and any necessary journal entry or entries to correct the accounts.

**Alternate problem B** The bank statement of Irish Company's checking account with the 2nd National Bank shows:

Balance, 2010 June 30		\$166,118
Deposits		245,700
		411,818
Less: Checks deducted	\$243,001	
Service charges	67	243,068
Balance, 2010 July 31		\$168,750

The following additional data are available:

Balance per ledger account as of July 31 was USD 128,209.

A credit memo included with the bank statement indicated the collection of a note by the bank for Irish Company. Proceeds were USD 13,500, of which USD 375 was interest.

An NSF check in the amount of USD 6,210 was returned by the bank and included in the total of checks deducted on the bank statement.

Deposits in transit as of July 31 totaled USD 33,750.

Checks outstanding as of July 31 were USD 55,350.

The bank added the USD 29,025 deposit of another company to Irish's account in error.

The bank deducted one of Irish's checks as USD 20,250 instead of the correct amount of USD 2,025.

## 8. Control of cash

Deposit of July 21 was recorded by the company as USD 4,299.75 and by the bank at the actual amount of USD 4,542.75. The receipts for the day were from collections on account.

The deposits amount shown on the bank statement includes USD 675 of interest earned by Irish on its checking account with the bank.

- a. Prepare a bank reconciliation as of 2010 July 31, for Irish Company.
- b. Prepare any journal entry or entries needed at 2010 July 31.

**Alternate problem C** Transactions involving the petty cash fund of Sonar Company are as follows:

Mar. 1 Established a petty cash fund of USD 750, which will be under the control of the assistant office manager.  
31 Fund was replenished on this date. Prior to replenishment, the fund consisted of the following:

Coins and currency	\$ 491.50
Petty cash voucher indicating disbursements for:	
Postage stamps	\$82.00
Suppliers money for office employees working overtime	36.00
Office supplies	32.70
Window washing service	60.00
Flowers for wedding employee	15.00
Flower for hospitalized employee	15.00
Employee's IOU	15.00

Present journal entries for these transactions. Use the Cash Short and Over account for any shortage or overage in the fund.

**Alternate problem D** Sun Company has decided to use a petty cash fund. Transactions involving this fund follow:

June 4 Set up a petty cash fund of USD 225.

22 When the fund had a cash amount of USD 31.35, the custodian of the fund was reimbursed for expenditures made, including:

Transportation-in	\$ 82.50
Postage	27.00
Office supplies	81.75

30 The fund was reimbursed to include petty cash items in the financial statement prepared for the fiscal year ending on this date. The fund had the following cash and vouchers before reimbursement:

Coins and currency	\$174.00
Petty cash vouchers for:	
Employee's IOU	15.00
Postage	27.00
Office supplies	11.10

July 1 The petty cash fund balance is increased to USD 300.

Prepare journal entries for all of these transactions.

### Beyond the numbers—Critical thinking

**Business decision case A** During a national emergency, a managerial accountant was called back to active duty with the US Army. An acquaintance of the accountant forged papers and assumed the identity of the accountant. He obtained a position in a small company as the only accountant. Eventually he took over from the manager the functions of approving bills for payment, preparing and signing checks, and almost all other financial duties. On one weekend, he traveled to some neighboring cities and mailed invoices made out to the company for which he worked. On Monday morning, he returned to work and began receiving, approving, and paying the invoices he had prepared. The following weekend he returned to the neighboring cities and cashed and deposited

the checks in bank accounts under his own name. After continuing this practice for several months, he withdrew all of the funds and never was heard from again.

Prepare a written list of the steps you would have taken to prevent this theft. Remember that this small company had limited financial resources.

**Business decision case B** John Billings was set up in business by his father, who purchased the business of an elderly acquaintance wishing to retire. One of the few changes in personnel made by Billings was to install a college classmate as the office manager-bookkeeper-cashier-sales manager. During the course of the year, Billings borrowed money from the bank with his father as cosigner. Although his business seemed profitable, there was a shortage of cash. The company's investments in inventories and receivables grew substantially. Finally, after a year had elapsed, Billings's father employed you, a certified public accountant, to audit the records of his business. You reported that the office manager-bookkeeper-cashier-sales manager had been misappropriating funds and had been using a variety of schemes to cover his actions. More specifically, he had:

- Pocketed cash receipts from sales and understated the cash register readings at the end of the day or altered the copies of the sales tickets retained.
- Stolen checks mailed to the company in payment of accounts receivable, credited the proper accounts, and then debited fictitious receivables to keep the records in balance.
- Issued checks to fictitious suppliers and deposited them in accounts bearing these names with himself as signer of checks drawn on these accounts; the books were kept in balance by debiting the Purchases account.
- Stolen petty cash funds by drawing false vouchers purporting to cover a variety of expenses incurred.
- Prepared false sales returns vouchers indicating the return of cash sales to cover further thefts of cash receipts.

For each item in the preceding list, describe in writing at least one feature of good internal control that would have prevented the losses due to dishonesty.

**Business decision case C** The outstanding checks of Brothers Company at 2010 November 30, were:

No. 229	\$ 1,000
No. 263	\$ 1,089
No. 3678	\$ 679
No. 3679	\$809
No. 3680	\$ 1,400

During December, Brothers issued checks numbered 3681-3720; and all of these checks cleared the bank except 3719 and 3720 for USD 963 and USD 726, respectively. Checks 3678, 3679, and 3680 also cleared the bank.

The bank statement on December 31 showed a balance of USD 23,944. Service charges amounted to USD 20, and two checks were returned by the bank, one marked NSF in the amount of USD 114 and the other marked "No account" in the amount of USD 2,000.

Brian Askew recently retired as the office manager-cashier-bookkeeper for Brothers Company and was replaced by Fred Hannah. Hannah noted the absence of an internal control structure but was momentarily deterred from embezzling for lack of a scheme of concealment. Finally, he hit upon several schemes. The USD 2,000 check marked "No account" by the bank is the product of one scheme. Hannah took cash receipts and replaced them with a check drawn on a nonexistent account to make it appear that a customer had given the company a worthless check.

## 8. Control of cash

The other scheme was more subtle. Hannah pocketed cash receipts in an amount equal to two unlisted outstanding checks and prepared the following bank reconciliation:

Balance per bank statement, 2010 December 31		\$23,944.00
Add: Deposit in transit		2,837.80
		\$26,781.80
Less: Outstanding checks		
No. 3719	\$ 963.00	
No. 3720	726.00	1,689.00
Adjusted balance, December 2010		\$25,092.80
Balance per ledger, 2010 December 31		\$27,226.80
Add: Worthless check	\$2,000.00	
NSF check	114.00	
Service charges	20.00	2,134.00
Adjusted balance, 2010 December 31		\$25,092.80

- State the nature of the second scheme hit on by Hannah. How much in total does it appear he has stolen by use of the two schemes together?
- Prepare a correct bank reconciliation as of 2010 December 31.
- After your analysis in (a) and (b), describe several procedures that would have defeated Fred Hannah's attempts to misappropriate funds and conceal these actions.

\*Note: This challenging problem was not specifically illustrated in the chapter, but it can be worked by applying the principles discussed in the chapter.

**Annual report analysis D** In Reader's Digest's Annual Report, under Report of Management, the chairman and chief executive officer and the executive vice president and chief financial officer stated:

*The company maintains a system of internal accounting controls designed to provide reasonable assurance, at reasonable cost, that transactions and events are recorded properly and that assets are safeguarded. The internal control system is supported by written policies and procedures and by the careful selection, training, and supervision of qualified personnel, and is monitored by an internal audit function.*

What is the purpose of this statement? To which basic elements of the internal control structure does the statement refer?

**Annual report analysis E** Obtain an annual report for a company (your library may have some annual reports). Determine the quick ratios for the two most recent years for the company. Comment on the results.

**Ethics case – Writing experience F** After reading the ethics case, discuss the ethical situation at the City Club Restaurant. Describe the steps the owners could take to end John Blue's wage supplement scheme.

**Group project G** With a small group of students, visit a large local company to inquire about its internal control structure. Specifically, discover how it protects its assets against theft and waste, ensures compliance with company policies and federal laws, evaluates performance of its personnel, and ensures accurate and reliable operating data and accounting reports. If an internal audit staff exists, inquire about some of its activities. Write a report to your instructor summarizing your findings and be prepared to make a short presentation to the class.

**Group project H** With one or two other students, locate and visit two companies that maintain petty cash funds. Interview the custodians of those funds to identify the controls that are used to manage those funds. Write a report to your instructor comparing the controls used, pointing out any differences between the control systems and any deficiencies in the systems. Be prepared to make a short presentation to the class.



**Group project I** "Kiting" of bank accounts has been used to conceal shortages in bank accounts. With one or two other students, research this topic in the library. Write a paper to your instructor describing how this technique works and the steps that can be taken to detect it once it occurs and to prevent it in the future.

**Using the Internet—A view of the real world**

Visit the following site:

<http://www.vfauditmall.com/>

This is the internet site for the Vanity Fair Audit Mall. Click on the visitors center, CCA Studio, Tool Box, Job Shop, Tek Shak, Risk Depot, Contact Plaza, and Arcade. After browsing the site write a one page memo as to what you learned about internal audit.

Visit the Securities and Exchange website and find the EDGAR database at:

<http://www.sec.gov/edgar.shtml>

EDGAR stands for the Electronic Data Gathering, Analysis, and Retrieval system. What is its purpose? What kinds of information can be found at this site? Select a company of your choice and search the EDGAR database for information on that company. Write a report to your instructor summarizing your findings.

**Answers to self-test**

**True-false**

**False.** Postdated checks are not included as cash.

**True.** A company should make sure that enough cash is available to pay bills as they come due.

**False.** The cash balance on a bank statement is not usually the same as the cash balance in the depositor's books because of deposits in transit, outstanding checks, and bank service charges.

**False.** A deposit in transit is one of the items that has been correctly recorded as a debit to the Cash account of the depositor and will be recorded as a deposit by the bank after the bank employees open the night deposit chute.

**False.** For convenience, a company may use a petty cash fund for small amounts of cash payments such as delivery charges or postage stamps.

**Multiple-choice**

**d.** An effective internal control structure does not necessarily guarantee a certain level of profits.

**a.**

Balance per bank statement	\$1,951.20
Add: Deposit in transit	271.20
Less: Outstanding checks	(427.80)
Adjusted balance	\$1,794.60
Balance per ledger	\$1,869.60
Less: NSF check	(61.20)
Service charges	(13.80)
Adjusted balance	\$1,794.60

**d.** Deposits in transit have been recorded in the company's accounting records but have not yet been recorded in the bank's records.

**b.** The entry to record bank service charges on the books is:

Bank Service Charge Expense	13.80	
Cash		13.80

**d.** The entry to replenish the petty cash fund has a credit to Cash, not Petty Cash.

Postage Expense	xxx	
Cash		xxx

# 9. Receivables and payables

## Learning objectives

After studying this chapter, you should be able to:

- Account for uncollectible accounts receivable under the allowance method.
- Record credit card sales and collections.
- Define liabilities, current liabilities, and long-term liabilities.
- Define and account for clearly determinable, estimated, and contingent liabilities.
- Account for notes receivable and payable, including calculation of interest.
- Account for borrowing money using an interest-bearing note versus a non interest-bearing note.
- Analyze and use the financial results—accounts receivable turnover and the number of days' sales in accounts receivable.

## A career in litigation support

What is litigation support? It does not mean working in an attorney's office. It involves assisting legal counsel in attempting to gain favorable verdicts in a court of law. Persons involved in litigation support generally work for a public accounting firm, a consulting firm, or as a sole proprietor or in partnership with others. An experienced litigation support person can expect to earn an income well into six figures.

Litigation support in a broad sense encompasses fraud auditing, valuation analysis, investigative accounting, and forensic accounting. The practice of litigation support involves assisting legal counsel in such things as product liability disputes, shareholder disputes, contract breaches, and major losses reported by entities. These investigations require the accountant to gather and evaluate evidence to assess the integrity and dollar amounts surrounding the aforementioned situations.

The accountant can be, and often is, requested to serve as an expert witness in a court of law. This experience requires knowledge of accounting and auditing in addition to possessing good communication skills, appropriate credentials, relevant experience, and critical information that could result in successful resolution of the issue.

What kind of person pursues litigation support as a career? It takes a very special individual. The person must be part accountant, part auditor, part lawyer, and part skilled businessperson. An undergraduate accounting degree, an MBA, and a law degree would be the perfect educational background needed for such a career. Many universities offer a combined MBA/JD program. Such a program fulfills the graduate needs of the litigation support person.

In addition to the degree, work experience in the business sector is essential. A career in public accounting, industry, or with a government agency would serve as valuable experience in pursuing a career in litigation support.

Much of the growth of business in recent years is due to the immense expansion of credit. Managers of companies have learned that by granting customers the privilege of charging their purchases, sales and profits increase. Using credit is not only a convenient way to make purchases but also the only way many people can own high-priced items such as automobiles.

## 9. Receivables and payables

This chapter discusses receivables and payables. For a company, a **receivable** is any sum of money due to be paid to that company from any party for any reason. Similarly, a **payable** describes any sum of money to be paid by that company to any party for any reason.

Primarily, receivables arise from the sale of goods and services. The two types of receivables are accounts receivable, which companies offer for short-term credit with no interest charge; and notes receivable, which companies sometimes extend for both short-and long-term credit with an interest charge. We pay particular attention to accounting for uncollectible accounts receivable.

Like their customers, companies use credit, which they show as accounts payable or notes payable. Accounts payable normally result from the purchase of goods or services and do not carry an interest charge. Short-term notes payable carry an interest charge and may arise from the same transactions as accounts payable, but they can also result from borrowing money from a bank or other institution. Chapter 4 identified accounts payable and short-term notes payable as current liabilities. A company also incurs other current liabilities, including payables such as sales tax payable, estimated product warranty payable, and certain liabilities that are contingent on the occurrence of future events. Long-term notes payable usually result from borrowing money from a bank or other institution to finance the acquisition of plant assets. As you study this chapter and learn how important credit is to our economy, you will realize that credit in some form will probably always be with us.

### Accounts receivable

In Chapter 3, you learned that most companies use the accrual basis of accounting since it better reflects the actual results of the operations of a business. Under the accrual basis, a merchandising company that extends credit records revenue when it makes a sale because at this time it has earned and realized the revenue. The company has earned the revenue because it has completed the seller's part of the sales contract by delivering the goods. The company has realized the revenue because it has received the customer's promise to pay in exchange for the goods. This promise to pay by the customer is an account receivable to the seller. Accounts receivable are amounts that customers owe a company for goods sold and services rendered on account. Frequently, these receivables resulting from credit sales of goods and services are called **trade receivables**.

When a company sells goods on account, customers do not sign formal, written promises to pay, but they agree to abide by the company's customary credit terms. However, customers may sign a sales invoice to acknowledge purchase of goods. Payment terms for sales on account typically run from 30 to 60 days. Companies usually do not charge interest on amounts owed, except on some past-due amounts.

Because customers do not always keep their promises to pay, companies must provide for these uncollectible accounts in their records. Companies use two methods for handling uncollectible accounts. The allowance method provides in advance for uncollectible accounts. The direct write-off method recognizes bad accounts as an expense at the point when judged to be uncollectible and is the required method for federal income tax purposes. However, since the allowance method represents the accrual basis of accounting and is the accepted method to record uncollectible accounts for financial accounting purposes, we only discuss and illustrate the allowance method in this text.

Even though companies carefully screen credit customers, they cannot eliminate all uncollectible accounts. Companies expect some of their accounts to become uncollectible, but they do not know which ones. The matching principle requires deducting expenses incurred in producing revenues from those revenues during the accounting

period. The allowance method of recording uncollectible accounts adheres to this principle by recognizing the uncollectible accounts expense in advance of identifying specific accounts as being uncollectible. The required entry has some similarity to the depreciation entry in Chapter 3 because it debits an expense and credits an allowance (contra asset). The purpose of the entry is to make the income statement fairly present the proper expense and the balance sheet fairly present the asset. **Uncollectible accounts expense** (also called doubtful accounts expense or **bad debts expense**) is an operating expense that a business incurs when it sells on credit. We classify uncollectible accounts expense as a selling expense because it results from credit sales. Other accountants might classify it as an administrative expense because the credit department has an important role in setting credit terms.

To adhere to the matching principle, companies must match the uncollectible accounts expense against the revenues it generates. Thus, an uncollectible account arising from a sale made in 2010 is a 2010 expense even though this treatment requires the use of estimates. Estimates are necessary because the company sometimes cannot determine until 2008 or later which 2010 customer accounts will become uncollectible.

**Recording the uncollectible accounts adjustment** A company that estimates uncollectible accounts makes an adjusting entry at the end of each accounting period. It debits Uncollectible Accounts Expense, thus recording the operating expense in the proper period. The credit is to an account called Allowance for Uncollectible Accounts.

As a contra account to the Accounts Receivable account, the **Allowance for Uncollectible Accounts** (also called Allowance for doubtful accounts or Allowance for bad debts) reduces accounts receivable to their net realizable value. **Net realizable value** is the amount the company expects to collect from accounts receivable. When the firm makes the uncollectible accounts adjusting entry, it does not know which specific accounts will become uncollectible. Thus, the company cannot enter credits in either the Accounts Receivable control account or the customers' accounts receivable subsidiary ledger accounts. If only one or the other were credited, the Accounts Receivable control account balance would not agree with the total of the balances in the accounts receivable subsidiary ledger. Without crediting the Accounts Receivable control account, the allowance account lets the company show that some of its accounts receivable are probably uncollectible.

To illustrate the adjusting entry for uncollectible accounts, assume a company has USD 100,000 of accounts receivable and estimates its uncollectible accounts expense for a given year at USD 4,000. The required year-end adjusting entry is:

Dec. 31	Uncollectible Accounts Expense (-SE)	4,000	
	Allowance for Uncollectible Accounts (-A)		4,000
	To record estimated uncollectible accounts.		

The debit to Uncollectible Accounts Expense brings about a matching of expenses and revenues on the income statement; uncollectible accounts expense is matched against the revenues of the accounting period. The credit to Allowance for Uncollectible Accounts reduces accounts receivable to their net realizable value on the balance sheet. When the books are closed, the firm closes Uncollectible Accounts Expense to Income Summary. It reports the allowance on the balance sheet as a deduction from accounts receivable as follows:

<b>Brice Company</b>			
<b>Balance Sheet</b>			
<b>2010 December 31</b>			
Current assets			
Cash			\$21,200
Accounts receivable	\$ 100,000		
Less: Allowance for uncollectible accounts	4,000	96,000	

## 9. Receivables and payables

**Estimating uncollectible accounts** Accountants use two basic methods to estimate uncollectible accounts for a period. The first method—percentage-of-sales method—focuses on the income statement and the relationship of uncollectible accounts to sales. The second method—percentage-of-receivables method—focuses on the balance sheet and the relationship of the allowance for uncollectible accounts to accounts receivable.

**Percentage-of-sales method** The **percentage-of-sales method** estimates uncollectible accounts from the credit sales of a given period. In theory, the method is based on a percentage of prior years' actual uncollectible accounts to prior years' credit sales. When cash sales are small or make up a fairly constant percentage of total sales, firms base the calculation on total net sales. Since at least one of these conditions is usually met, companies commonly use total net sales rather than credit sales. The formula to determine the amount of the entry is:

Amount of journal entry for uncollectible accounts – Net sales (total or credit) x Percentage estimated as uncollectible

To illustrate, assume that Rankin Company's uncollectible accounts from 2008 sales were 1.1 per cent of total net sales. A similar calculation for 2009 showed an uncollectible account percentage of 0.9 per cent. The average for the two years is 1 per cent  $[(1.1 + 0.9)/2]$ . Rankin does not expect 2010 to differ from the previous two years. Total net sales for 2010 were USD 500,000; receivables at year-end were USD 100,000; and the Allowance for Uncollectible Accounts had a zero balance. Rankin would make the following adjusting entry for 2010:

Dec. 31	Uncollectible Accounts Expense (-SE)	5,000	
	Allowance for Uncollectible Accounts (-A)		5,000
	To record estimated uncollectible accounts (\$500,000 X 0.01).		

Using T-accounts, Rankin would show:

<b>Uncollectible Accounts Expense</b>		<b>Allowance for Uncollectible Accounts</b>	
Dec. 31		Bal. before	
Adjustment 5,000		adjustment	-0-
		Dec. 31	
		Adjustment	5,000
		Bal. after	
		adjustment	5,000

Rankin reports Uncollectible Accounts Expense on the income statement. It reports the accounts receivable less the allowance among current assets in the balance sheet as follows:

Accounts receivable	\$ 100,000	
Less: Allowance for uncollectible accounts	5,000	\$ 95,000
<b>Or Rankin's balance sheet could show:</b>		
Accounts receivable (less estimated uncollectible accounts, \$5,000)	\$95,000	

On the income statement, Rankin would match the uncollectible accounts expense against sales revenues in the period. We would classify this expense as a selling expense since it is a normal consequence of selling on credit.

The Allowance for Uncollectible Accounts account usually has either a debit or credit balance before the year-end adjustment. Under the percentage-of-sales method, the company ignores any existing balance in the allowance when calculating the amount of the year-end adjustment (except that the allowance account must have a credit balance after adjustment).

For example, assume Rankin's allowance account had a USD 300 credit balance before adjustment. The adjusting entry would still be for USD 5,000. However, the balance sheet would show USD 100,000 accounts receivable less a USD 5,300 allowance for uncollectible accounts, resulting in net receivables of USD 94,700. On the income statement, Uncollectible Accounts Expense would still be 1 per cent of total net sales, or USD 5,000.

In applying the percentage-of-sales method, companies annually review the percentage of uncollectible accounts that resulted from the previous year's sales. If the percentage rate is still valid, the company makes no change. However, if the situation has changed significantly, the company increases or decreases the percentage rate to reflect the changed condition. For example, in periods of recession and high unemployment, a firm may increase the percentage rate to reflect the customers' decreased ability to pay. However, if the company adopts a more stringent credit policy, it may have to decrease the percentage rate because the company would expect fewer uncollectible accounts.

**Percentage-of-receivables method** The **percentage-of-receivables method** estimates uncollectible accounts by determining the desired size of the Allowance for Uncollectible Accounts. Rankin would multiply the ending balance in Accounts Receivable by a rate (or rates) based on its uncollectible accounts experience. In the percentage-of-receivables method, the company may use either an overall rate or a different rate for each age category of receivables.

To calculate the amount of the entry for uncollectible accounts under the percentage-of-receivables method using an overall rate, Rankin would use:

Amount of entry for uncollectible accounts – (Accounts receivable ending balance x percentage estimated as uncollectible) – Existing credit balance in allowance for uncollectible accounts or existing debit balance in allowance for uncollectible accounts

Using the same information as before, Rankin makes an estimate of uncollectible accounts at the end of 2010. The balance of accounts receivable is USD 100,000, and the allowance account has no balance. If Rankin estimates that 6 per cent of the receivables will be uncollectible, the adjusting entry would be:

Dec. 31	Uncollectible Accounts Expense (-SE)	6,000	
	Allowance for Uncollectible Accounts (-A)		6,000
	To record estimated uncollectible accounts (\$100,000 X 0.06).		

Using T-accounts, Rankin would show:

<b>Uncollectible Accounts Expense</b>		<b>Allowance for Uncollectible Accounts</b>	
Dec. 31		Bal. before	
Adjustment 6,000		Adjustment	-0-
		Dec. 31	
		Adjustment	6,000
		Bal. after	
		Adjustment	6,000

If Rankin had a USD 300 credit balance in the allowance account before adjustment, the entry would be the same, except that the amount of the entry would be USD 5,700. The difference in amounts arises because management wants the allowance account to contain a credit balance equal to 6 per cent of the outstanding receivables when presenting the two accounts on the balance sheet. The calculation of the necessary adjustment is [(USD 100,000 X 0.06)-USD 300] = USD 5,700. Thus, under the percentage-of-receivables method, firms consider any existing balance in the allowance account when adjusting for uncollectible accounts. Using T-accounts, Rankin would show:

<b>Uncollectible Accounts Expense</b>		<b>Allowance for Uncollectible Accounts</b>	
Dec. 31		Bal. before	
Adjustment 5,700		Adjustment	300
		Dec. 31	
		Adjustment	5,700
		Bal. after	
		Adjustment	6,000

## 9. Receivables and payables

<b>ALLEN COMPANY</b>						
<b>Accounts Receivable Aging Schedule</b>						
<b>2010 December 31</b>						
<b>Customer</b>	<b>Accounts Receivable Balance</b>	<b>Not Yet Due</b>	<b>Days Past Due</b>			<b>Over 90</b>
			<b>1-30</b>	<b>31-60</b>	<b>61-90</b>	
X	\$ 5,000					\$ 5,000
Y	14,000		\$ 12,000	\$2,000		
Z	400				\$200	200
All others	808,600	\$ 560,000	240,000	2,000	600	6,000
	<b>\$ 828,000</b>	<b>\$ 560,000</b>	<b>\$252,000</b>	<b>\$4,000</b>	<b>\$800</b>	<b>\$11,200</b>
Percentage estimated as uncollectible		1%	5%	10%	25%	50%
Estimated amount uncollectible	\$ 24,400	\$ 5,600	\$ 12,600	\$ 400	\$200	\$ 5,600

### Exhibit 77: Accounts receivable aging schedule

As another example, suppose that Rankin had a USD 300 debit balance in the allowance account before adjustment. Then, a credit of USD 6,300 would be necessary to get the balance to the required USD 6,000 credit balance. The calculation of the necessary adjustment is  $[(\text{USD } 100,000 \times 0.06) + \text{USD } 300] = \text{USD } 6,300$ . Using T-accounts, Rankin would show:

<b>Uncollectible Accounts Expense</b>	<b>Allowance for Uncollectible Accounts</b>	<b>Dec. 31</b>
Dec. 31	Bal. before	Dec. 31
Adjustment 6,300	Adjustment 300	Adjustment 6,300
		Bal. after
		Adjustment 6,000

No matter what the pre-adjustment allowance account balance is, when using the percentage-of-receivables method, Rankin adjusts the Allowance for Uncollectible Accounts so that it has a credit balance of USD 6,000—equal to 6 per cent of its USD 100,000 in Accounts Receivable. The desired USD 6,000 ending credit balance in the Allowance for Uncollectible Accounts serves as a "target" in making the adjustment.

So far, we have used one uncollectibility rate for all accounts receivable, regardless of their age. However, some companies use a different percentage for each age category of accounts receivable. When accountants decide to use a different rate for each age category of receivables, they prepare an aging schedule. An **aging schedule** classifies accounts receivable according to how long they have been outstanding and uses a different uncollectibility percentage rate for each age category. Companies base these percentages on experience. In Exhibit 77, the aging schedule shows that the older the receivable, the less likely the company is to collect it.

Classifying accounts receivable according to age often gives the company a better basis for estimating the total amount of uncollectible accounts. For example, based on experience, a company can expect only 1 per cent of the accounts not yet due (sales made less than 30 days before the end of the accounting period) to be uncollectible. At the other extreme, a company can expect 50 per cent of all accounts over 90 days past due to be uncollectible. For each age category, the firm multiplies the accounts receivable by the percentage estimated as uncollectible to find the estimated amount uncollectible.

The sum of the estimated amounts for all categories yields the total estimated amount uncollectible and is the desired credit balance (the target) in the Allowance for Uncollectible Accounts.

Since the aging schedule approach is an alternative under the percentage-of-receivables method, the balance in the allowance account before adjustment affects the year-end adjusting entry amount recorded for uncollectible

accounts. For example, the schedule in Exhibit 77 shows that USD 24,400 is needed as the ending credit balance in the allowance account. If the allowance account has a USD 5,000 credit balance before adjustment, the adjustment would be for USD 19,400.

The information in an aging schedule also is useful to management for other purposes. Analysis of collection patterns of accounts receivable may suggest the need for changes in credit policies or for added financing. For example, if the age of many customer balances has increased to 61-90 days past due, collection efforts may have to be strengthened. Or, the company may have to find other sources of cash to pay its debts within the discount period. Preparation of an aging schedule may also help identify certain accounts that should be written off as uncollectible.

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### An accounting perspective:

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#### Business insight

According to the Fair Debt Collection Practices Act, collection agencies can call persons only between 8 am and 9 pm, and cannot use foul language. Agencies can call employers only if the employers allow such calls. And, they can threaten to sue only if they really intend to do so.

**Write-off of receivables** As time passes and a firm considers a specific customer's account to be uncollectible, it writes that account off. It debits the Allowance for Uncollectible Accounts. The credit is to the Accounts Receivable control account in the general ledger and to the customer's account in the accounts receivable subsidiary ledger. For example, assume Smith's USD 750 account has been determined to be uncollectible. The entry to write off this account is:

Allowance for Uncollectible Accounts (-SE)	750	
Accounts Receivable—Smith (-A)		750
To write off Smith's account as uncollectible.		

The credit balance in Allowance for Uncollectible Accounts before making this entry represented potential uncollectible accounts not yet specifically identified. Debiting the allowance account and crediting Accounts Receivable shows that the firm has identified Smith's account as uncollectible. Notice that the debit in the entry to write off an account receivable does not involve recording an expense. The company recognized the uncollectible accounts expense in the same accounting period as the sale. If Smith's USD 750 uncollectible account were recorded in Uncollectible Accounts Expense again, it would be counted as an expense twice.

A write-off does not affect the net realizable value of accounts receivable. For example, suppose that Amos Company has total accounts receivable of USD 50,000 and an allowance of USD 3,000 before the previous entry; the net realizable value of the accounts receivable is USD 47,000. After posting that entry, accounts receivable are USD 49,250, and the allowance is USD 2,250; net realizable value is still USD 47,000, as shown here:

	<i>Before Write-Off</i>	<i>Entry for Write-Off</i>	<i>After Write-Off</i>
Accounts receivable	\$ 50,000 Dr.	\$750 Cr.	\$ 49,250 Dr.
Allowance for uncollectible accounts	3,000 Cr.	750 Dr.	2,250 Cr.
Net realizable value	\$47,000		\$ 47,000

You might wonder how the allowance account can develop a debit balance before adjustment. To explain this, assume that Jenkins Company began business on 2009 January 1, and decided to use the allowance method and



## 9. Receivables and payables

make the adjusting entry for uncollectible accounts only at year-end. Thus, the allowance account would not have any balance at the beginning of 2009. If the company wrote off any uncollectible accounts during 2009, it would debit Allowance for Uncollectible Accounts and cause a debit balance in that account. At the end of 2009, the company would debit Uncollectible Accounts Expense and credit Allowance for Uncollectible Accounts. This adjusting entry would cause the allowance account to have a credit balance. During 2010, the company would again begin debiting the allowance account for any write-offs of uncollectible accounts. Even if the adjustment at the end of 2009 was adequate to cover all accounts receivable existing at that time that would later become uncollectible, some accounts receivable from 2010 sales may be written off before the end of 2010. If so, the allowance account would again develop a debit balance before the end-of-year 2010 adjustment.

**Uncollectible accounts recovered** Sometimes companies collect accounts previously considered to be uncollectible after the accounts have been written off. A company usually learns that an account has been written off erroneously when it receives payment. Then the company reverses the original write-off entry and reinstates the account by debiting Accounts Receivable and crediting Allowance for Uncollectible Accounts for the amount received. It posts the debit to both the general ledger account and to the customer's accounts receivable subsidiary ledger account. The firm also records the amount received as a debit to Cash and a credit to Accounts Receivable. And it posts the credit to both the general ledger and to the customer's accounts receivable subsidiary ledger account.

To illustrate, assume that on May 17 a company received a USD 750 check from Smith in payment of the account previously written off. The two required journal entries are:

May	17	Accounts Receivable—Smith (+A)	750	
		Allowance for Uncollectible Accounts (-A)		750
		To reverse original write-off of Smith account.		
May	17	Cash (+A)	750	
		Accounts Receivable—Smith (-A)		750
		To record collection of account.		

The debit and credit to Accounts Receivable—Smith on the same date is to show in Smith's subsidiary ledger account that he did eventually pay the amount due. As a result, the company may decide to sell to him in the future.

When a company collects part of a previously written off account, the usual procedure is to reinstate only that portion actually collected, unless evidence indicates the amount will be collected in full. If a company expects full payment, it reinstates the entire amount of the account.

Because of the problems companies have with uncollectible accounts when they offer customers credit, many now allow customers to use bank or external credit cards. This policy relieves the company of the headaches of collecting overdue accounts.

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### A broader perspective:

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#### GECS allowance for losses on financing receivables

**Recognition of losses on financing receivables.** The allowance for losses on small-balance receivables reflects management's best estimate of probable losses inherent in the portfolio determined principally on the basis of historical experience. For other receivables, principally the larger loans and leases, the allowance for losses is determined primarily on the basis of

management's best estimate of probable losses, including specific allowances for known troubled accounts.

All accounts or portions thereof deemed to be uncollectible or to require an excessive collection cost are written off to the allowance for losses. Small-balance accounts generally are written off when 6 to 12 months delinquent, although any such balance judged to be uncollectible, such as an account in bankruptcy, is written down immediately to estimated realizable value. Large-balance accounts are reviewed at least quarterly, and those accounts with amounts that are judged to be uncollectible are written down to estimated realizable value.

When collateral is repossessed in satisfaction of a loan, the receivable is written down against the allowance for losses to estimated fair value of the asset less costs to sell, transferred to other assets and subsequently carried at the lower of cost or estimated fair value less costs to sell. This accounting method has been employed principally for specialized financing transactions.

<b>(In millions)</b>	<b>2000</b>	<b>1999</b>	<b>1998</b>
Balance at January 1	\$3,708	\$3,223	\$2,745
Provisions charged			
To operations	2,045	1,671	1,603
Net transfers related to companies acquired or sold	22	271	386
Amounts written off-net	(1,741)	(1,457)	(1,511)
Balance at December 31	\$4,034	\$3,708	\$3,223

Source: General Electric Company, 2000 Annual Report.

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### An accounting perspective:

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#### Uses of technology

Auditors use expert systems to review a client's internal control structure and to test the reasonableness of a client's Allowance for Uncollectible Accounts balance. The expert system reaches conclusions based on rules and information programmed into the expert system software. The rules are modeled on the mental processes that a human expert would use in addressing the situation. In the medical field, for instance, the rules constituting the expert system are derived from modeling the diagnostic decision processes of the foremost experts in a given area of medicine. A physician can input information from a remote location regarding the symptoms of a certain patient, and the expert system will provide a probable diagnosis based on the expert model. In a similar fashion, an accountant can feed client information into the expert system and receive an evaluation as to the appropriateness of the account balance or internal control structure.

**Credit cards** are either nonbank (e.g. American Express) or bank (e.g. VISA and MasterCard) charge cards that customers use to purchase goods and services. For some businesses, uncollectible account losses and other costs of extending credit are a burden. By paying a service charge of 2 per cent to 6 per cent, businesses pass these costs on

## 9. Receivables and payables

to banks and agencies issuing national credit cards. The banks and credit card agencies then absorb the uncollectible accounts and costs of extending credit and maintaining records.

Usually, banks and agencies issue credit cards to approved credit applicants for an annual fee. When a business agrees to honor these credit cards, it also agrees to pay the percentage fee charged by the bank or credit agency.

When making a credit card sale, the seller checks to see if the customer's card has been canceled and requests approval if the sale exceeds a prescribed amount, such as USD 50. This procedure allows the seller to avoid accepting lost, stolen, or canceled cards. Also, this policy protects the credit agency from sales causing customers to exceed their established credit limits.

The seller's accounting procedures for credit card sales differ depending on whether the business accepts a nonbank or a bank credit card. To illustrate the entries for the use of nonbank credit cards (such as American Express), assume that a restaurant American Express invoices amounting to USD 1,400 at the end of a day. American Express charges the restaurant a 5 per cent service charge. The restaurant uses the **Credit Card Expense account** to record the credit card agency's service charge and makes the following entry:

Accounts Receivable—American Express (+A)	1,330	
Credit Card Expense (-SE)	70	
Sales (+SE)		1,400
To record credit card sales.		

The restaurant mails the invoices to American Express. Sometime later, the restaurant receives payment from American Express and makes the following entry:

Cash (+A)	1,330	
Accounts Receivable – American Express (-A)		1,330
To record remittance from American Express.		

To illustrate the accounting entries for the use of bank credit cards (such as VISA or MasterCard), assume that a retailer has made sales of USD 1,000 for which VISA cards were accepted and the service charge is USD 30 (which is 3 per cent of sales). VISA sales are treated as cash sales because the receipt of cash is certain. The retailer deposits the credit card sales invoices in its VISA checking account at a bank just as it deposits checks in its regular checking account. The entry to record this deposit is:

Cash (+A)	970	
Credit Card Expense (-SE)	30	
Sales (+SE)		1,000
To record credit Visa card sales.		

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### An accounting perspective:

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#### Business insight

Recent innovations in credit cards include picture IDs on cards to reduce theft, credits toward purchases of new automobiles (e.g. General Motors cards), credit toward free trips on airlines, and cash rebates on all purchases. Discover Card, for example, remits a percentage of all charges back to credit card holders. Also, some credit card companies have reduced interest rates on unpaid balances and have eliminated the annual fee.

Just as every company must have current assets such as cash and accounts receivable to operate, every company incurs current liabilities in conducting its operations. Corporations (IBM and General Motors), partnerships (CPA

firms), and single proprietorships (corner grocery stores) all have one thing in common—they have liabilities. The next section discusses some of the current liabilities companies incur.

## Current liabilities

**Liabilities** result from some past transaction and are obligations to pay cash, provide services, or deliver goods at some future time. This definition includes each of the liabilities discussed in previous chapters and the new liabilities presented in this chapter. The balance sheet divides liabilities into current liabilities and long-term liabilities. **Current liabilities** are obligations that (1) are payable within one year or one operating cycle, whichever is longer, or (2) will be paid out of current assets or create other current liabilities. **Long-term liabilities** are obligations that do not qualify as current liabilities. This chapter focuses on current liabilities and Chapter 15 describes long-term liabilities.

Note the definition of a current liability uses the term operating cycle. An **operating cycle** (or cash cycle) is the time it takes to begin with cash, buy necessary items to produce revenues (such as materials, supplies, labor, and/or finished goods), sell goods or services, and receive cash by collecting the resulting receivables. For most companies, this period is no longer than a few months. Service companies generally have the shortest operating cycle, since they have no cash tied up in inventory. Manufacturing companies generally have the longest cycle because their cash is tied up in inventory accounts and in accounts receivable before coming back. Even for manufacturing companies, the cycle is generally less than one year. Thus, as a practical matter, current liabilities are due in one year or less, and long-term liabilities are due after one year from the balance sheet date.

The operating cycles for various businesses follow:

Type of Business	Operating Cycle
Service company selling for cash only	Instantaneous
Service company selling on credit	Cash -> Accounts Receivable -> Cash
Merchandising company selling for cash	Cash -> Inventory -> Cash
Merchandising company selling on credit	Cash -> Inventory -> Accounts receivable -> Cash
Manufacturing company selling for cash	Cash -> Materials inventory -> Work in process inventory -> Finished goods inventory -> Accounts Receivable -> Cash

Current liabilities fall into these three groups:

- **Clearly determinable liabilities.** The existence of the liability and its amount are certain. Examples include most of the liabilities discussed previously, such as accounts payable, notes payable, interest payable, unearned delivery fees, and wages payable. Sales tax payable, federal excise tax payable, current portions of long-term debt, and payroll liabilities are other examples.
- **Estimated liabilities.** The existence of the liability is certain, but its amount only can be estimated. An example is estimated product warranty payable.
- **Contingent liabilities.** The existence of the liability is uncertain and usually the amount is uncertain because contingent liabilities depend (or are contingent) on some future event occurring or not occurring. Examples include liabilities arising from lawsuits, discounted notes receivable, income tax disputes, penalties that may be assessed because of some past action, and failure of another party to pay a debt that a company has guaranteed.

The following table summarizes the characteristics of current liabilities:

Type of Liability	Is the Existence Certain?	Is the Amount Certain?
Clearly determinable liabilities	Yes	Yes

## 9. Receivables and payables

Estimated liabilities	Yes	No
Contingent liabilities	No	No

Clearly determinable liabilities have clearly determinable amounts. In this section, we describe liabilities not previously discussed that are clearly determinable—sales tax payable, federal excise tax payable, current portions of long-term debt, and payroll liabilities. Later in this chapter, we discuss clearly determinable liabilities such as notes payable.

**Sales tax payable** Many states have a state sales tax on items purchased by consumers. The company selling the product is responsible for collecting the sales tax from customers. When the company collects the taxes, the debit is to Cash and the credit is to Sales Tax Payable. Periodically, the company pays the sales taxes collected to the state. At that time, the debit is to Sales Tax Payable and the credit is to Cash.

To illustrate, assume that a company sells merchandise in a state that has a 6 per cent sales tax. If it sells goods with a sales price of USD 1,000 on credit, the company makes this entry:

Accounts Receivable (+A)	1,060	
Sales (+SE)		1,000
Sales Tax Payable (+L)		60
To record sales and sales tax payable.		

Now assume that sales for the entire period are USD 100,000 and that USD 6,000 is in the Sales Tax Payable account when the company remits the funds to the state taxing agency. The following entry shows the payment to the state:

Sales Tax Payable (-L)	6,000	
Cash (-A)		6,000

An alternative method of recording sales taxes payable is to include these taxes in the credit to Sales. For instance, the previous company could record sales as follows:

Accounts Receivable (+A)	1,060	
Sales (+SE)		1,060

When recording sales taxes in the same account as sales revenue, the firm must separate the sales tax from sales revenue at the end of the accounting period. To make this separation, it adds the sales tax rate to 100 per cent and divides this percentage into recorded sales revenue. For instance, assume that total recorded sales revenues for an accounting period are USD 10,600, and the sales tax rate is 6 per cent. To find the sales revenue, use the following formula:

$$\begin{aligned} \text{Sales} &= \frac{\text{Amount recorded for sales account}}{100 \text{ per cent} + \text{sales tax rate}} \\ &= \frac{\text{USD } 10,600}{106 \text{ per cent}} = \text{USD } 10,000 \end{aligned}$$

The sales revenue is USD 10,000 for the period. Sales tax is equal to the recorded sales revenue of USD 10,600 less actual sales revenue of USD 10,000, or USD 600.

**Federal excise tax payable** Consumers pay federal excise tax on some goods, such as alcoholic beverages, tobacco, gasoline, cosmetics, tires, and luxury automobiles. The entries a company makes when selling goods subject to the federal excise tax are similar to those made for sales taxes payable. For example, assume that the Dixon Jewelry Store sells a diamond ring to a young couple for USD 2,000. The sale is subject to a 6 per cent sales tax and a 10 per cent federal excise tax. The entry to record the sale is:

Accounts Receivable (+A)	2,320	
Sales (+L)		2,000
Sales Tax Payable (+L)		120

Federal Excise Tax Payable  
To record the sale of a diamond ring.

200

The company records the remittance of the taxes to the federal taxing agency by debiting Federal Excise Tax Payable and crediting Cash.

**Current portions of long-term debt** Accountants move any portion of long-term debt that becomes due within the next year to the current liability section of the balance sheet. For instance, assume a company signed a series of 10 individual notes payable for USD 10,000 each; beginning in the 6th year, one comes due each year through the 15<sup>th</sup> year. Beginning in the 5th year, an accountant would move a USD 10,000 note from the long-term liability category to the current liability category on the balance sheet. The current portion would then be paid within one year.

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### An accounting perspective:

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#### Uses of technology

Many companies use service bureaus to process their payrolls because these bureaus keep up to date on rates, bases, and changes in the laws affecting payroll. Companies can either send their data over the Internet or have the service bureaus pick up time sheets and other data. Managers instruct service bureaus either to print the payroll checks or to transfer data back to the company over the Internet so it can print the checks.

**Payroll liabilities** In most business organizations, accounting for payroll is particularly important because (1) payrolls often are the largest expense that a company incurs, (2) both federal and state governments require maintaining detailed payroll records, and (3) companies must file regular payroll reports with state and federal governments and remit amounts withheld or otherwise due. Payroll liabilities include taxes and other amounts withheld from employees' paychecks and taxes paid by employers.

Employers normally withhold amounts from employees' paychecks for federal income taxes; state income taxes; FICA (social security) taxes; and other items such as union dues, medical insurance premiums, life insurance premiums, pension plans, and pledges to charities. Assume that a company had a payroll of USD 35,000 for the month of April 2010. The company withheld the following amounts from the employees' pay: federal income taxes, USD 4,100; state income taxes, USD 360; FICA taxes, USD 2,678; and medical insurance premiums, USD 940. This entry records the payroll:

2010			
April	30	Salaries Expense (-SE)	35,000
		Employees' Federal Income Taxes Payable (+L)	4,100
		Employees' State Income Taxes Payable (+L)	360
		FICA Taxes Payable (+L)	2,678
		Employees' Medical Insurance Premiums Payable (+L)	940
		Salaries Payable (+L)	26,922
		To record the payroll for the month ending April 30.	

All accounts credited in the entry are current liabilities and will be reported on the balance sheet if not paid prior to the preparation of financial statements. When these liabilities are paid, the employer debits each one and credits Cash.

## 9. Receivables and payables

Employers normally record payroll taxes at the same time as the payroll to which they relate. Assume the payroll taxes an employer pays for April are FICA taxes, USD 2,678; state unemployment taxes, USD 1,890; and federal unemployment taxes, USD 280. The entry to record these payroll taxes would be:

2010			
April	30	Payroll Taxes Expense (-SE)	4,848
		FICA Taxes Payable (+L)	2,678
		State Unemployment Taxes Payable (+L)	1,890
		Federal Unemployment Taxes Payable (+L)	280
		To record employer's payroll taxes.	

These amounts are in addition to the amounts withheld from employees' paychecks. The credit to FICA Taxes Payable is equal to the amount withheld from the employees' paychecks. The company can credit both its own and the employees' FICA taxes to the same liability account, since both are payable at the same time to the same agency. When these liabilities are paid, the employer debits each of the liability accounts and credits Cash.

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### An accounting perspective:

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#### Uses of technology

One of the basic components in accounting software packages is the payroll module. As long as companies update this module each time rates, bases, or laws change, they can calculate withholdings, print payroll checks, and complete reporting forms for taxing agencies. In addition to calculating the employer's payroll taxes, this software maintains all accounting payroll records.

Managers of companies that have estimated liabilities know these liabilities exist but can only estimate the amount. The primary accounting problem is to estimate a reasonable liability as of the balance sheet date. An example of an estimated liability is product warranty payable.

**Estimated product warranty payable** When companies sell products such as computers, often they must guarantee against defects by placing a warranty on their products. When defects occur, the company is obligated to reimburse the customer or repair the product. For many products, companies can predict the number of defects based on experience. To provide for a proper matching of revenues and expenses, the accountant estimates the warranty expense resulting from an accounting period's sales. The debit is to Product Warranty Expense and the credit to Estimated Product Warranty Payable.

To illustrate, assume that a company sells personal computers and warrants all parts for one year. The average price per computer is USD 1,500, and the company sells 1,000 computers in 2010. The company expects 10 per cent of the computers to develop defective parts within one year. By the end of 2010, customers have returned 40 computers sold that year for repairs, and the repairs on those 40 computers have been recorded. The estimated average cost of warranty repairs per defective computer is USD 150. To arrive at a reasonable estimate of product warranty expense, the accountant makes the following calculation:

## 9. Receivables and payables

Number of computers sold	1,000
Percent estimated to develop defects	X 10%
Total estimated defective computers	100
Deduct computers returned as defective to date	40
Estimated additional number to become defective during warranty period	60
Estimated average warranty repair cost per compute:	X \$ 150
Estimated product warranty payable	\$9,000

The entry made at the end of the accounting period is:

<b>Product Warranty Expense (-SE)</b>	<b>9,000</b>	
<b>Estimated Product Warranty Payable (+L)</b>		<b>9,000</b>
<b>To record estimated product warranty expense.</b>		

When a customer returns one of the computers purchased in 2010 for repair work in 2008 (during the warranty period), the company debits the cost of the repairs to Estimated Product Warranty Payable. For instance, assume that Evan Holman returns his computer for repairs within the warranty period. The repair cost includes parts, USD 40, and labor, USD 160. The company makes the following entry:

<b>Estimated Product Warranty Payable (-L)</b>	<b>200</b>	
<b>Repair Parts Inventory (-A)</b>		<b>40</b>
<b>Wages Payable (+L)</b>		<b>160</b>
<b>To record replacement of parts under warranty.</b>		

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### An accounting perspective:

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#### Business insight

Another estimated liability that is quite common relates to clean-up costs for industrial pollution. One company had the following note in its recent financial statements:

*In the past, the Company treated hazardous waste at its chemical facilities. Testing of the ground waters in the areas of the treatment impoundments at these facilities disclosed the presence of certain contaminants. In compliance with environmental regulations, the Company developed a plan that will prevent further contamination, provide for remedial action to remove the present contaminants, and establish a monitoring program to monitor ground water conditions in the future. A similar plan has been developed for a site previously used as a metal pickling facility. Estimated future costs of USD 2,860,000 have been accrued in the accompanying financial statements...to complete the procedures required under these plans.*

When liabilities are contingent, the company usually is not sure that the liability exists and is uncertain about the amount. *FASB Statement No. 5* defines a contingency as "an existing condition, situation, or set of circumstances involving uncertainty as to possible gain or loss to an enterprise that will ultimately be resolved when one or more future events occur or fail to occur".<sup>29</sup>

According to *FASB Statement No. 5*, if the liability is probable and the amount can be reasonably estimated, companies should record contingent liabilities in the accounts. However, since most contingent liabilities may not

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<sup>29</sup> FASB, *Statement of Financial Accounting Standards No. 5*, "Accounting for Contingencies" (Stamford, Conn., 1975). Copyright © by Financial Accounting Standards Board, High Ridge Park, Stamford, Connecticut 06905, USA.



occur and the amount often cannot be reasonably estimated, the accountant usually does not record them in the accounts. Instead, firms typically disclose these contingent liabilities in notes to their financial statements.

Many contingent liabilities arise as the result of lawsuits. In fact, 469 of the 957 companies contacted in the AICPA's annual survey of accounting practices reported contingent liabilities resulting from litigation.<sup>30</sup>

The following two examples from annual reports are typical of the disclosures made in notes to the financial statements. Be aware that just because a suit is brought, the company being sued is not necessarily guilty. One company included the following note in its annual report to describe its contingent liability regarding various lawsuits against the company:

**Contingent liabilities:**

Various lawsuits and claims, including those involving ordinary routine litigation incidental to its business, to which the Company is a party, are pending, or have been asserted, against the Company. In addition, the Company was advised...that the United States Environmental Protection Agency had determined the existence of PCBs in a river and harbor near Sheboygan, Wisconsin, USA, and that the Company, as well as others, allegedly contributed to that contamination. It is not presently possible to determine with certainty what corrective action, if any, will be required, what portion of any costs thereof will be attributable to the Company, or whether all or any portion of such costs will be covered by insurance or will be recoverable from others. Although the outcome of these matters cannot be predicted with certainty, and some of them may be disposed of unfavorably to the Company, management has no reason to believe that their disposition will have a materially adverse effect on the consolidated financial position of the Company.

Another company dismissed an employee and included the following note to disclose the contingent liability resulting from the ensuing litigation:

**Contingencies:**

...A jury awarded USD 5.2 million to a former employee of the Company for an alleged breach of contract and wrongful termination of employment. The Company has appealed the judgment on the basis of errors in the judge's instructions to the jury and insufficiency of evidence to support the amount of the jury's award. The Company is vigorously pursuing the appeal.

The Company and its subsidiaries are also involved in various other litigation arising in the ordinary course of business.

Since it presently is not possible to determine the outcome of these matters, no provision has been made in the financial statements for their ultimate resolution. The resolution of the appeal of the jury award could have a significant effect on the Company's earnings in the year that a determination is made; however, in management's opinion, the final resolution of all legal matters will not have a material adverse effect on the Company's financial position.

Contingent liabilities may also arise from discounted notes receivable, income tax disputes, penalties that may be assessed because of some past action, and failure of another party to pay a debt that a company has guaranteed.

The remainder of this chapter discusses notes receivable and notes payable. Business transactions often involve one party giving another party a note.

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30 AICPA, *Accounting Trends & Techniques* (New York, 2000), p. 100.

## 9. Receivables and payables

### Notes receivable and notes payable

A note (also called a **promissory note**) is an unconditional written promise by a borrower (**maker**) to pay a definite sum of money to the lender (**payee**) on demand or on a specific date. On the balance sheet of the lender (payee), a note is a receivable; on the balance sheet of the borrower (maker), a note is a payable. Since the note is usually negotiable, the payee may transfer it to another party, who then receives payment from the maker. Look at the promissory note in Exhibit 78.

A customer may give a note to a business for an amount due on an account receivable or for the sale of a large item such as a refrigerator. Also, a business may give a note to a supplier in exchange for merchandise to sell or to a bank or an individual for a loan. Thus, a company may have notes receivable or notes payable arising from transactions with customers, suppliers, banks, or individuals.

Companies usually do not establish a subsidiary ledger for notes. Instead, they maintain a file of the actual notes receivable and copies of notes payable.

Most promissory notes have an explicit interest charge. **Interest** is the fee charged for use of money over a period. To the maker of the note, or borrower, interest is an expense; to the payee of the note, or lender, interest is a revenue. A borrower incurs interest expense; a lender earns interest revenue. For convenience, bankers sometimes calculate interest on a 360-day year; we calculate it on that basis in this text. (Some companies use a 365-day year.)

Illustration 9.2 Promissory Note

<b>Principal</b>	\$ 2,400.00	July 1, 2007
<b>Payee</b>	Sixty days	AFTER DATE We PROMISE TO PAY TO
	THE ORDER OF <b>SAXON CORPORATION</b>	
	Twenty-four hundred and no/100	DOLLARS
	AT Saxon Corporation, Lansing, Michigan	
<b>Interest rate</b>	FOR VALUE RECEIVED WITH INTEREST AT THE RATE OF 10%	PER ANNUM FROM July 1, 2007
	<small>This note is one of a series of _____ notes of even date herewith numbered 487 to _____ inclusive, and all of said notes shall become immediately due and payable at the option of the holder hereof on default being made in the payment of any one at maturity.</small>	
<b>Maker</b>	NO. 487 DUE August 31, 2007	MOTOR WHEEL COMPANY (SEAL) Michael D. Smith, Treasurer (SEAL)

Exhibit 78: Promissory note

The basic formula for computing interest is:

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}, \text{ or } I = P \times R \times T$$

**Principal** is the face value of the note. The **rate** is the stated interest rate on the note; interest rates are generally stated on an annual basis. **Time**, which is the amount of time the note is to run, can be either days or months.

To show how to calculate interest, assume a company borrowed USD 20,000 from a bank. The note has a principal (face value) of USD 20,000, an annual interest rate of 10 per cent, and a life of 90 days. The interest calculation is:

$$\text{Interest} = \text{USD } 20,000 \times 0.10 \times \frac{90}{360}$$

$$\text{Interest} = \text{USD } 500$$

Note that in this calculation we expressed the time period as a fraction of a 360-day year because the interest rate is an annual rate.

The **maturity date** is the date on which a note becomes due and must be paid. Sometimes notes require monthly installments (or payments) but usually all of the principal and interest must be paid at the same time as in Exhibit 78. The wording in the note expresses the maturity date and determines when the note is to be paid. A note falling due on a Sunday or a holiday is due on the next business day. Examples of the maturity date wording are:

- On demand. "On demand, I promise to pay..." When the maturity date is on demand, it is at the option of the holder and cannot be computed. The holder is the payee, or another person who legally acquired the note from the payee.
- On a stated date. "On 2010 July 18, I promise to pay..." When the maturity date is designated, computing the maturity date is not necessary.
- At the end of a stated period.

(a) "One year after date, I promise to pay..." When the maturity is expressed in years, the note matures on the same day of the same month as the date of the note in the year of maturity.

(b) "Four months after date, I promise to pay..." When the maturity is expressed in months, the note matures on the same date in the month of maturity. For example, one month from 2010 July 18, is 2010 August 18, and two months from 2010 July 18, is 2010 September 18. If a note is issued on the last day of a month and the month of maturity has fewer days than the month of issuance, the note matures on the last day of the month of maturity. A one-month note dated 2010 January 31, matures on 2010 February 28.

(c) "Ninety days after date, I promise to pay..." When the maturity is expressed in days, the exact number of days must be counted. The first day (date of origin) is omitted, and the last day (maturity date) is included in the count. For example, a 90-day note dated 2010 October 19, matures on 2008 January 17, as shown here:

Life of note (days)		90 days
Days remaining in October not counting date of origin of note:		
Days to count in October (31 - 19)	12	
Total days in November	30	
Total Days in December	31	73
Maturity date in January		17 days

Sometimes a company receives a note when it sells high-priced merchandise; more often, a note results from the conversion of an overdue account receivable. When a customer does not pay an account receivable that is due, the company (creditor) may insist that the customer (debtor) gives a note in place of the account receivable. This action allows the customer more time to pay the balance due, and the company earns interest on the balance until paid. Also, the company may be able to sell the note to a bank or other financial institution.

To illustrate the conversion of an account receivable to a note, assume that Price Company (maker) had purchased USD 18,000 of merchandise on August 1 from Cooper Company (payee) on account. The normal credit period has elapsed, and Price cannot pay the invoice. Cooper agrees to accept Price's USD 18,000, 15 per cent, 90-day note dated September 1 to settle Price's open account. Assuming Price paid the note at maturity and both Cooper and Price have a December 31 year-end, the entries on the books of the payee and the maker are:

<b>Cooper Company, Payee</b>			
Aug. 1	Accounts Receivable—Price Company (+A)	18,000	18,000
	Sales (+SE)		
	To record sale of merchandise on account.		
Sept. 1	Notes Receivable (+A)	18,000	
	Accounts Receivable—Price Company (-A)		18,000
	To record exchange of a note from Price Company for open account.		
Nov. 30	Cash (+A)	18,675	
	Notes Receivable (-A)		18,000
	Interest Revenue ( $\$18,000 \times 0.15 \times \frac{90}{360}$ ). (+SE)		675
	To record receipt of Price Company note principal and interest.		
<b>Price Company, Maker</b>			
Aug. 1	Purchase (+A)	18,000	18,000
	Accounts Payable—Cooper Company (+L)		
	To record purchase of merchandise on account.		
Sept. 1	Accounts Payable—Cooper Company (-L)	18,000	
	Notes Payable (+L)		18,000
	To record exchange of a note to Cooper Company for open account.		
Nov. 30	Notes Payable (-L)	18,000	
	Interest Expense ( $\$18,000 \times 0.15 \times \frac{90}{360}$ ). (-SE)	675	
	Cash (-A)		18,675
	To record payment of note principal and interest.		

The USD 18,675 paid by Price to Cooper is called the maturity value of the note. **Maturity value** is the amount that the maker must pay on a note on its maturity date; typically, it includes principal and accrued interest, if any.

Sometimes the maker of a note does not pay the note when it becomes due. The next section describes how to record a note not paid at maturity.

A **dishonored note** is a note that the maker failed to pay at maturity. Since the note has matured, the holder or payee removes the note from Notes Receivable and records the amount due in Accounts Receivable (or Dishonored Notes Receivable).

At the maturity date of a note, the maker should pay the principal plus interest. If the interest has not been accrued in the accounting records, the maker of a dishonored note should record interest expense for the life of the note by debiting Interest Expense and crediting Interest Payable. The payee should record the interest earned and remove the note from its Notes Receivable account. Thus, the payee of the note should debit Accounts Receivable for the maturity value of the note and credit Notes Receivable for the note's face value and Interest Revenue for the interest. After these entries have been posted, the full liability on the note—principal plus interest—is included in the records of both parties. Interest continues to accrue on the note until it is paid, replaced by a new note, or written off as uncollectible. To illustrate, assume that Price did not pay the note at maturity. The entries on each party's books are:

<b>Cooper Company, Payee</b>			
Nov. 30	Accounts Receivable—Price Company (+A)	18,675	
	Notes Receivable (-A)		18,000
	Interest Revenue (+SE)		675
	<b>To record dishonor of Price Company note.</b>		
<b>Price Company, Maker</b>			
Nov. 30	Interest Expense (-SE)	675	
	Interest Payable (+L)		675
	To record interest on note payable.		

When unable to pay a note at maturity, sometimes the maker pays the interest on the original note or includes the interest in the face value of a new note that replaces the old note. Both parties account for the new note in the same manner as the old note. However, if it later becomes clear that the maker of a dishonored note will never pay,

## 9. Receivables and payables

the payee writes off the account with a debit to Uncollectible Accounts Expense (or to an account with a title such as Loss on Dishonored Notes) and a credit to Accounts Receivable. The debit should be to the Allowance for Uncollectible Accounts if the payee made an annual provision for uncollectible notes receivable.

Assume that Price Company pays the interest at the maturity date and issues a new 15 per cent, 90-day note for USD 18,000. The entries on both sets of books would be:

<b>Cooper Company, Payee</b>		<b>Price Company, Maker</b>	
Cash (+A)	675	Interest Expense (-SE)	675
Interest Revenue (+SE)	675	Cash (-A)	675
To record the receipt of interest on Price Company note.		To record the payment of interest on note to Cooper Company.	
(Optional entry)	18,000	(Optional entry)	18,000
Notes Receivable (+A)	18,000	Notes Payable (-L)	18,000
Notes Receivable (-A)		Notes Payable (+L)	
To replace old 15%, 90-day note from Price Company with new 15%, 90-day note.		To replace old 15%, 90-day note to Cooper Company with new 15%, 90-day note.	

Although the second entry on each set of books has no effect on the existing account balances, it indicates that the old note was renewed (or replaced). Both parties substitute the new note, or a copy, for the old note in a file of notes.

Now assume that Price Company does not pay the interest at the maturity date but instead includes the interest in the face value of the new note. The entries on both sets of books would be:

<b>Cooper Company, Payee</b>		<b>Price Company, Maker</b>	
Notes Receivable (+A)	18,675	Interest Expense (-SE)	675
Interest Revenue (+SE)	675	Notes Payable (-L)	18,000
Notes Receivable (-A)	18,000	Notes Payable (+L)	18,675
To record the replacement of the old Price Company \$18,000, 15%, 90-day note with a new \$18,675, 15%, 90-day note.		To record the replacement of the old \$18,000, 15%, 90-day note to Cooper Company with a new \$18,675, 15%, 90-day note.	

On an interest-bearing note, even though interest accrues, or accumulates, on a day-to-day basis, usually both parties record it only at the note's maturity date. If the note is outstanding at the end of an accounting period, however, the time period of the interest overlaps the end of the accounting period and requires an adjusting entry at the end of the accounting period. Both the payee and maker of the note must make an adjusting entry to record the accrued interest and report the proper assets and revenues for the payee and the proper liabilities and expenses for the maker. Failure to record accrued interest understates the payee's assets and revenues by the amount of the interest earned but not collected and understates the maker's expenses and liabilities by the interest expense incurred but not yet paid.

**Payee's books** To illustrate how to record accrued interest on the payee's books, assume that the payee, Cooper Company, has a fiscal year ending on October 31 instead of December 31. On October 31, Cooper would make the following adjusting entry relating to the Price Company note:

Oct. 1	Interest Receivable (+A)	450	
	Interest Revenue (\$18,000 X 0.15 X 60/360) (+SE)		450
	To record interest earned on Price Company		

*note  
for the period September 1 through October  
31.*

The **Interest Receivable account** shows the interest earned but not yet collected. Interest receivable is a current asset in the balance sheet because the interest will be collected in 30 days. The interest revenue appears in the income statement. When Price pays the note on November 30, Cooper makes the following entry to record the collection of the note's principal and interest:

Nov. 3	Cash (+A)	18,675	
0			
	Notes Receivable (-A)	18,000	
	Interest Receivable (-A)	450	
	Interest Revenue (+SE)	225	
	<i>To record collection of Price Company note and interest.</i>		

Note that the entry credits the Interest Receivable account for the USD 450 interest accrued from September 1 through October 31, which was debited to the account in the previous entry, and credits Interest Revenue for the USD 225 interest earned in November.

**Maker's books** Assume Price Company's accounting year also ends on October 31 instead of December 31. Price's accounting records would be incomplete unless the company makes an adjusting entry to record the liability owed for the accrued interest on the note it gave to Cooper Company. The required entry is:

Oct. 3	Interest Expense ( $\$18,000 \times 0.15 \times \frac{60}{360}$ ) (-SE)	450	
1			
	Interest Payable (+L)	450	
	<i>To record accrued interest on note to Cooper Company for the period September 1 through October 31.</i>		

The **Interest Payable account**, which shows the interest expense incurred but not yet paid, is a current liability in the balance sheet because the interest will be paid in 30 days. Interest expense appears in the income statement. When the note is paid, Price makes the following entry:

Nov. 3	Notes Payable (-L)	18,000	
0			
	Interest Payable (-L)	450	
	Interest Expense (-SE)	225	
	Cash (-A)		18,675
	<i>To record payment of principal and interest on note to Cooper Company.</i>		

In this illustration, Cooper's financial position made it possible for the company to carry the Price note to the maturity date. Alternatively, Cooper could have sold, or discounted, the note to receive the proceeds before the maturity date. This topic is reserved for a more advanced text.

### Short-term financing through notes payable

A company sometimes needs short-term financing. This situation may occur when (1) the company's cash receipts are delayed because of lenient credit terms granted customers, or (2) the company needs cash to finance the buildup of seasonal inventories, such as before Christmas. To secure short-term financing, companies issue interest-bearing or non interest-bearing notes.

**Interest-bearing notes** To receive short-term financing, a company may issue an interest-bearing note to a bank. An interest-bearing note specifies the interest rate charged on the principal borrowed. The company receives

## 9. Receivables and payables

from the bank the principal borrowed; when the note matures, the company pays the bank the principal plus the interest.

Accounting for an interest-bearing note is simple. For example, assume the company's accounting year ends on December 31. Needham Company issued a USD 10,000, 90-day, 9 per cent note on 2009 December 1. The following entries would record the loan, the accrual of interest on 2009 December 31 and its payment on 2010 March 1:

2009	1	Cash (+A)	10,000	
Dec.		Notes Payable (+L)		10,000
		To record 90-day bank loan.		
	31	Interest Expense (-SE)	75	
		Interest Payable (+L)		75
		To record accrued interest on a note payable at year-end ( $\$10,000 \times 0.09 \times \frac{30}{360}$ ).		
2010	1	Notes Payable (-L)	10,000	
Mar.		Interest Expense ( $\$10,000 \times 0.09 \times \frac{60}{360}$ ) (-SE)	150	
		Interest Payable (-L)	75	
		Cash (-A)		10,225
		To record principal and interest paid on bank loan.		

**Non interest-bearing notes (discounting notes payable)** A company may also issue a non interest-bearing note to receive short-term financing from a bank. A non interest-bearing note does not have a stated interest rate applied to the face value of the note. Instead, the note is drawn for a maturity amount less a bank discount; the borrower receives the proceeds. A **bank discount** is the difference between the maturity value of the note and the cash proceeds given to the borrower. The **cash proceeds** are equal to the maturity amount of a note less the bank discount. This entire process is called **discounting a note payable**. The purpose of this process is to introduce interest into what appears to be a non interest-bearing note. The meaning of discounting here is to deduct interest in advance.

Because interest is related to time, the bank discount is not interest on the date the loan is made; however, it becomes interest expense to the company and interest revenue to the bank as time passes. To illustrate, assume that on 2009 December 1, Needham Company presented its USD 10,000, 90-day, non interest-bearing note to the bank, which discounted the note at 9 per cent. The discount is USD 225 ( $\$10,000 \times 0.09 \times \frac{90}{360}$ ), and the proceeds to Needham are USD 9,775. The entry required on the date of the note's issue is:

2009			
Dec.	1	Cash (+A)	9,775
		Discount on Notes Payable (-L)	225
		Notes Payable (+L)	10,000
		<i>Issued a 90-day note to bank.</i>	

Needham credits Notes Payable for the face value of the note. **Discount on notes payable** is a contra account used to reduce Notes Payable from face value to the net amount of the debt. The balance in the Discount on Notes Payable account appears on the balance sheet as a deduction from the balance in the Notes Payable account.

Over time, the discount becomes interest expense. If Needham paid the note before the end of the fiscal year, it would charge the entire USD 225 discount to Interest Expense and credit Discount on Notes Payable. However, if Needham's fiscal year ended on December 31, an adjusting entry would be required as follows:

2009			
Dec.	3	Interest Expense (-SE)	75
	1	Discount on Notes Payable (+L)	75
		<i>To record accrued interest on note payable at year-end.</i>	

This entry records the interest expense incurred by Needham for the 30 days the note has been outstanding. The expense can be calculated as USD 10,000 X 0.09 X 30/360, or 30/90 X USD 225. Notice that for entries involving discounted notes payable, no separate Interest Payable account is needed. The Notes Payable account already contains the total liability that will be paid at maturity, USD 10,000. From the date the proceeds are given to the borrower to the maturity date, the liability grows by reducing the balance in the Discount on Notes Payable contra account. Thus, the current liability section of the 2009 December 31, balance sheet would show:

<i>Current Liabilities:</i>	
Notes payable	\$ 10,000
Less: Discount on notes payable	150 \$ 9,850

When the note is paid at maturity, the entry is:

2010			
Mar.	1	Notes Payable (-L)	10,000
		Interest Expense (-SE)	150
		Cash (-A)	10,000
		Discount on Notes Payable (+L)	150
		<i>To record note payment and interest expense.</i>	

The T-accounts for Discount on Notes Payable and for Interest Expense appear as follows:

Discount on Notes Payable			Interest Expense		
2009		2009	2009		2009
Dec. 1	225	Dec. 31	75	Dec. 31	75
Dec. 31	Balance 150	2010		2010	Dec. 31 To close 75
		Mar. 1	150	Mar. 1	150

In Exhibit 79, we compare the journal entries for interest-bearing notes and non-interest-bearing notes used by Needham Company.



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Interest-Bearing Notes				Non interest-Bearing Notes			
2009				2009			
Dec.	1	Cash (+A)	10,000	Dec.	1	Cash (+A)	9,775
		Notes Payable (+L)				Discount on Notes Payable (-L)	225
			10,000				
			0				
		To record 90-day bank loan,				Notes Payable (+L)	10,000
						To record 90-day bank loan.	
	31	Interest Expense (-SE)	75	31	Interest Expense (-SE)	75	
		Interest Payable (+L)				Discount on Notes Payable (+L)	75
			75			To record accrued interest on a	
		To record accrued interest on a				note payable at year-end.	
		note payable at year-end.					
2010				2010			
Mar.	1	Notes Payable (-L)	10,000	Mar.	1	Notes Payable (-L)	10,000
		Interest Expense (-SE)	150			Interest Expense (-SE)	150
		Interest Payable (-L)	75			Cash (-A)	10,000
		Cash (-A)				Discount on Notes Payable (+L)	150
			10,22			To record note payment and	
		To record note principal and	5			interest expense.	
		interest payment.					

Exhibit 79: Comparison between interest-bearing notes and noninterest-bearing notes

### Analyzing and using the financial results—Accounts receivable turnover and number of days' sales in accounts receivable

**Accounts receivable turnover** is the number of times per year that the average amount of accounts receivable is collected. To calculate this ratio divide net credit sales, or net sales, by the average net accounts receivable (accounts receivable after deducting the allowance for uncollectible accounts):

$$\text{Accounts receivable turnover} = \frac{\text{Net credit sales (net sales)}}{\text{Average net accounts receivable}}$$

Ideally, average net accounts receivable should represent weekly or monthly averages; often, however, beginning and end-of-year averages are the only amounts available to users outside the company. Although analysts should use net credit sales, frequently net credit sales are not known to those outside the company. Instead, they use net sales in the numerator.

Generally, the faster firms collect accounts receivable, the better. A company with a high accounts receivable turnover ties up a smaller proportion of its funds in accounts receivable than a company with a low turnover. Both the company's credit terms and collection policies affect turnover. For instance, a company with credit terms of 2/10, n/30 would expect a higher turnover than a company with terms of n/60. Also, a company that aggressively pursues overdue accounts receivable has a higher turnover of accounts receivable than one that does not.

For example, we calculated these accounts receivable turnovers for the following hypothetical companies:

	Net Sales (millions)	Accounts Receivable	
		Average Net	Turnover
Abercrombie & Fitch	\$ 1,238	\$ 14	88.43
The Limited, Inc.	10,105	1,012	10.00

We calculate the **number of days' sales in accounts receivable** (also called the average collection period for accounts receivable) as follows:

$$\text{Number of days' sales per accounts receivable} = \frac{\text{Number of days per a year (365)}}{\text{Accounts receivable turnover}}$$

This ratio measures the average liquidity of accounts receivable and gives an indication of their quality. The faster a firm collects receivables, the more liquid (the closer to being cash) they are and the higher their quality. The longer accounts receivable remain outstanding, the greater the probability they never will be collected. As the time period increases, so does the probability that customers will declare bankruptcy or go out of business.

Based on 365 days, we calculated the number of days' sales for each of these hypothetical companies:

<i>Company</i>	<i>Accounts Receivable Turnover</i>	<i>Number of Day's Sales in</i>
Abercrombie & Fitch	88.43	4.1
The Limited, Inc.	10.00	36.5

These companies have collection periods ranging from 4.1 to 36.5 days. Assuming credit terms of 2/10, n/30, one would expect the average collection period to be under 30 days. If customers do not pay within 10 days and take the discount offered, they incur an annual interest rate of 36.5 per cent on these funds. (They lose a 2 per cent discount and get to use the funds another 20 days, which is equivalent to an annual rate of 36.5 per cent.)

Having studied receivables and payables in this chapter, you will study plant assets in the next chapter. These long-term assets include land and depreciable assets such as buildings, machinery, and equipment.

### Understanding the learning objectives

- Companies use two methods to account for uncollectible accounts receivable: the allowance method, which provides in advance for uncollectible accounts; and the direct write-off method, which recognizes uncollectible accounts as an expense when judged uncollectible. The allowance method is the preferred method and is the only method discussed and illustrated in this text.
- The two basic methods for estimating uncollectible accounts under the allowance method are the percentage-of-sales method and the percentage-of-receivables method.
- The percentage-of-sales method focuses attention on the income statement and the relationship of uncollectible accounts to sales. The debit to Uncollectible Accounts Expense is a certain per cent of credit sales or total net sales.
- The percentage-of-receivables method focuses attention on the balance sheet and the relationship of the allowance for uncollectible accounts to accounts receivable. The credit to the Allowance for Uncollectible Accounts is the amount necessary to bring that account up to a certain percentage of the Accounts Receivable balance. Either one overall percentage or an aging schedule may be used.
- Credit cards are charge cards used by customers to charge purchases of goods and services. These cards are of two types—nonbank credit cards (such as American Express) and bank credit cards (such as VISA).
- The sale is recorded at the gross amount of the sale, and the cash or receivable is recorded at the net amount the company will receive.
- Liabilities result from some past transaction and are obligations to pay cash, provide services, or deliver goods at some time in the future.
- Current liabilities are obligations that (1) are payable within one year or one operating cycle, whichever is longer, or (2) will be paid out of current assets or create other current liabilities.
- Long-term liabilities are obligations that do not qualify as current liabilities.
- Clearly determinable liabilities are those for which the existence of the liability and its amount are certain. An example is accounts payable.
- Estimated liabilities are those for which the existence of the liability is certain, but its amount can only be estimated. An example is estimated product warranty payable.

## 9. Receivables and payables

- Contingent liabilities are those for which the existence, and usually the amount, are uncertain because these liabilities depend (or are contingent) on some future event occurring or not occurring. An example is a liability arising from a lawsuit.

- A promissory note is an unconditional written promise by a borrower (maker) to pay the lender (payee) or someone else who legally acquired the note a certain sum of money on demand or at a definite time.

- Interest is the fee charged for the use of money through time.

Interest = Principal × Rate of interest × Time.

- Companies sometimes need short-term financing. Short-term financing may be secured by issuing interest-bearing notes or by issuing non interest-bearing notes.

- An interest-bearing note specifies the interest rate that will be charged on the principal borrowed.

- A non interest-bearing note does not have a stated interest rate applied to the face value of the note.

- Calculate accounts receivable turnover by dividing net credit sales, or net sales, by average net accounts receivable.

- Calculate the number of days' sales in accounts receivable (or average collection period) by dividing the number of days in the year by the accounts receivable turnover.

- Together, these ratios show the liquidity of accounts receivable and give some indication of their quality. Generally, the higher the accounts receivable turnover, the better; and the shorter the average collection period, the better.

### Demonstration problem

**Demonstration problem A** a. Prepare the journal entries for the following transactions:

As of the end of 2010, Post Company estimates its uncollectible accounts expense to be 1 per cent of sales. Sales in 2010 were USD 1,125,000.

On 2011 January 15, the company decided that the account for John Nunn in the amount of USD 750 was uncollectible.

On 2011 February 12, John Nunn's check for USD 750 arrived.

b. Prepare the journal entries in the records of Lyle Company for the following:

On 2010 June 15, Lyle Company received a USD 22,500, 90-day, 12 per cent note dated 2010 June 15, from Stone Company in payment of its account.

Assume that Stone Company did not pay the note at maturity. Lyle Company decided that the note was uncollectible.

**Demonstration problem B** a. Prepare the entries on the books of Cromwell Company assuming the company borrowed USD 10,000 at 7 per cent from First National Bank and signed a 60-day non interest-bearing note payable on 2009 December 1, accrued interest on 2009 December 31, and paid the debt on the maturity date.

b. Prepare the entries on the books of Cromwell Company assuming it purchased equipment from Jones Company for USD 5,000 and signed a 30-day, 9 per cent interest-bearing note payable on 2010 February 24. Cromwell paid the note on its maturity date.

### Solution to demonstration problem

#### Solution to demonstration problem A

a.

1.	2010	31	Uncollectible Accounts Expense (-SE)	11,250	
	Dec.		Allowance for Uncollectible Accounts (-A)		11,250
			To record estimated Uncollectible accounts for the year.		
2.	2011	15	Allowance for Uncollectible Accounts (+A)	750	
	Jan.		Accounts Receivable—John Nunn (-A)		750
			To write off the account of John Nunn as Uncollectible.		
3.	Feb.	12	Accounts Receivable—John Nunn (+A)	750	
			Allowance for Uncollectible Accounts (-A)		750
			To correct the write-off of John Nunn's account on January 15.		
		12	Cash (+A)	750	
			Accounts Receivable—John Nunn (-A)		750
			To record the collection of John Nunn's account receivable.		

b.

1.	2010	15	Notes Receivable (+A)	22,500	
	June		Accounts Receivable—Stone Company (-A)		22,500
			To record receipt of a note from Stone Company.		
2.	Sept	13	Accounts Receivable—Stone Company (+A)	23,175	
			Notes Receivable (-A)		22,500
			Interest Revenue(+SE)		675
			To record the default of the Stone Company note of \$22,500. Interest revenue was \$675.		
		13	Allowance for Uncollectible Accounts* (+A)	23,175	
			Accounts Receivable—Stone Company (-A)		23,175
			To write off the Stone Company as uncollectible.		

\*This debt assumes that Notes Receivable were taken into consideration when an allowance was established. If not, the debit should be to Loss from Dishonored Notes Receivable.

### Solution to demonstration problem B

a.

2009	1	Cash (+A)	9,883.33	
Dec.		Bank Discount ( $\$10,000 \times 0.07 \times \frac{10}{36}$ ) (+A)	116.67	
		Notes Payable (+L)		10,000.00
	31	Interest Expense (-SE)	58.33	
		Bank Discount (-A)		58.33
		( $\$10,000 \times 0.07 \times \frac{10}{36}$ )		
2010	30	Notes Payable (-L)	10,000.00	
Jan.		Interest Expense (-SE)	58.33	
		Bank Discount (-A)		58.33
		Cash (-A)		10,000.00

b.

2010	2	Equipment (+A)	5,000.00	
Feb	4	Notes Payable (+L)		5,000.00
Mar	2	Notes Payable (-L)	5,000.00	
	6	Interest Expense (-SE)	37.50	
		Cash (-A)		5,037.50
		( $\$5,000 \times 0.09 \times \frac{30}{360}$ ) = \$37.50		675

### Key terms

**Accounts receivable turnover** Net credit sales (or net sales) divided by average net accounts receivable.

**Aging schedule** A means of classifying accounts receivable according to their age; used to determine the necessary balance in an Allowance for Uncollectible Accounts. A different uncollectibility percentage rate is used for each age category.

**Allowance for Uncollectible Accounts** A contra-asset account to the Accounts Receivable account; it reduces accounts receivable to their net realizable value. Also called Allowance for Doubtful Accounts or Allowance for Bad Debts.

**Bad debts expense** See Uncollectible accounts expense.

**Bank discount** The difference between the maturity value of a note and the actual amount—the note's proceeds—given to the borrower.

## 9. Receivables and payables

**Cash proceeds** The maturity amount of a note less the bank discount.

**Clearly determinable liabilities** Liabilities whose existence and amount are certain. Examples include accounts payable, notes payable, interest payable, unearned delivery fees, wages payable, sales tax payable, federal excise tax payable, current portions of long-term debt, and various payroll liabilities.

**Contingent liabilities** Liabilities whose existence is uncertain. Their amount is also usually uncertain. Both their existence and amount depend on some future event that may or may not occur. Examples include liabilities arising from lawsuits, discounted notes receivable, income tax disputes, penalties that may be assessed because of some past action, and failure of another party to pay a debt that a company has guaranteed.

**Credit Card Expense account** Used to record credit card agency's service charges for services rendered in processing credit card sales.

**Credit cards** Nonbank charge cards (e.g. American Express) and bank charge cards (e.g. VISA and MasterCard) that customers use to charge their purchases of goods and services.

**Current liabilities** Obligations that (1) are payable within one year or one operating cycle, whichever is longer, or (2) will be paid out of current assets or result in the creation of other current liabilities.

**Discount on Notes Payable** A contra account used to reduce Notes Payable from face value to the net amount of the debt.

**Discounting a note payable** The act of borrowing on a non interest-bearing note drawn for a maturity amount, from which a bank discount is deducted, and the proceeds are given to the borrower.

**Dishonored note** A note that the maker failed to pay at maturity.

**Estimated liabilities** Liabilities whose existence is certain, but whose amount can only be estimated. An example is estimated product warranty payable.

**Interest** The fee charged for use of money over a period of time ( $I = P \times R \times T$ ).

**Interest Payable account** An account showing the interest expense incurred but not yet paid; reported as a current liability in the balance sheet.

**Interest Receivable account** An account showing the interest earned but not yet collected; reported as a current asset in the balance sheet.

**Liabilities** Obligations that result from some past transaction and are obligations to pay cash, perform services, or deliver goods at some time in the future.

**Long-term liabilities** Obligations that do not qualify as current liabilities.

**Maker (of a note)** The party who prepares a note and is responsible for paying the note at maturity.

**Maturity date** The date on which a note becomes due and must be paid.

**Maturity value** The amount that the maker must pay on the note on its maturity date.

**Net realizable value** The amount the company expects to collect from accounts receivable.

**Number of days' sales in accounts receivable** The number of days in a year (365) divided by the accounts receivable turnover.

**Operating cycle** The time it takes to start with cash, buy necessary items to produce revenues (such as materials, supplies, labor, and/or finished goods), sell goods or services, and receive cash by collecting the resulting receivables.

**Payable** Any sum of money due to be paid by a company to any party for any reason.

**Payee (of a note)** The party who receives a note and will be paid cash at maturity.

**Percentage-of-receivables method** A method for determining the desired size of the Allowance for Uncollectible Accounts by basing the calculation on the Accounts Receivable balance at the end of the period.

**Percentage-of-sales method** A method of estimating the uncollectible accounts from the sales of a given period's total net credit sales or net sales.

**Principal (of a note)** The face value of a note.

**Promissory note** An unconditional written promise by a borrower (maker) to pay a definite sum of money to the lender (payee) on demand or at a specific date.

**Rate (of a note)** The stated interest rate on the note.

**Receivable** Any sum of money due to be paid to a company from any party for any reason.

**Time (of a note)** The amount of time the note is to run; can be expressed in days, months, or years.

**Trade receivables** Amounts customers owe a company for goods sold or services rendered on account. Also called accounts receivable or trade accounts receivable.

**Uncollectible accounts expense** An operating expense that a business incurs when it sells on credit; also called doubtful accounts expense or bad debts expense.

#### Self test

##### True-false

Indicate whether each of the following statements is true or false.

The percentage-of-sales method estimates the uncollectible accounts from the ending balance in Accounts Receivable.

Under the allowance method, uncollectible accounts expense is recognized when a specific customer's account is written off.

Bank credit card sales are treated as cash sales because the receipt of cash is certain.

Liabilities result from some future transaction.

Current liabilities are classified as clearly determinable, estimated, and contingent.

A dishonored note is removed from Notes Receivable, and the total amount due is recorded in Accounts Receivable.

When an interest-bearing note is given to a bank when taking out a loan, the difference between the cash proceeds and the maturity amount is debited to Discount on Notes Payable.

##### Multiple-choice

Select the best answer for each of the following questions.

Which of the following statements is false?

- Any existing balance in the Allowance for Uncollectible Accounts is ignored in calculating the uncollectible accounts expense under the percentage-of-sales method except that the allowance account must have a credit balance after adjustment.
- The percentage-of-receivables method may use either an overall rate or a different rate for each age category.
- The Allowance for Uncollectible Accounts reduces accounts receivable to their net realizable value.
- A write-off of an account reduces the net amount shown for accounts receivable on the balance sheet.
- None of the above.

Hunt Company estimates uncollectible accounts using the percentage-of-receivables method and expects that 5 per cent of outstanding receivables will be uncollectible for 2010. The balance in Accounts Receivable is USD 200,000, and the allowance account has a USD 3,000 credit balance before adjustment at year-end. The uncollectible accounts expense for 2010 will be:

- USD 7,000.
- USD 10,000.
- USD 13,000.
- USD 9,850.
- None of the above.

Which type of company typically has the longest operating cycle?

- Service company.
- Merchandising company.
- Manufacturing company.

## 9. Receivables and payables

d. All equal.

Maxwell Company records its sales taxes in the same account as sales revenues. The sales tax rate is 6 per cent. At the end of the current period, the Sales account has a balance of USD 265,000. The amount of sales tax payable is:

- a. USD 12,000.
- b. USD 15,000.
- c. USD 15,900.
- d. USD 18,000.

Dawson Company sells fax machines. During 2010, the company sold 2,000 fax machines. The company estimates that 5 per cent of the machines require repairs under warranty. To date, 30 machines have been repaired. The estimated average cost of warranty repairs per defective fax machine is USD 200. The required amount of the adjusting entry to record estimated product warranty payable is:

- a. USD 400,000.
- b. USD 6,000.
- c. USD 14,000.
- d. USD-0-.

To compute interest on a promissory note, all of the following elements must be known except:

- a. The face value of the note.
- b. The stated interest rate.
- c. The name of the payee.
- d. The life of the note.
- e. None of the above.

Keats Company issued its own USD 10,000, 90-day, non interest-bearing note to a bank. If the note is discounted at 10 per cent, the proceeds to Keats are:

- a. USD 10,000.
- b. USD 9,000.
- c. USD 9,750.
- d. USD 10,250.
- e. None of the above.

Now turn to “Answers to self-test” at the back of the chapter to check your answers.

### Questions

- In view of the difficulty in estimating future events, would you recommend that accountants wait until collections are made from customers before recording sales revenue? Should they wait until known accounts prove to be uncollectible before charging an expense account?
- The credit manager of a company has established a policy of seeking to completely eliminate all losses from uncollectible accounts. Is this policy a desirable objective for a company? Explain.
- What are the two major purposes of establishing an allowance for uncollectible accounts?

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- In view of the fact that it is impossible to estimate the exact amount of uncollectible accounts receivable for any one year in advance, what exactly does the Allowance for Uncollectible Accounts account contain after a number of years?
- What must be considered before adjusting the allowance for uncollectible accounts under the percentage-of-receivables method?
- How might information in an aging schedule prove useful to management for purposes other than estimating the size of the required allowance for uncollectible accounts?
- For a company using the allowance method of accounting for uncollectible accounts, which of the following directly affects its reported net income: (1) the establishment of the allowance, (2) the writing off of a specific account, or (3) the recovery of an account previously written off as uncollectible?
- Why might a retailer agree to sell by credit card when such a substantial discount is taken by the credit card agency in paying the retailer?
- Define liabilities, current liabilities, and long-term liabilities.
- What is an operating cycle? Which type of company is likely to have the shortest operating cycle, and which is likely to have the longest operating cycle? Why?
- Describe the differences between clearly determinable, estimated, and contingent liabilities. Give one or more examples of each type.
- In what instances might a company acquire notes receivable?
- How is the maturity value of a note calculated?
- What is a dishonored note receivable and how is it reported in the balance sheet?
- Under what circumstances does the account Discount on Notes Payable arise? How is it reported in the financial statements? Explain why.
- **Real world question** Refer to "A Broader Perspective: GECS allowance for losses on financing receivables". What factors are taken into account by the General Electric Company in determining the adjusting entry to establish the desired balance in the Allowance for Losses?
- **Real world question** Refer to "A Broader Perspective: GECS allowance for losses on financing receivables". Explain how the General Electric Company writes off uncollectibles.

### Exercises

**Exercise A** The accounts of Stackhouse Company as of 2010 December 31, show Accounts Receivable, USD 190,000; Allowance for Uncollectible Accounts, USD 950 (credit balance); Sales, USD 920,000; and Sales Returns and Allowances, USD 12,000. Prepare journal entries to adjust for possible uncollectible accounts under each of the following assumptions:

- a. Uncollectible accounts are estimated at 1 per cent of net sales.
- b. The allowance is to be increased to 3 per cent of accounts receivable.

**Exercise B** Compute the required balance of the Allowance for Uncollectible Accounts for the following receivables:

Accounts Receivable	Age (months)	Probability of Collection
\$180,000	Less than 1	95%
90,000	1-3	85



## 9. Receivables and payables

39,000	3-6	75
12,000	6-9	35
2,250	9-12	10

**Exercise C** On 2009 April 1, Kelley Company, which uses the allowance method of accounting for uncollectible accounts, wrote off Bob Dyer's USD 400 account. On 2009 December 14, the company received a check in that amount from Dyer marked "in full payment of account". Prepare the necessary entries.

**Exercise D** Jamestown Furniture Mart, Inc., sold USD 80,000 of furniture in May to customers who used their American Express credit cards. Such sales are subject to a 3 per cent discount by American Express (a nonbank credit card),

- Prepare journal entries to record the sales and the subsequent receipt of cash from the credit card company.
- Do the same as requirement (a), but assume the credit cards used were VISA cards (a bank credit card).

**Exercise E** Dunwoody Discount Toys, Inc., sells merchandise in a state that has a 5 per cent sales tax. Rather than record sales taxes collected in a separate account, the company records both the sales revenue and the sales taxes in the Sales account. At the end of the first quarter of operations, when it is time to remit the sales taxes to the state taxing agency, the company has USD 420,000 in the Sales account. Determine the correct amount of sales revenue and the amount of sales tax payable.

**Exercise F** Assume the following note appeared in the annual report of a company:

*In 2009, two small retail customers filed separate suits against the company alleging misrepresentation, breach of contract, conspiracy to violate federal laws, and state antitrust violations arising out of their purchase of retail grocery stores through the company from a third party. Damages sought range up to USD 10 million in each suit for actual and treble damages and punitive damages of USD 2 million in one suit and USD 10 million in the other. The company is vigorously defending the actions and management believes there will be no adverse financial effect.*

What kind of liability is being reported? Why is it classified this way? Do you think it is possible to calculate a dollar amount for this obligation? How much would the company have to pay if it lost the suit and had to pay the full amount?

**Exercise G** Determine the maturity date for each of the following notes:

Issue Date	Life	
2010 January 13	30	days
2010 January 31	90	days
2010 June 4	1	year
2010 December 2	1	month

**Exercise H** Crawford, Inc., gave a USD 20,000, 120-day, 12 per cent note to Dunston, Inc., in exchange for merchandise. Crawford uses periodic inventory procedure. Prepare journal entries to record the issuance of the note and the entries needed at maturity for both parties, assuming payment is made.

**Exercise I** Based on the facts in the previous exercise, prepare the entries that Crawford, Inc., and Dunston, Inc., would make at the maturity date, assuming Crawford defaults.

**Exercise J** John Wood is negotiating a bank loan for his company, Wood, Inc., of USD 16,000 for 90 days. The bank's current interest rate is 10 per cent. Prepare Wood's entries to record the loan under each of the following assumptions:

- Wood signs a note for USD 16,000. Interest is deducted in calculating the proceeds turned over to him.
- Wood signs a note for USD 16,000 and receives that amount. Interest is to be paid at maturity.

**Exercise K** Based on the previous exercise, prepare the entry or entries that would be made at the maturity date for each alternative, assuming the loan is paid before the end of the accounting period.

**Exercise L** Pistol Pete provides communication services and products, as well as network equipment and computer systems, to businesses, consumers, communications services providers, and government agencies. The following amounts were included in its 2010 annual report:

	<b>(Millions)</b>
Net sales	USD 79,609
Receivables, net, 2009 December 31	29,275
Receivables, net, 2008 December 31	28,623

Calculate the accounts receivable turnover and the number of days' sales in accounts receivable. Use net sales instead of net credit sales in the calculation. Comment on the results.

### Problems

**Problem A** As of 2009 December 31, Fargo Company's accounts prior to adjustment show:

Allowance for uncollectible accounts (credit balance)

Accounts receivable	\$ 40,000
Allowance for uncollectible accounts (credit balance)	750
Sales	250,000

Fargo Company estimates uncollectible accounts at 1 per cent of sales.

On 2010 February 23, the account of Dan Hall in the amount of USD 300 was considered uncollectible and written off. On 2010 August 12, Hall remitted USD 200 and indicated that he intends to pay the balance due as soon as possible. By 2010 December 31, no further remittance had been received from Hall and no further remittance was expected.

- a. Prepare journal entries to record all of these transactions and adjusting entries.
- b. Give the entry necessary as of 2009 December 31, if Fargo Company estimated its uncollectible accounts at 8 per cent of outstanding receivables rather than at 1 per cent of sales.

**Problem B** At the close of business, Jim's Restaurant had credit card sales of USD 12,000. Of this amount, USD 4,000 were VISA (bank credit card) sales invoices, which can be deposited in a bank for immediate credit, less a discount of 3 per cent. The balance of USD 8,000 consisted of American Express (nonbank credit card) charges, subject to a 5 per cent service charge. These invoices were mailed to American Express. Shortly thereafter, a check was received.

Prepare journal entries for all these transactions.

**Problem C** Ruiz Company sells merchandise in a state that has a 5 per cent sales tax. On 2010 January 2, Ruiz sold goods with a sales price of USD 80,000 on credit. Sales taxes collected are recorded in a separate account. Assume that sales for the entire month were USD 900,000. On 2010 January 31, the company remitted the sales taxes collected to the state taxing agency.

- a. Prepare the general journal entries to record the January 2 sales revenue. Also prepare the entry to show the remittance of the taxes on January 31.
- b. Now assume that the merchandise sold on January 2 also is subject to federal excise taxes of 12 per cent. The federal excise taxes collected are remitted to the proper agency on January 31. Show the entries on January 2 and January 31.

## 9. Receivables and payables

**Problem D** Honest Tim's Auto Company sells used cars and warrants all parts for one year. The average price per car is USD 10,000, and the company sold 900 in 2009. The company expects 30 per cent of the cars to develop defective parts within one year of sale. The estimated average cost of warranty repairs per defective car is USD 600. By the end of the year, 80 cars sold that year had been returned and repaired under warranty. On 2010 January 4, a customer returned a car purchased in 2009 for repairs under warranty. The repairs were made on January 8. The cost of the repairs included parts, USD 400, and labor, USD 210.

- Calculate the amount of the estimated product warranty payable.
- Prepare the entry to record the estimated product warranty payable on 2009 December 31.
- Prepare the entry to record the repairs made on 2010 January 8.

**Problem E** Celoron Power Boat Company is in the power boat manufacturing business. As of 2010 September 1, the balance in its Notes Receivable account is USD 256,000. The balance in Dishonored Notes Receivable is USD 60,660 (includes the interest of USD 600 and the protest fee of USD 60). A schedule of the notes (including the dishonored note) is as follows:

Face Amount	Maker	Date of Note	Life	Interest Rate
\$ 100,000	C. Glass Co.	2009/6/01	120 days	12%
72,000	A. Lamp Co.	2009/6/15	90	8
84,000	C. Wall Co.	2009/7/01	90	10
60,000	N. Case Co.	2009/7/01	60	6
\$316,000				

Following are Celoron Power Boat Company's transactions for September:

Sept. 10 Received USD 36,660 from N. Case Company as full settlement of the amount due from it. The company does not charge losses on notes to the Allowance for Uncollectible Accounts account.

- ? The A. Lamp Company note was collected when due.
- ? The C. Glass Company note was not paid at maturity.
- ? C. Wall Company paid its note at maturity.

30 Received a new 60-day, 12 per cent note from C. Glass Company for the total balance due on the dishonored note. The note was dated as of the maturity date of the dishonored note. Celoron Power Boat Company accepted the note in good faith.

Prepare dated journal entries for these transactions.

**Problem F** Premium Office Equipment, Inc., discounted its own USD 30,000, non interest-bearing, 180-day note on 2009 November 16, at Niagara County Bank at a discount rate of 12 per cent.

Prepare dated journal entries for:

- The original discounting on November 16.
- The adjustment required at the end of the company's calendar-year accounting period.
- Payment at maturity.

### Alternate problems

**Alternate problem A** The following selected accounts are for Keystone, Inc., a name brand shoe wholesale store, as of 2009 December 31. Prior to closing the accounts and making allowance for uncollectible accounts entries, the USD 5,000 account of Morgan Company is to be written off (this was a credit sale of 2009 February 12).

Accounts receivable	\$ 360,000
Allowance for uncollectible accounts (credit)	6,000

Sales	1,680,000
Sales returns and allowances	30,000

a. Prepare journal entries to record all of these transactions and the uncollectible accounts expense for the period. Assume the estimated expense is 2 per cent of net sales.

b. Give the entry to record the estimated expense for the period if the allowance account is to be adjusted to 5 per cent of outstanding receivables instead of as in (a).

**Alternate problem B** The cash register at Frank's Restaurant at the close of business showed cash sales of USD 7,500 and credit card sales of USD 10,000 (USD 6,000 VISA and USD 4,000 American Express). The VISA (bank credit card) invoices were discounted 5 per cent when they were deposited. The American Express (nonbank credit card) charges were mailed to the company and were subject to a 5 per cent service charge. A few days later, Frank received a check for the net amount of the American Express credit card charges.

Prepare journal entries for all of these transactions.

**Alternate problem C** Beacham Hardware, Inc., sells merchandise in a state that has a 6 per cent sales tax. On 2010 July 1, it sold goods with a sales price of USD 20,000 on credit. Sales taxes collected are recorded in a separate account. Assume that sales for the entire month were USD 400,000. On 2010 July 31, the company remitted the sales taxes collected to the state taxing agency.

a. Prepare the general journal entries to record the July 1 sales revenue and sales tax payable. Also prepare the entry to show the remittance of the taxes on July 31.

b. Now assume that the merchandise sold also is subject to federal excise taxes of 10 per cent in addition to the 6 per cent sales tax. The company remitted the federal excise taxes collected to the proper agency on July 31. Show the entries on July 1 and July 31.

**Alternate problem D** Quick Wheels, Inc., sells racing bicycles and warrants all parts for one year. The average price per bicycle is USD 560, and the company sold 4,000 in 2009. The company expects 20 per cent of the bicycles to develop defective parts within one year of sale. The estimated average cost of warranty repairs per defective bicycle is USD 40. By the end of the year, 500 bicycles sold that year had been returned and repaired under warranty. On 2010 January 2, a customer returned a bicycle purchased in 2009 for repairs under warranty. The repairs were made on January 3. The cost of the repairs included parts, USD 25, and labor, USD 15.

a. Calculate the amount of the estimated product warranty payable.

b. Prepare the entry to record the estimated product warranty payable on 2009 December 31.

c. Prepare the entry to record the repairs made on 2010 January 3.

**Alternate problem E** Vance Commercial Properties, Inc., has an accounting period of one year, ending on July 31. On 2009 July 1, the balances of certain ledger accounts are Notes Receivable, USD 654,000; and Notes Payable, USD 900,000. A schedule of the notes receivable is as follows:

Face Amount	Maker	Date of Note	Life	Interest Rate
\$ 270,000	Parker Co.	2009/5/15	60 days	12%
120,000	Dot Co.	2009/5/31	60	12
264,000	Fixx Co.	2009/6/15	30	10
\$654,000				

The note payable is a 60-day bank loan dated 2009 May 20. Notes Payable—Discount was debited for the discount of USD 6,000. Following are the company's transactions during July:

## 9. Receivables and payables

July 1 Vance Commercial Properties, Inc., discounted its own USD 90,000, 60-day, non interest-bearing note at Key Bank. The discount rate is 10 per cent, and the note was dated today.

3 Received a 20-day, 12 per cent note, dated today, from Sox Company in settlement of an account receivable of USD 36,000.

6 Purchased merchandise from Link Company, USD 288,000, and issued a 60-day, 12 per cent note, dated today, for the purchase.

8 Sold merchandise to Fan Company, USD 360,000. A 30-day, 12 per cent note, dated today, is received to cover the sale.

14 Received payment on the Parker Company note dated 2009 June 15.

15 Fixx Company sent a USD 120,000, 30-day, 12 per cent note, dated today, and a check to cover the part of the old note not covered by the new note, plus all interest expense incurred on the prior note.

19 The note payable dated 2009 May 20, was paid in full.

23 Sox Company dishonored its note of July 3 and sent a check for the interest on the dishonored note and a new 30-day, 12 per cent note dated 2009 July 23.

30 The Dot Company note dated 2009 May 31, was paid with interest in full.

Prepare dated journal entries for these transactions and necessary July 31 adjusting entries.

**Alternate problem F** On 2010 November 1, Grand Strand Property Management, Inc., discounted its own USD 50,000, 180-day, non interest-bearing note at its bank at 18 per cent. The note was paid on its maturity date. The company uses a calendar-year accounting period.

Prepare dated journal entries to record (a) the discounting of the note, (b) the year-end adjustment, and (c) the payment of the note.

### Beyond the numbers—Critical thinking

**Business decision case A** Sally Stillwagon owns a hardware store; she sells items for cash and on account. During 2009, which seemed to be a typical year, some of her company's operating data and other data were as follows:

Sales:	
For cash	\$1,200,000
On credit	2,200,000
Cost of obtaining credit reports on customers	3,600
Cost incurred in paying a part-time bookkeeper to keep the accounts receivable subsidiary ledger up to date	12,000
Cost associated with preparing and mailing invoices to customers and other collection activities	18,000
Uncollectible accounts expense	45,000
Average outstanding accounts receivable balance (on which Stillwagon estimates she could have earned 10 per cent if it had been invested in other assets)	180,000

A national credit card agency has tried to convince Stillwagon that instead of carrying her own accounts receivable, she should accept only the agency's credit card for sales on credit. The agency would pay her two days after she submits sales charges, deducting 6 per cent from the amount and paying her 94 per cent.

a. Using the data given, prepare an analysis showing whether or not Stillwagon would benefit from switching to the credit card method of selling on credit.

b. What other factors should she take into consideration?

**Business decision case B** Jim Perry operates a large fruit and vegetable stand on the outskirts of a city. In a typical year he sells USD 600,000 of goods to regular customers. His sales are 40 per cent for cash and 60 per cent on credit. He carries all of the credit himself. Only after a customer has a USD 300 unpaid balance on which no payments have been made for two months does he refuse that customer credit for future purchases. His income before taxes is approximately USD 95,000. The total of uncollectible accounts for a given year is USD 48,000.

You are one of Perry's regular customers. He knows that you are taking a college course in accounting and has asked you to tell him your opinion of several alternatives recommended to him to reduce or eliminate the USD 48,000 per year uncollectible accounts expense. The alternatives are as follows:

- Do not sell on credit.
- Sell on credit by national credit card only.
- Allow customers to charge only until their account balances reach USD 50.
- Allow a bill collector to go after uncollectible accounts and keep half of the amount collected.

Write a report for Perry about the advisability of following any of these alternatives.

**Annual report analysis C** Visit the Internet site:

<http://www.cocacola.com>

Locate the most recent annual reports of The Coca-Cola Company. Calculate accounts receivable turnover and the number of days' sales in accounts receivable and prepare a written comment on the results.

**Group project D** In groups of two or three students, write a two-page, double-spaced paper on one of the following topics:

Which is better—the percentage-of-sales method or the percentage-of-receivables method?

Why not eliminate bad debts by selling only for cash?

Why allow customers to use credit cards when credit card expense is so high?

Should banks be required to use 365 days instead of 360 days in interest calculations?

Present your analysis in a convincing manner, without spelling or grammatical errors. Include a cover page with the title and authors' names.

**Group project E** "Lapping" of accounts receivable has been used to conceal the fact that payments received on accounts receivable have been "borrowed" and used by an employee for personal use. With one or two other students, research this topic in the library. Write a paper to your instructor describing how this technique works and the steps that can be taken to detect it once it occurs and to prevent it in the future.

**Group project F** In a group of two or three students, visit a fairly large company in your community to investigate the effectiveness of its management of accounts receivable. Inquire about its credit and sales discount policies, collection policies, and how it establishes the amount for the adjusting entry for uncollectible accounts at year-end. Also ask about how it decides to write off accounts as uncollectible. Calculate its accounts receivable turnover and average collection period for each of the last two years. In view of its credit policies, does its collection period seem reasonable?

**Using the Internet—A view of the real world**

Visit one of the following Internet sites:

<http://www.federatedinvestors.com>

<http://www.dreyfus.com>

## 9. Receivables and payables

<http://www.invesco.com>

Follow some of the other options available at the site. Write a report to your instructor on your experience, describing some of the things you learned at this site. You may want to pretend that you invested in one or more of these funds for the duration of the quarter or semester and see how your investment would have fared during that period. Many investors with a limited amount to invest can have a diversified portfolio by investing in mutual funds. Thus, they spread their risk by investing in a mutual fund that, in turn, invests in many different companies.

Visit Procter & Gamble's site at:

<http://www.pg.com>

Procter & Gamble markets more than 250 brands to nearly five billion consumers in over 140 countries. Click on any items that deal with financial news, annual report summary, stock quote, and anything else that looks interesting. Write a memo to your instructor summarizing your findings. Include in your memo some of the financial highlights contained in the annual report summary.

### Answers to self test

#### True-false

**False.** The percentage-of-sales method estimates the uncollectible accounts from the net credit sales or net sales of a given period.

**False.** Uncollectible accounts expense is recognized at the end of the accounting period in an adjusting entry.

**True.** The retailer deposits the credit card invoices directly in a special checking account.

**False.** Liabilities result from a past transaction.

**True.** Current liabilities are classified into those three categories.

**True.** The note has passed its maturity date and should be removed from the Notes Receivable account. The maturity value plus any protest fee should be debited to Accounts Receivable.

**False.** Discount on Notes Payable is recorded when a non interest-bearing note is issued.

#### Multiple-choice

**d.** A write-off of an account receivable results in a debit to Allowance for Uncollectible Accounts and a credit to Accounts Receivable for the same amount. The net amount (accounts receivable minus allowance for uncollectible accounts) does not change.

**a.** The uncollectible accounts expense for 2010 is computed as follows:

Allowance balance after adjustment (\$200,000 X 0.05)	\$ 10,000
Balance before adjustment	( 3,000)
Uncollectible accounts expense	\$7,000

**c.** Manufacturing companies tend to have the longest operating cycle. They must invest cash in raw materials, convert these raw materials into work in process and then finished goods, sell the items on account, and then collect the accounts receivable.

**b.**  $\frac{\text{USD } 265,000}{1.06} = \text{USD } 250,000$ ;

USD 265,000 - USD 250,000 = USD 15,000.

**c.**  $2,000 \times 5$  per cent = 100 machines is defective.

$100 - 30$  already returned = 70 more expected to be returned.

$70 \times \text{USD } 200 = \text{USD } 14,000$  estimated product warranty payable.

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- c. The name of the payee is not needed to compute interest expense on a promissory note.
- c. The proceeds from a bank are computed as follows:

$$\text{Discount amount} = \text{USD } 10,000 \times 0.10 \times \frac{90}{360} = \text{USD } 250$$

$$\text{Proceeds} = \text{USD } 10,000 - \text{USD } 250 = \text{USD } 9,750$$



# 10. Property, plant, and equipment

## Learning objectives

After studying this chapter, you should be able to:

- List the characteristics of plant assets and identify the costs of acquiring plant assets.
- List the four major factors affecting depreciation expense.
- Describe the various methods of calculating depreciation expense.
- Distinguish between capital and revenue expenditures for plant assets.
- Describe the subsidiary records used to control plant assets.
- Analyze and use the financial results—rate of return on operating assets.

## A company accountant's role in managing plant assets

Property, plant, and equipment (fixed assets or operating assets) compose more than one-half of total assets in many corporations. These resources are necessary for the companies to operate and ultimately make a profit. It is the efficient use of these resources that in many cases determines the amount of profit corporations will earn.

Accountants employed by a company are deeply involved in nearly all decisions regarding the company's fixed assets, from pre-acquisition planning to the ultimate disposal or sale of those assets. Companies do not view an asset acquisition as merely a purchase, but as an investment. For example, should your company or client purchase an airplane to visit clients? Accountants will investigate all the benefits, both financial and intangible, and compare these benefits to the costs. By determining whether or not the airplane will be a good investment for the company, the accountant can assist the company in making sound strategic business decisions.

Since these assets are so closely related to profits, good management is required. In accounting terms, a good return on operating assets is crucial to the success of the corporation. Many corporations have a staff of accountants whose primary task is to manage operating assets. This task involves making decisions concerning the purchase, use, and disposal of said assets. Once an asset has been acquired, accountants are responsible for determining the original value of the asset, the period over which it will extend benefits to the company, and its current market value while owned by the entity. The accountant must ultimately determine when and how to dispose of such an asset. The decision can range from trading the asset for a new asset to selling the asset to a salvage dealer.

Recently, The Williams Companies, Inc. had over USD 10 billion dollars in property, plant, and equipment. In addition, the company also had approximately USD 530 million in commitments for construction and acquisition of property, plant, and equipment. Managing a portfolio of assets of this magnitude takes both accounting knowledge and analytical skills. Successful management of these assets can be financially rewarding to both the company and the accountant.

On a classified balance sheet, the asset section contains: (1) current assets; (2) property, plant, and equipment; and (3) other categories such as intangible assets and long-term investments. Previous chapters discussed current

## 10. Property, plant, and equipment

assets. This chapter begins a discussion of property, plant, and equipment that is concluded in Chapter 11. Property, plant, and equipment are often called **plant and equipment** or simply plant assets. Plant assets are long-lived assets because they are expected to last for more than one year. Long-lived assets consist of tangible assets and intangible assets. **Tangible assets** have physical characteristics that we can see and touch; they include plant assets such as buildings and furniture, and natural resources such as gas and oil. **Intangible assets** have no physical characteristics that we can see and touch but represent exclusive privileges and rights to their owners.

### Nature of plant assets

To be classified as a plant asset, an asset must: (1) be tangible, that is, capable of being seen and touched; (2) have a useful service life of more than one year; and (3) be used in business operations rather than held for resale. Common plant assets are buildings, machines, tools, and office equipment. On the balance sheet, these assets appear under the heading "Property, plant, and equipment".

Plant assets include all long-lived tangible assets used to generate the principal revenues of the business. Inventory is a tangible asset but not a plant asset because inventory is usually not long-lived and it is held for sale rather than for use. What represents a plant asset to one company may be inventory to another. For example, a business such as a retail appliance store may classify a delivery truck as a plant asset because the truck is used to deliver merchandise. A business such as a truck dealership would classify the same delivery truck as inventory because the truck is held for sale. Also, land held for speculation or not yet put into service is a long-term investment rather than a plant asset because the land is not being used by the business. However, standby equipment used only in peak or emergency periods is a plant asset because it is used in the operations of the business.

Accountants view plant assets as a collection of service potentials that are consumed over a long time. For example, over several years, a delivery truck may provide 100,000 miles of delivery services to an appliance business. A new building may provide 40 years of shelter, while a machine may perform a particular operation on 400,000 parts. In each instance, purchase of the plant asset actually represents the advance payment or prepayment for expected services. Plant asset costs are a form of prepaid expense. As with short-term prepayments, the accountant must allocate the cost of these services to the accounting periods benefited.

Accounting for plant assets involves the following four steps:

- Record the acquisition cost of the asset.
- Record the allocation of the asset's original cost to periods of its useful life through depreciation.
- Record subsequent expenditures on the asset.
- Account for the disposal of the asset.

In Exhibit 80, note how the asset's life begins with its procurement and the recording of its acquisition cost, which is usually in the form of a dollar purchase. Then, as the asset provides services through time, accountants record the asset's depreciation and any subsequent expenditures related to the asset. Finally, accountants record the disposal of the asset. We discuss the first three steps in this chapter and the disposal of an asset in Chapter 11. The last section in this chapter explains how accountants use subsidiary ledgers to control assets.

Remember that in recording the life history of an asset, accountants match expenses related to the asset with the revenues generated by it. Because measuring the periodic expense of plant assets affects net income, accounting for property, plant, and equipment is important to financial statement users.

## Initial recording of plant assets

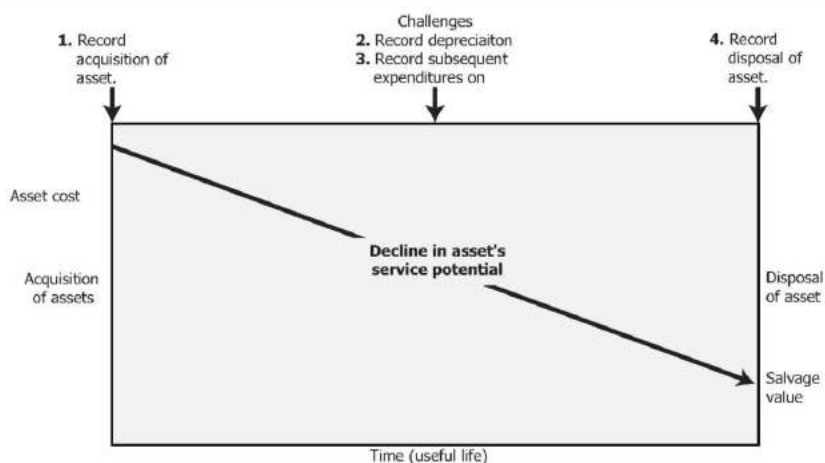
When a company acquires a plant asset, accountants record the asset at the cost of acquisition (historical cost). This cost is objective, verifiable, and the best measure of an asset's fair market value at the time of purchase. **Fair market value** is the price received for an item sold in the normal course of business (not at a forced liquidation sale). Even if the market value of the asset changes over time, accountants continue to report the acquisition cost in the asset account in subsequent periods.

The **acquisition cost** of a plant asset is the amount of cash or cash equivalents given up to acquire and place the asset in operating condition at its proper location. Thus, cost includes all normal, reasonable, and necessary expenditures to obtain the asset and get it ready for use. Acquisition cost also includes the repair and reconditioning costs for used or damaged assets. Unnecessary costs (such as traffic tickets or fines) that must be paid as a result of hauling machinery to a new plant are not part of the acquisition cost of the asset.

The next sections discuss which costs are capitalized (debited to an asset account) for: (1) land and land improvements; (2) buildings; (3) group purchases of assets; (4) machinery and other equipment; (5) self-constructed assets; (6) noncash acquisitions; and (7) gifts of plant assets.

The cost of land includes its purchase price and other costs such as option cost, real estate commissions, title search and title transfer fees, and title insurance premiums. Also included are an existing mortgage note or unpaid taxes (back taxes) assumed by the purchaser; costs of surveying, clearing, and grading; and local assessments for sidewalks, streets, sewers, and water mains. Sometimes land purchased as a building site contains an unusable building that must be removed. Then, the accountant debits the entire purchase price to Land, including the cost of removing the building less any cash received from the sale of salvaged items while the land is being readied for use.

**Illustration 10.1** Recording the Life History of a Depreciable Asset



**Exhibit 80:** Recording the life history of a depreciable asset

To illustrate, assume that Spivey Company purchased an old farm on the outskirts of San Diego, California, USA, as a factory site. The company paid USD 225,000 for the property. In addition, the company agreed to pay unpaid property taxes from previous periods (called back taxes) of USD 12,000. Attorneys' fees and other legal costs relating to the purchase of the farm totaled USD 1,800. Spivey demolished (razed) the farm buildings at a cost of USD 18,000. The company salvaged some of the structural pieces of the building and sold them for USD 3,000.

## 10. Property, plant, and equipment

Because the firm was constructing a new building at the site, the city assessed Spivey Company USD 9,000 for water mains, sewers, and street paving. Spivey computed the cost of the land as follows:

	Land
Cost of factory site	\$225,000
Back taxes	12,000
Attorneys' fees and other legal costs	1,800
Demolition	18,000
Sale of salvaged parts	(3,000)
City assessment	9,000
	\$262,800

Accountants assigned all costs relating to the farm purchase and razing of the old buildings to the Land account because the old buildings purchased with the land were not usable. The real goal was to purchase the land, but the land was not available without the buildings.

Land is considered to have an unlimited life and is therefore not depreciable. However, **land improvements**, including driveways, temporary landscaping, parking lots, fences, lighting systems, and sprinkler systems, are attachments to the land. They have limited lives and therefore are depreciable. Owners record depreciable land improvements in a separate account called Land Improvements. They record the cost of permanent landscaping, including leveling and grading, in the Land account.

When a business buys a building, its cost includes the purchase price, repair and remodeling costs, unpaid taxes assumed by the purchaser, legal costs, and real estate commissions paid.

Determining the cost of constructing a new building is often more difficult. Usually this cost includes architect's fees; building permits; payments to contractors; and the cost of digging the foundation. Also included are labor and materials to build the building; salaries of officers supervising the construction; and insurance, taxes, and interest during the construction period. Any miscellaneous amounts earned from the building during construction reduce the cost of the building. For example, an owner who could rent out a small completed portion during construction of the remainder of the building, would credit the rental proceeds to the Buildings account rather than to a revenue account.

Sometimes a company buys land and other assets for a lump sum. When land and buildings purchased together are to be used, the firm divides the total cost and establishes separate ledger accounts for land and for buildings. This division of cost establishes the proper balances in the appropriate accounts. This is especially important later because the depreciation recorded on the buildings affects reported income, while no depreciation is taken on the land.

Returning to our example of Spivey Company, suppose one of the farm buildings was going to be remodeled for use by the company. Then, Spivey would determine what portion of the purchase price of the farm, back taxes, and legal fees (USD 225,000 + USD 12,000 + USD 1,800 = USD 238,800) it could assign to the buildings and what portion to the land. (The net cost of demolition would not be incurred, and the city assessment would be incurred at a later time.) Spivey would assign the USD 238,800 to the land and the buildings on the basis of their appraised values. For example, assume that the land was appraised at USD 162,000 and the buildings at USD 108,000. Spivey would determine the cost assignable to each of these plant assets as follows:

Asset	Appraised Value	Per cent of Total Value		Cost Assigned
Land	\$162,000	60% (162/270)		
Buildings	108,000	40 (108/270)		
	\$270,000	100% (270/270)		
	Per cent of Total Value	X Purchase Price =		
Land	60%	X \$238,800* =		\$ 143,280
Buildings	40	X \$238,800 =		95,520
				\$ 238,800

\*The purchase price is the sum of the cash price, back taxes, and legal fees.

The journal entry to record the purchase of the land and buildings would be:

Land (+A)	143,280	
Buildings (+A)	95,520	
Cash (-A)		238,800
To record the purchase of land and buildings.		

When the city eventually assessed the charges for the water mains, sewers, and street paving, the company would still debit these costs to the Land account as in the previous example.

Often companies purchase machinery or other equipment such as delivery or office equipment. Its cost includes the seller's net invoice price (whether the discount is taken or not), transportation charges incurred, insurance in transit, cost of installation, costs of accessories, and testing and break-in costs. Also included are other costs needed to put the machine or equipment in operating condition in its intended location. The cost of machinery does not include removing and disposing of a replaced, old machine that has been used in operations. Such costs are part of the gain or loss on disposal of the old machine, as discussed in Chapter 11.

To illustrate, assume that Clark Company purchased new equipment to replace equipment that it has used for five years. The company paid a net purchase price of USD 150,000, brokerage fees of USD 5,000, legal fees of USD 2,000, and freight and insurance in transit of USD 3,000. In addition, the company paid USD 1,500 to remove old equipment and USD 2,000 to install new equipment. Clark would compute the cost of new equipment as follows:

Net purchase price	\$150,000
Brokerage fees	5,000
Legal fees	2,000
Freight and insurance in transit	3,000
Installation costs	2,000
Total cost	\$162,000

If a company builds a plant asset for its own use, the cost includes all materials and labor directly traceable to construction of the asset. Also included in the cost of the asset are interest costs related to the asset and amounts paid for utilities (such as heat, light, and power) and for supplies used during construction. To determine how much of these indirect costs to capitalize, the company compares utility and supply costs during the construction period with those costs in a period when no construction occurred. The firm records the increase as part of the asset's cost. For example, assume a company normally incurred a USD 600 utility bill for June. This year, the company constructed a machine during June, and the utility bill was USD 975. Thus, it records the USD 375 increase as part of the machine's cost.

To illustrate further, assume that Tanner Company needed a new die-casting machine and received a quote from Smith Company for USD 23,000, plus USD 1,000 freight costs. Tanner decided to build the machine rather than buy it. The company incurred the following costs to build the machine: materials, USD 4,000; labor, USD 13,000; and indirect services of heat, power, and supplies, USD 3,000. Tanner would record the machine at its cost of USD 20,000 (USD 4,000 + USD 13,000 + USD 3,000) rather than USD 24,000, the purchase price of the machine. The USD 20,000 is the cost of the resources given up to construct the machine. Also, recording the machine at USD 24,000 would require Tanner to recognize a gain on construction of the assets. Accountants do not subscribe to the idea that a business can earn revenue (or realize a gain), and therefore net income, by dealing with itself.

You can apply the general guidelines we have just discussed to other plant assets, such as furniture and fixtures. The accounting methods are the same.

When a plant asset is purchased for cash, its acquisition cost is simply the agreed on cash price. However, when a business acquires plant assets in exchange for other noncash assets (shares of stock, a customer's note, or a tract of land) or as gifts, it is more difficult to establish a cash price. This section discusses three possible asset valuation bases.

The general rule on noncash exchanges is to value the noncash asset received at its fair market value or the fair market value of what was given up, whichever is more clearly evident. The reason for not using the book value of the old asset to value the new asset is that the asset being given up is often carried in the accounting records at historical cost or book value. Neither amount may adequately represent the actual fair market value of either asset. Therefore, if the fair market value of one asset is clearly evident, a firm should record this amount for the new asset at the time of the exchange.

**Appraised value** Sometimes, neither of the items exchanged has a clearly determinable fair market value. Then, accountants record exchanges of items at their appraised values as determined by a professional appraiser. An **appraised value** is an expert's opinion of an item's fair market price if the item were sold. Appraisals are used often to value works of art, rare books, and antiques.

**Book value** The **book value** of an asset is its recorded cost less accumulated depreciation. An old asset's book value is usually not a valid indication of the new asset's fair market value. If a better basis is not available, however, a firm could use the book value of the old asset.

Occasionally, a company receives an asset without giving up anything for it. For example, to attract industry to an area and provide jobs for local residents, a city may give a company a tract of land on which to build a factory. Although such a gift costs the recipient company nothing, it usually records the asset (Land) at its fair market value. Accountants record gifts of plant assets at fair market value to provide information on all assets owned by the company. Omitting some assets may make information provided misleading. They would credit assets received as gifts to a stockholders' equity account titled Paid-in Capital—Donations.

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### An accounting perspective:

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#### Use of technology

How can CPA firms sell services on the Web other than by advertising their services? Ernst & Young has developed a website for nonaudit consulting clients in which they charge an annual fixed fee for nonaudit clients to obtain advice from the firm's consultants. The site is secure in that it can only be accessed by those who have paid the fee. The subscribers type in their questions on any business topic and get a response from an expert within two working days. Another firm, PricewaterhouseCoopers, has an on-line service for tax professionals to seek advice. The other large accounting firms undoubtedly have developed or are developing secure websites for providing similar types of services.

#### Depreciation of plant assets

Companies record depreciation on all plant assets except land. Since the amount of depreciation may be relatively large, depreciation expense is often a significant factor in determining net income. For this reason, most financial statement users are interested in the amount of, and the methods used to compute, a company's depreciation expense.

**Depreciation** is the amount of plant asset cost allocated to each accounting period benefiting from the plant asset's use. Depreciation is a process of allocation, not valuation. Eventually, all assets except land wear out or become so inadequate or outmoded that they are sold or discarded; therefore, firms must record depreciation on

every plant asset except land. They record depreciation even when the market value of a plant asset temporarily rises above its original cost because eventually the asset is no longer useful to its current owner.

**Illustration 10.2** Factors Affecting Depreciation

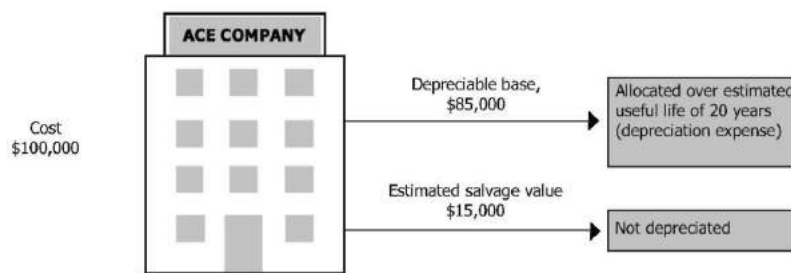


Exhibit 81: Factors affecting depreciation

Major causes of depreciation are (1) physical deterioration, (2) inadequacy for future needs, and (3) obsolescence. **Physical deterioration** results from the use of the asset—wear and tear—and the action of the elements. For example, an automobile may have to be replaced after a time because its body rusted out. The **inadequacy** of a plant asset is its inability to produce enough products or provide enough services to meet current demands. For example, an airline cannot provide air service for 125 passengers using a plane that seats 90. The **obsolescence** of an asset is its decline in usefulness brought about by inventions and technological progress. For example, the development of the xerographic process of reproducing printed matter rendered almost all previous methods of duplication obsolete.

The use of a plant asset in business operations transforms a plant asset cost into an operating expense. Depreciation, then, is an operating expense resulting from the use of a depreciable plant asset. Because depreciation expense does not require a current cash outlay, it is often called a noncash expense. The purchaser gave up cash in the period when the asset was acquired, not during the periods when depreciation expense is recorded.

To compute depreciation expense, accountants consider four major factors:

- Cost of the asset.
- Estimated salvage value of the asset. **Salvage value** (or scrap value) is the amount of money the company expects to recover, less disposal costs, on the date a plant asset is scrapped, sold, or traded in.
- Estimated useful life of the asset. **Useful life** refers to the time the company owning the asset intends to use it; useful life is not necessarily the same as either economic life or physical life. The economic life of a car may be 7 years and its physical life may be 10 years, but if a company has a policy of trading cars every 3 years, the useful life for depreciation purposes is 3 years. Various firms express useful life in years, months, working hours, or units of production. Obsolescence also affects useful life. For example, a machine capable of producing units for 20 years, may be expected to be obsolete in 6 years. Thus, its estimated useful life is 6 years—not 20. Another example, on TV you may have seen a demolition crew setting off explosives in a huge building (e.g. The Dunes Hotel and Casino in Las Vegas, Nevada, USA) and wondering why the owners decided to destroy what looked like a perfectly good building. The building was destroyed because it had reached the end of its economic life. The land on which the building stood could be put to better use, possibly by constructing a new building.



- Depreciation method used in depreciating the asset. We describe the four common depreciation methods in the next section.

## 10. Property, plant, and equipment

Method	Number of Companies			
	2003	2002	2001	2000
Straight-line	580	579	579	576
Declining Balance	22	22	22	22
Sum of year's digits	5	5	6	7
Accelerated method-not specified	41	44	49	53
Units of production	30	32	32	34
Other	4	7	9	10

Source: Based on American Institute of Certified Public Accountants, Accounting Trends & Techniques (New York: AICPA, 2004), p. 409.

### Exhibit 82: Depreciation method used

In Exhibit 81, note the relationship among these factors. Assume Ace Company purchased an office building for USD 100,000. The building has an estimated salvage value of USD 15,000 and a useful life of 20 years. The depreciable cost of the building is USD 85,000 (cost less estimated salvage value). Ace would allocate this depreciable base over the useful life of the building using the proper depreciation method under the circumstances.

Today, companies can use many different methods to calculate depreciation on assets.<sup>31</sup> This section discusses and illustrates the most common methods—straight-line, units-of-production, and accelerated depreciation method (double-declining-balance).

As is true for inventory methods, normally a company is free to adopt the most appropriate depreciation method for its business operations. According to accounting theory, companies should use a depreciation method that reflects most closely their underlying economic circumstances. Thus, companies should adopt the depreciation method that allocates plant asset cost to accounting periods according to the benefits received from the use of the asset. Exhibit 82 shows the frequency of use of these methods for 600 companies. You can see that most companies use the straight-line method for financial reporting purposes. Note that some companies use one method for certain assets and another method for other assets. In practice, measuring the benefits from the use of a plant asset is impractical and often not possible. As a result, a depreciation method must meet only one standard: the depreciation method must allocate plant asset cost to accounting periods in a systematic and rational manner. The following four methods meet this requirement.

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### An accounting perspective:

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#### Business insight

Regardless of the method or methods of depreciation chosen, companies must disclose their depreciation methods in the footnotes to their financial statements. They include this information in the first footnote, which summarizes significant accounting policies.

*The disclosure is generally straightforward: Sears, Roebuck & Co. operates department stores, paint and hardware stores, auto supply stores, and eye wear stores. Its annual report states simply that "depreciation is provided principally by the straight-line method". Companies may use different depreciation methods for different assets. General Electric Company is a highly diversified multinational corporation that develops, manufactures, and markets aerospace*

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<sup>31</sup> Because depreciation expense is an estimate, calculations may be rounded to the nearest dollar.

*products, major appliances, industrial products, and high-performance engineered plastics. It uses an accelerated method for most of its property, plant, and equipment; however, it depreciates some assets on a straight-line basis, while the company's mining properties are depreciated under the units-of-production method.*

In the illustrations of the four depreciation methods that follow, we assume the following: On 2010 January 1, a company purchased a machine for USD 54,000 with an estimated useful life of 10 years, or 50,000 units of output, and an estimated salvage value of USD 4,000.

**Straight-line method** **Straight-line depreciation** has been the most widely used depreciation method in the United States for many years because, as you saw in Chapter 3, it is easily applied. To apply the straight-line method, a firm charges an equal amount of plant asset cost to each accounting period. The formula for calculating depreciation under the straight-line method is:

$$\text{Depreciation per period} = \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Number of accounting periods for estimated useful life}}$$

Using our example of a machine purchased for USD 54,000, the depreciation is:

$$\frac{\$54,000 - \$4,000}{10 \text{ years}} = \$5,000 \text{ per year}$$

In Exhibit 83, we present a schedule of annual depreciation entries, cumulative balances in the accumulated depreciation account, and the book (or carrying) values of the USD 54,000 machine.

Using the straight-line method for assets is appropriate where (1) time rather than obsolescence is the major factor limiting the asset's life and (2) the asset produces relatively constant amounts of periodic services. Assets that possess these features include items such as pipelines, fencing, and storage tanks.

**Units-of-production (output) method** The **units-of-production depreciation** method assigns an equal amount of depreciation to each unit of product manufactured or service rendered by an asset. Since this method of depreciation is based on physical output, firms apply it in situations where usage rather than obsolescence leads to the demise of the asset. Under this method, you would compute the depreciation charge per unit of output. Then, multiply this figure by the number of units of goods or services produced during the accounting period to find the period's depreciation expense. The formula is:

$$\text{Depreciation per unit} = \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Estimated total units of production (service) during useful life of asset}}$$

$$\text{Depreciation per period} = \text{Depreciation per unit} \times \text{Number of units of goods/services produced}$$

You would determine the depreciation charge for the USD 54,000 machine as:

$$\frac{\text{USD } 54,000 - \text{USD } 4,000}{50,000 \text{ units}} = \$1 \text{ per unit}$$

## 10. Property, plant, and equipment

End of Year	Depreciation Expense Dr.; Accumulated Depreciation Cr.	Total Accumulated Depreciation	Book Value
			\$54,000
1	\$ 5,000	\$ 5,000	49,000
2	5,000	10,000	44,000
3	5,000	15,000	39,000
4	5,000	20,000	34,000
5	5,000	25,000	29,000
6	5,000	30,000	24,000
7	5,000	35,000	19,000
8	5,000	40,000	14,000
9	5,000	45,000	9,000
10	5,000	50,000	4,000*
	\$50,000		

\* Estimated salvage value.

### Exhibit 83: Straight-line depreciation schedule

If the machine produced 1,000 units in 2010 and 2,500 units in 2011, depreciation expense for those years would be USD 1,000 and USD 2,500, respectively.

**Accelerated depreciation methods** record higher amounts of depreciation during the early years of an asset's life and lower amounts in the asset's later years. A business might choose an accelerated depreciation method for the following reasons:

- The value of the benefits received from the asset decline with age (for example, office buildings).
- The asset is a high-technology asset subject to rapid obsolescence (for example, computers).
- Repairs increase substantially in the asset's later years; under this method, the depreciation and repairs together remain fairly constant over the asset's life (for example, automobiles).

The most common accelerated method of depreciation is the double-declining-balance (DDB) method.

End of Year	Depreciation Expense Dr.; Accumulated Depreciation Cr.	Total Accumulated Depreciation	Book Value
			\$54,000
1. (20% of \$54,000)	\$10,800	\$10,800	43,200
2. (20% of \$43,200)	8,640	19,440	34,560
3. (20% of \$34,560)	6,912	26,352	27,648
4. (20% of \$27,648)	5,530	31,882	22,118
5. (20% of \$22,118)	4,424	36,306	17,694
6. (20% of \$17,694)	3,539	39,845	14,155
7. (20% of \$14,155)	2,831	42,676	11,324
8. (20% of \$11,324)	2,265	44,941	9,059
9. (20% of \$9,059)	1,812	46,753	7,247
10. (20% of \$7,247)	1,449*	48,202	5,798

\* This amount could be \$3,247 to reduce the book value to the estimated salvage value of \$4,000. Then, accumulated depreciation would be \$50,000.

#### Exhibit 84: Double-declining-balance (DDB) depreciation schedule

**Double-declining-balance method** To apply the **double-declining-balance (DDB)** method of computing periodic depreciation charges you begin by calculating the straight-line depreciation rate. To do this, divide 100 per cent by the number of years of useful life of the asset. Then, multiply this rate by 2. Next, apply the resulting double-declining rate to the declining book value of the asset. Ignore salvage value in making the calculations. At the point where book value is equal to the salvage value, no more depreciation is taken. The formula for DDB depreciation is:

$$\text{Depreciation per period} = 2 \times (\text{Straight-line rate}) \times (\text{Asset cost} - \text{Accumulated depreciation})$$

## 10. Property, plant, and equipment

Method	Base	Calculation
Straight-line	Asset Estimated Cost - salvage value	Number of accounting periods in Base estimated useful life
Double-declining balance	Asset - Accumulated% %Cost - Depreciation	Base X (2 X Straight-line rate)

### Exhibit 85: Summary of depreciation methods

Look at the calculations for the USD 54,000 machine using the DDB method in Exhibit 84. The straight-line rate is 10 per cent (100 per cent/10 years), which, when doubled, yields a DDB rate of 20 per cent. (Expressed as fractions, the straight-line rate is 1/10, and the DDB rate is 2/10.) Since at the beginning of year 1 no accumulated depreciation has been recorded, cost is the basis of the calculation. In each of the following years, book value is the basis of the calculation at the beginning of the year.

In the 10th year, you could increase depreciation to USD 3,247 if the asset is to be retired and its salvage value is still USD 4,000. This higher depreciation amount for the last year (USD 3,247) would reduce the book value of USD 7,247 down to the salvage value of USD 4,000. If an asset is continued in service, depreciation should only be recorded until the asset's book value equals its estimated salvage value.

For a summary of the three depreciation methods, see Exhibit 85.

In Exhibit 86, we compare two of the depreciation methods just discussed—straight line and double-declining balance—using the same example of a machine purchased on 2010 January 1, for USD 54,000. The machine has an estimated useful life of 10 years and an estimated salvage value of USD 4,000.

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### An accounting perspective:

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#### Uses of technology

Corporations are subject to corporate income taxes. Also, CPA firms hire many tax professionals to address the tax matters of their clients. If you have an interest in taxes, you may want to visit the following website to learn more about taxes:

<http://webcast.ey.com/thoughtcenter/default.aspx>

This site was created by the CPA firm, Ernst & Young, and has many interesting features. For instance, you can see highlights of what is new in the world of tax, accounting and legal issues.

So far we have assumed that the assets were put into service at the beginning of an accounting period and ignored the fact that often assets are put into service during an accounting period. When assets are acquired during an accounting period, the first recording of depreciation is for a partial year. Normally, firms calculate the depreciation for the partial year to the nearest full month the asset was in service. For example, they treat an asset purchased on or before the 15th day of the month as if it were purchased on the 1st day of the month. And they treat an asset purchased after the 15th of the month as if it were acquired on the 1st day of the following month.

To compare the calculation of partial-year depreciation, we use a machine purchased for USD 7,600 on 2010 September 1, with an estimated salvage value of USD 400, an estimated useful life of five years, and an estimated total units of production of 25,000 units.

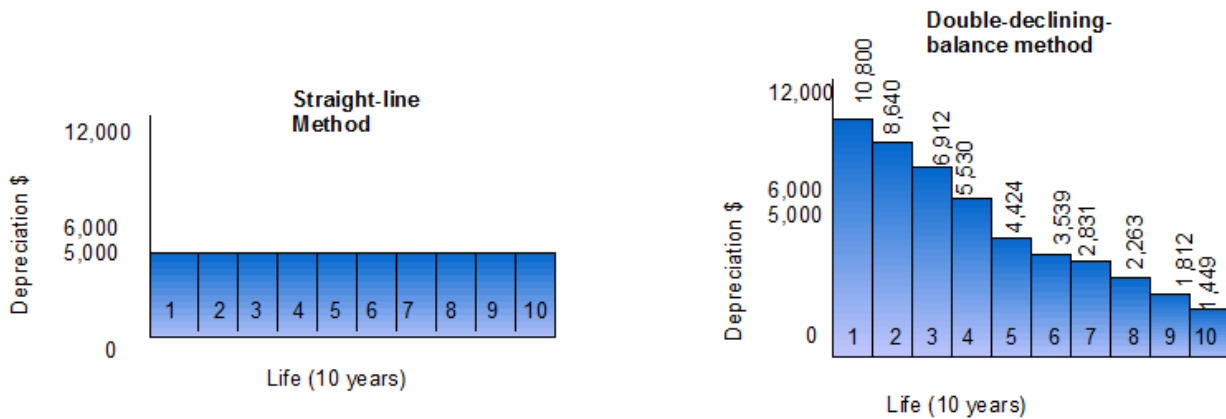


Exhibit 86: Comparison of straight-line and double-declining-balance depreciation methods

**Straight-line method** Partial-year depreciation calculations for the straight-line depreciation method are relatively easy. Begin by finding the 12-month charge by the normal computation explained earlier. Then, multiply this annual amount by the fraction of the year for which the asset was in use. For example, for the USD 7,600 machine purchased 2010 September 1 (estimated salvage value, USD 400; and estimated useful life, five years), the annual straight-line depreciation is  $[(\text{USD } 7,600 - \text{USD } 400)/5 \text{ years}] = \text{USD } 1,440$ . The machine would operate for four months prior to the end of the accounting year, December 31, or one-third of a year. The 2010 depreciation is  $(\text{USD } 1,440 \times 1/3) = \text{USD } 480$ .

**Units-of-production method** The units-of-production method requires no unusual computations to record depreciation for a partial year. To compute the partial-year depreciation, multiply the depreciation charge per unit by the units produced. The charge for a partial year would be less than for a full year because fewer units of goods or services are produced.

**Double-declining-balance method** Under the double-declining-balance method, it is relatively easy to determine depreciation for a partial year and then for subsequent full years. For the partial year, simply multiply the fixed rate times the cost of the asset times the fraction of the partial year. For example, DDB depreciation on the USD 7,600 asset for 2010 is  $(\text{USD } 7,600 \times 0.4 \times 1/3) = \text{USD } 1,013$ . For subsequent years, compute the depreciation using the regular procedure of multiplying the book value at the beginning of the period by the fixed rate. The 2011 depreciation would be  $[(\text{USD } 7,600 - \text{USD } 1,013) \times 0.4] = \text{USD } 2,635$ .

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### An accounting perspective:

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#### Uses of technology

Most companies report property, plant, and equipment as one amount in the balance sheet in their annual report; however, that account is made up of many items. Computers and accounting software have simplified record keeping for all of a company's depreciable assets. When depreciable plant assets are purchased, employees enter in the computer the cost, estimated useful life, and estimated salvage value of the assets. In addition, they enter the method of depreciation

## 10. Property, plant, and equipment

that the company decides to use on the assets. After processing this information, the computer calculates the company's depreciation expense and accumulates depreciation for each type of asset and each individual asset (e.g. a machine).

After depreciating an asset down to its estimated salvage value, a firm records no more depreciation on the asset even if continuing to use it. At times, a firm finds the estimated useful life of an asset or its estimated salvage value is incorrect before the asset is depreciated down to its estimated salvage value; then, it computes revised depreciation charges for the remaining useful life. These revised charges do not correct past depreciation taken; they merely compensate for past incorrect charges through changed expense amounts in current and future periods. To compute the new depreciation charge per period, divide the book value less the newly estimated salvage value by the estimated periods of useful life remaining.

For example, assume that a machine cost USD 30,000, has an estimated salvage value of USD 3,000, and originally had an estimated useful life of eight years. At the end of the fourth year of the machine's life, the balance in its accumulated depreciation account (assuming use of the straight-line method) was  $(\text{USD } 30,000 - \text{USD } 3,000) \times 4/8 = \text{USD } 13,500$ . At the beginning of the fifth year, a manager estimates that the asset will last six more years. The newly estimated salvage value is USD 2,700. To determine the revised depreciation per period:

Original cost	\$ 30,000
Less: Accumulated depreciation at end of 4 <sup>th</sup> year	13,500
Book value at the beginning of 5 <sup>th</sup> year	16,500
Less: Revised salvage value	2,700
Remaining depreciable cost	\$13,800
Revised depreciation per period	\$ 13,000/6 = \$2,300

Had this company used the units-of-production method, its revision of the life estimate would have been in units. Thus, to determine depreciation expense, compute a new per-unit depreciation charge by dividing book value less revised salvage value by the estimated remaining units of production. Multiply this per unit charge by the periodic production to determine depreciation expense.

Using the double-declining-balance method, the book value at the beginning of year 5 would be USD 9,492.19 (cost of USD 30,000 less accumulated depreciation of USD 20,507.81). Depreciation expense for year 5 would be twice the new straight-line rate times book value. The straight-line rate is 100 per cent/6 = 16.67 per cent. So twice the straight-line rate is 33.33 per cent, or 1/3. Thus,  $1/3 \times \text{USD } 9,492.19 = \text{USD } 3,164.06$ .

*APB Opinion No. 12* requires that companies separately disclose the methods of depreciation they use and the amount of depreciation expense for the period in the body of the income statement or in the notes to the financial statements. Major classes of plant assets and their related accumulated depreciation amounts are reported as shown in Exhibit 87.

Showing cost less accumulated depreciation in the balance sheet gives statement users a better understanding of the percentages of a company's plant assets that have been used up than reporting only the book value (remaining undepreciated cost) of the assets. For example, reporting buildings at USD 75,000 less USD 45,000 of accumulated depreciation, resulting in a net amount of USD 30,000, is quite different from merely reporting buildings at USD 30,000. In the first case, the statement user can see that the assets are about 60 per cent used up. In the latter case, the statement user has no way of knowing whether the assets are new or old.



## 10. Property, plant, and equipment

### Reed Company Partial Balance Sheet 2010 June 30

Property, plant, and equipment		
Land		\$ 30,000
Buildings	\$ 75,000	
Less: Accumulated depreciation	45,000	30,000
Equipment	\$ 9,000	
Less: Accumulated depreciation	1,500	7,500
Total property, plant, and equipment		\$ 67,500

Exhibit 87: Partial balance sheet

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### An accounting perspective:

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#### Business insight

In their financial statements, companies often provide one amount for property, plant, and equipment that is net of accumulated depreciation. Nonetheless, notes (footnotes) actually provide the additional information regarding the separate types of assets. The Limited, Inc. is a world leader in the design and distribution of numerous lines of women's and men's clothing. For instance, its 2001 Feb 3, balance sheet showed property, plant, and equipment, net, equal to USD 1,394,619. In a note to the financial statements (slightly modified to clarify), management explained this amount as follows:

**(Dollar amounts in thousands)**

Property and Equipment, Net		
Property and Equipment, at cost	2000	1999
Land, buildings and improvements	\$ 362,997	\$ 390,121
Furniture, fixtures and equipment	2,079,567	2,020,651
Leaseholds and improvements	655,736	498,232
Construction in progress	46,748	35,823
Total	\$3,145,048	\$2,944,827
Less: accumulated depreciation and amortization	1,750,429	1,715,215
Property and equipment, net	\$1,394,619	\$1,229,612

**A misconception** Some mistaken financial statement users believe that accumulated depreciation represents cash available for replacing old plant assets with new assets. However, the accumulated depreciation account balance does not represent cash; accumulated depreciation simply shows how much of an asset's cost has been charged to expense. Companies use the plant asset and its contra account, accumulated depreciation, so that data on the total original acquisition cost and accumulated depreciation are readily available to meet reporting requirements.

**Costs or market values in the balance sheet** In the balance sheet, firms report plant assets at original cost less accumulated depreciation. One of the justifications for reporting the remaining undepreciated costs of the asset rather than market values is the going-concern concept. As you recall from Chapter 5, the going-concern concept assumes that the company will remain in business indefinitely, which implies the company will use its plant assets rather than sell them. Generally, analysts do not consider market values relevant for plant assets in primary financial statements, although they may be reported in supplemental statements.

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A broader perspective:

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Wolverine World Wide, Inc.

## 10. Property, plant, and equipment

(Dollars in Thousands)	2002	2001
Total current assets	\$ 349,301	\$ 340,978
Property, Plant and Equipment		
Land	1,177	1,177
Buildings and improvements	64,848	63,006
Machinery and equipment	117,524	108,094
Software	29,217	22,097
	\$212,766	\$194,374
Less accumulated depreciation	96,483	83,239
Total plant assets	\$ 116,283	\$ 111,135
Other Assets		
Goodwill and other intangibles, less accumulated amortization (2002-\$3,565; 2001-\$2,447)	16,178	19,931
Cash value of life insurance	16,443	14,725
Prepaid pension costs	19,099	15,242
Assets held for exchange	7,706	7,942
Notes receivable	4,736	4,921
Other	4,649	6,604
Total other assets	\$ 68,811	\$ 69,365
Total Assets	\$534,395	\$521,478

### NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

#### 1 (In Part): Summary of Significant Accounting Policies

##### *Property, Plant and Equipment*

Property, plant and equipment are stated on the basis of cost and include expenditures for new facilities, major renewals, betterments and software. Normal repairs and maintenance are expensed as incurred.

Depreciation of plant, equipment and software is computed using the straight-line method. The depreciable lives for buildings and improvements range from five to forty years; from three to ten years for machinery and equipment; and from three to ten years for software.

As required, the Company adopted the American Institute of Certified Public Accountants Statement of Position (SoP) 98-1, Accounting for the Costs of Computer Software Developed and Obtained for Internal Use, in 1999. The SOP provides guidelines for determining whether costs should be expensed or capitalized for computer software developed or purchased for internal use. The Company's accounting policies for such items were already in substantial compliance with SOP 98-1 and, therefore, the adoption did not have a material effect on its 1999 consolidated financial position or results of operations.

### Subsequent expenditures (capital and revenue) on assets

Companies often spend additional funds on plant assets that have been in use for some time. They debit these expenditures to: (1) an asset account; (2) an accumulated depreciation account; or (3) an expense account.

Expenditures debited to an asset account or to an accumulated depreciation account are **capital expenditures**. Capital expenditures increase the book value of plant assets. **Revenue expenditures**, on the other hand, do not qualify as capital expenditures because they help to generate the current period's revenues rather than future periods' revenues. As a result, companies expense these revenue expenditures immediately and report them in the income statement as expenses.

**Betterments** or **improvements** to existing plant assets are capital expenditures because they increase the quality of services obtained from the asset. Because betterments or improvements add to the service-rendering

ability of assets, firms charge them to the asset accounts. For example, installing an air conditioner in an automobile that did not previously have one is a betterment. The debit for such an expenditure is to the asset account, Automobiles.

Occasionally, expenditures made on plant assets extend the quantity of services beyond the original estimate but do not improve the quality of the services. Since these expenditures benefit an increased number of future periods, accountants capitalize rather than expense them. However, since there is no visible, tangible addition to, or improvement in, the quality of services, they charge the expenditures to the accumulated depreciation account, thus reducing the credit balance in that account. Such expenditures cancel a part of the existing accumulated depreciation; firms often call them **extraordinary repairs**.

To illustrate, assume that after operating a press for four years, a company spent USD 5,000 to recondition the press. The reconditioning increased the machine's life to 14 years instead of the original estimate of 10 years. The journal entry to record the extraordinary repair is:

Accumulated Depreciation-Machinery (+A)	5,000	
Cash (for Accounts Payable) (-A)		5,000

To record the cost of reconditioning a press.

Originally, the press cost USD 40,000, had an estimated useful life of 10 years, and had no estimated salvage value. At the end of the fourth year, the balance in its accumulated depreciation account under the straight-line method is  $[(USD\ 40,000/10) \times 4] = USD\ 16,000$ . After debiting the USD 5,000 spent to recondition the press to the accumulated depreciation account, the balances in the asset account and its related accumulated depreciation account are as shown in the last column:

	Before Extraordinary Repair	After Extraordinary Repair
Press	\$40,000	\$40,000
Accumulated depreciation	16,000	11,000
Book value (end of four years)	\$24,000	\$29,000

In effect, the expenditure increases the carrying amount (book value) of the asset by reducing its contra account, accumulated depreciation. Under the straight-line method, we would divide the new book value of the press, USD 29,000, equally among the 10 remaining years in amounts of USD 2,900 per year (assuming that the estimated salvage value is still zero).

As a practical matter, expenditures for major repairs not extending the asset's life are sometimes charged to accumulated depreciation. This avoids distorting net income by expensing these expenditures in the year incurred. Then, firms calculate a revised depreciation expense, and spread the cost of major repairs over a number of years. This treatment is not theoretically correct.

To illustrate, assume the same facts as in the previous example except that the USD 5,000 expenditure did not extend the life of the asset. Because of the size of this expenditure, the company still charges it to accumulated depreciation. Now, it would spread the USD 29,000 remaining book value over the remaining six years of the life of the press. Under the straight-line method, annual depreciation would then be  $(USD\ 29,000/6) = USD\ 4,833$ .

## 10. Property, plant, and equipment

Illustration 10.10 Expenditures on Plant Assets after Acquisition

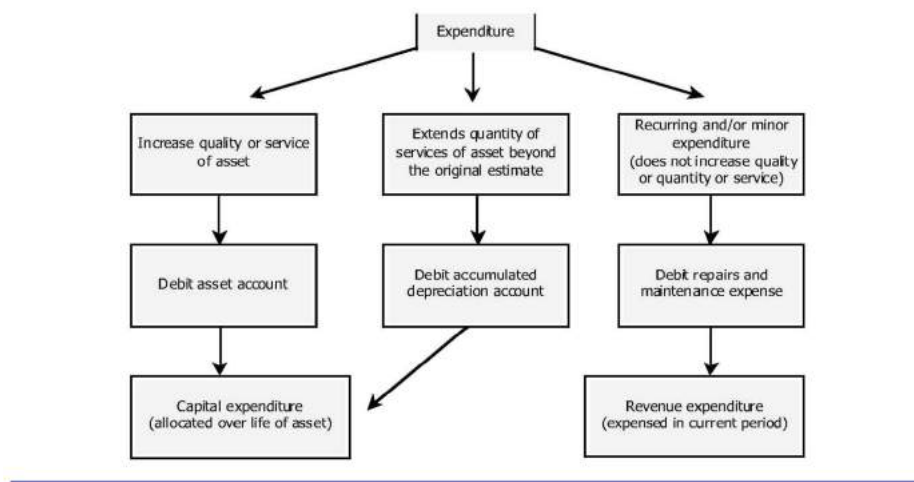


Exhibit 88: Expenditures on plant assets after acquisition

Accountants treat as expenses those recurring and/or minor expenditures that neither add to the asset's service-rendering quality nor extend its quantity of services beyond its original estimated useful life. Thus, firms immediately expense regular maintenance (lubricating a machine) and ordinary repairs (replacing a broken fan belt on an automobile) as revenue expenditures. For example, a company that spends USD 190 to repair a machine after using it for some time, debits Maintenance Expense or Repairs Expense.

**Low-cost items** Most businesses purchase **low-cost items** that provide years of service, such as paperweights, hammers, wrenches, and drills. Because of the small dollar amounts involved, it is impractical to use the ordinary depreciation methods for such assets, and it is often costly to maintain records of individual items. Also, the effect of low-cost items on the financial statements is not significant. Accordingly, it is more efficient to record the items as expenses when they are purchased. For instance, many companies charge any expenditure less than an arbitrary minimum, say, USD 100, to expense regardless of its impact on the asset's useful life. This practice of accounting for such low unit cost items as expenses is an example of the modifying convention of materiality that was discussed in Chapter 5. In Exhibit 88, we summarize expenditures on plant assets after acquisition.

In practice, it is difficult to decide whether to debit an expenditure to the asset account or to the accumulated depreciation account. For example, some expenditures seem to affect both the quality and quantity of services. Even if the wrong account were debited for the expenditure, the book value of the plant asset at that point would be the same amount it would have been if the correct account had been debited. However, both the asset and accumulated depreciation accounts would be misstated.

As an example of the effect of misstated asset and accumulated depreciation accounts, assume Watson Company had an asset that had originally cost USD 15,000 and had been depreciated to a book value of USD 6,000 at the beginning of 2010. At that time, Watson estimated the equipment had a remaining useful life of two years. The company spent USD 4,000 in early January 2010 to install a new motor in the equipment. This motor extended the useful life of the asset four years beyond the original estimate. Since the expenditure extended the life, the firm should capitalize it by a debit to the accumulated depreciation account. We show the calculations for depreciation

expense if the entry was made correctly and if the expenditure had been improperly charged (debited) to the asset account in Exhibit 89.

	2010 Jan 1	After Expenditure Entry	
		Correct	Incorrect
Cost	\$15,000	\$15,000	\$19,000 <sup>T</sup>
Accumulated depreciation	9,000	5,000*	9,000
Book value	\$ 6,000	\$10,000	\$10,000
Remaining life	2 years	6 years	6 years
Depreciation expense per year	\$ 3,000	\$ 1,667	\$1,667
* (\$9,000 - \$4,000)			
T (\$15,000 + \$4,000)			

#### Exhibit 89: Expenditure extending plant asset life

If an expenditure that should be expensed is capitalized, the effects are more significant. Assume now that USD 6,000 in repairs expense is incurred for a plant asset that originally cost USD 40,000 and had a useful life of four years and no estimated salvage value. This asset had been depreciated using the straight-line method for one year and had a book value of USD 30,000 (USD 40,000 cost—USD 10,000 first-year depreciation) at the beginning of 2010. The company capitalized the USD 6,000 that should have been charged to repairs expense in 2010. The charge for depreciation should have remained at USD 10,000 for each of the next three years. With the incorrect entry, however, depreciation increases.

Regardless of whether the repair was debited to the asset account or the accumulated depreciation account, the firm would change the depreciation expense amount to USD 12,000 for each of the next three years [(USD 30,000 book value + USD 6,000 repairs expense)/3 more years of useful life]. These errors would cause net income for the year 2010 to be overstated USD 4,000: (1) repairs expense is understated by USD 6,000, causing income to be overstated by USD 6,000; and (2) depreciation expense is overstated by USD 2,000, causing income to be understated by USD 2,000. In 2011, the overstatement of depreciation by USD 2,000 would cause 2011 income to be understated by USD 2,000.

Note that the USD 6,000 recording error affects more than just the expense accounts and net income. Plant asset and Retained Earnings accounts on the balance sheet also reflect the impact of this error. To see the effect of incorrectly capitalizing the USD 6,000 to the asset account rather than correctly expensing it, look at Exhibit 90.

### Subsidiary records used to control plant assets

Most companies maintain formal records (ranging from handwritten documents to computer tapes) to ensure control over their plant assets. These records include an asset account and a related accumulated depreciation account in the general ledger for each major class of depreciable plant assets, such as buildings, factory machinery, office equipment, delivery equipment, and store equipment.

Because the general ledger account has no room for detailed information about each item in a major class of depreciable plant assets, many companies use plant asset subsidiary ledgers. Subsidiary ledgers for Accounts Receivable and Accounts Payable were explained briefly in **An accounting perspective** in Chapter 4. A company may also use subsidiary ledgers for plant assets. For instance, assume a company has a general ledger account for office furniture. The subsidiary ledger for office furniture might contain four separate accounts entitled: Desks, Chairs, File Cabinets and Bookshelves. Alternatively, a company could even have a separate subsidiary account for each piece of furniture. The total of all the subsidiary account balances must equal the total of the general ledger "control" account for Office Furniture at the end of the accounting period. Each general ledger account for each class of depreciable asset, such as Buildings, Delivery Equipment, and so on, could have a subsidiary ledger backing

## 10. Property, plant, and equipment

it up and showing information such as the description, cost, and purchase date for each asset. These subsidiary ledgers and detailed records provide more information and allow the company to maintain better control over plant and equipment.

	2010	
	Correctly Expensing	Incorrectly Expensing
Depreciation expense	\$10,000	\$12,000
Repair Expense	6,000	-0-
Net in come overstated by \$4,000, which affects retained earnings	\$16,000	\$12,000
Asset cost	\$40,000	\$46,000
Accumulated depreciation	20,000	22,000
Book value	\$20,000	\$24,000
	2011	
	Correctly Expensing	Incorrectly Expensing
Depreciation expense	\$10,000	\$12,000
Repair Expense	-0-	-0-
Net in come understated by \$2,000, which affects retained earnings	\$10,000	\$12,000
Asset cost	\$40,000	\$46,000
Accumulated depreciation	30,000	34,000
Book value	\$10,000	\$12,000

### Exhibit 90: Effect of revenue expenditure treated as capital expenditure

When they are kept for each major class of plant and equipment, a company may have subsidiary ledgers for factory machinery, office equipment, and other classes of depreciable plant assets. Then there may be an additional subsidiary ledger for each type of asset within each category. For example, the subsidiary office equipment ledger may contain accounts for microcomputers, printers, fax machines, copying machines, and so on. Companies also keep a detailed record for each item represented in a subsidiary ledger account. For example, there may be a separate detailed record for each microcomputer represented in the Microcomputer subsidiary ledger account. Each detailed record should include a description of the asset, identification or serial number, location of the asset, date of acquisition, cost, estimated salvage value, estimated useful life, annual depreciation, accumulated depreciation, insurance coverage, repairs, date of disposal, and gain or loss on final disposal of the asset. Note the detailed record for one particular microcomputer as of 2010 December 31, in Exhibit 91.

To enhance control over plant and equipment, companies stencil on or attach the identification or serial number to each asset. Periodically, firms must take a physical inventory to determine whether all items in the accounting records actually exist, whether they are located where they should be, and whether they are still being used. A company that does not use detailed records and identification numbers or take physical inventories finds it difficult to determine whether assets have been discarded or stolen.

The general ledger control account balance for each major class of plant and equipment should equal the total of the amounts in the subsidiary ledger accounts for that class of plant assets. Also, the totals in the detailed records for a specific subsidiary ledger account (such as Microcomputers) should equal the balance of that account. Each time a plant asset is acquired, exchanged, or disposed of, the firm posts an entry to both a general ledger control account and the appropriate subsidiary ledger account. It also updates the detailed record for the items affected.

Item Dell Precision M40	Insurance coverage:
Id. No. Z-43806	United Ins. Co.
Location Rm. 403, Adm. bldg.	Pol. No. 0052-61481-24
Date acquired 2009 Jan. 1	Amt. \$3,000
Cost \$3,000	Repairs:
Estimated salvage value \$200	2010/6/13 \$140
Estimated useful life 4 yrs.	
Depreciation per year \$700	
Accumulated depreciation: '	Disposal date
2009/12/31 \$ 700	Gain or loss
2010/12/31 1,400	
2011/12/31	
2012/12/31	

Exhibit 91: Detailed record of a specific plant asset

DEMENT & PEERY, INC.  
Consolidated Balance Sheets  
2010 December 31 and 2009 (Dollars in millions)

	2010	2009
ASSETS		
Current Assets:		
Cash	\$ 121	\$ 192
Accounts receivable, net of allowance for doubtful accounts of \$15 in both 2010 and 2009	379	491
Inventories	247	175
Deposits, prepaid expenses and other	120	58
Total Current Assets	\$ 867	\$ 916
Investments		
Equity affiliates	170	277
Other assets	87	63
Property and Equipment - Net	4,153	3,919
Deferred Charges	164	154
Total Assets	\$5,441	\$5,329
Net Operating Earnings	\$ 560	\$ 433

Exhibit 92: Consolidated balance sheets

### Analyzing and using the financial results—Rate of return on operating assets

Analyzing the ratios of income statement and balance sheet items from one year to the next can reveal important trends. Management uses these ratios to measure performance by establishing targets and evaluating results. As an example, look at Exhibit 92. Analysts use these figures to calculate the ratios and to explain the importance of this information to management and investors.

To determine the **rate of return on operating assets** for Dement & Peery for 2009 and 2010, use the following formula:

$$\text{Rate of return on operating assets} = \frac{\text{Net operating income}}{\text{Operating assets}}$$

2009: USD 433,000/USD 5,329,000 = 8.13 per cent

2010: USD 560,000/USD 5,441,000 = 10.29 per cent

Net operating income is also called net operating earnings or income before interest and taxes. In calculating Dement & Peery's ratio, we have assumed that all assets are operating assets used in producing operating revenues.

This ratio measures the profitability of the company in carrying out its primary business function. For Dement & Peery, these figures indicate a slight increase in the earning power of the company in 2010. Net operating income increased more than proportionately compared to the increase in operating assets. Perhaps this performance justifies the increase in operating assets.

In this chapter, you learned how to account for the acquisition of plant assets and depreciation. The next chapter discusses how to record the disposal of plant assets and how to account for natural resources and intangible assets.



## 10. Property, plant, and equipment

### Understanding the learning objectives

- To be classified as a plant asset, an asset must: (1) be tangible; (2) have a useful service life of more than one year; and (3) be used in business operations rather than held for resale.
- In accounting for plant assets, accountants must:
  - (a) Record the acquisition cost of the asset.
  - (b) Record the allocation of the asset's original cost to periods of its useful life through depreciation.
  - (c) Record subsequent expenditures on the asset.
  - (d) Account for the disposal of the asset.
- Accountants consider four major factors in computing depreciation: (1) cost of the asset; (2) estimated salvage value of the asset; (3) estimated useful life of the asset; and (4) depreciation method to use in depreciating the asset.

- **Straight-line method:** Assigns an equal amount of depreciation to each period. The formula for calculating straight-line depreciation is:

$$\text{Depreciation per period} = \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Number of accounting periods} \in \text{estimated useful life}}$$

- **Units-of-production method:** Assigns an equal amount of depreciation to each unit of product manufactured by an asset. The units-of-production depreciation formulas are:

$$\text{Depreciation per period} = \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Estimated total units of production (service) during useful life of asset}}$$

$$\text{Depreciation per period} = \text{Depreciation per unit} \times \text{Number of units of goods/services produced}$$

- **Double-declining-balance method:** DDB is an accelerated depreciation method. Salvage value is ignored in making annual calculations. The formula for DDB depreciation is:

$$\text{Depreciation per period} = (2 \times \text{straight-line rate}) \times (\text{Asset cost} - \text{Accumulated depreciation})$$

- Capital expenditures are debited to an asset account or an accumulated depreciation account and increase the book value of plant assets. Expenditures that increase the quality of services or extend the quantity of services beyond the original estimate are capital expenditures.
- Revenue expenditures are expensed immediately and reported in the income statement as expenses. Recurring and or minor expenditures that neither add to the asset's quality of service-rendering abilities nor extend its quantity of services beyond the asset's original estimated useful life are expenses.
- Plant asset subsidiary ledgers contain detailed information that cannot be maintained in the general ledger account about each item in a major class of depreciable plant assets.
- Control over plant and equipment is enhanced by plant asset subsidiary ledgers and other detailed records. Information in a detailed record may include a description of the asset, identification or serial number, location of the asset, date of acquisition, cost, estimated salvage value, estimated useful life, annual depreciation, accumulated depreciation, insurance coverage, repairs, date of disposal, and gain or loss on final disposal of the asset. A periodic physical inventory should be taken to determine whether items in accounting records actually exist and are still being used at the proper location.
- To calculate the rate of return on operating assets, divide net operating income by operating assets. This ratio helps management determine how effectively it used assets to produce a profit.

### Demonstration problem

**Demonstration problem A** Cleveland Company purchased a 2-square-mile farm under the following terms: cash paid, USD 486,000; mortgage note assumed, USD 240,000; and accrued interest on mortgage note assumed, USD 6,000. The company paid USD 55,200 for brokerage and legal services to acquire the property and secure clear title. Cleveland planned to subdivide the property into residential lots and to construct homes on these lots. Clearing and leveling costs of USD 21,600 were paid. Crops on the land were sold for USD 14,400. A house on the land, to be moved by the buyer of the house, was sold for USD 5,040. The other buildings were torn down at a cost of USD 9,600, and salvaged material was sold for USD 10,080.

Approximately 6 acres of the land were deeded to the township for roads, and another 10 acres was deeded to the local school district as the site for a future school. After the subdivision was completed, this land would have an approximate value of USD 7,680 per acre. The company secured a total of 1,200 salable lots from the remaining land.

Present a schedule showing in detail the composition of the cost of the 1,200 salable lots.

**Demonstration problem B** Calvin Company acquired and put into use a machine on 2010 January 1, at a total cost of USD 45,000. The machine was estimated to have a useful life of 10 years and a salvage value of USD 5,000. It was also estimated that the machine would produce one million units of product during its life. The machine produced 90,000 units in 2010 and 125,000 units in 2011.

Compute the amounts of depreciation to be recorded in 2010 and 2011 under each of the following:

- Straight-line method.
- Units-of-production method.
- Double-declining-balance method.
- Assume 30,000 units were produced in the first quarter of 2010. Compute depreciation for this quarter under each of the three methods.

### Solution to demonstration problem

#### Solution to demonstration problem A

CLEVELAND COMPANY			
Schedule of Cost of 1,200 Residential Lots			
Costs incurred:			
Cash paid	\$486,000		
Mortgage note assumed	240,000		
Interest accrued on mortgage note assumed	6,000		
Broker and legal services	55,200		
Clearing and leveling costs incurred	21,600		
Tearing down costs	9,600	\$818,400	
Less proceeds from sale of:			
Crops	\$ 14,400		
House	5,040		
Salvaged materials	10,080	29,520	
Net cost of land to be subdivided into 1,200 lots			\$788,880

#### Solution to demonstration problem B

a. Straight-line method:

$$2010: \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{10} = \text{USD } 4,000$$

$$2011: \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{10} = \text{USD } 4,000$$

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### b. Units-of-production method:

$$2010: \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{1,000,000} \times 90,000 = \text{USD } 3,600$$

$$2011: \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{1,000,000} \times 125,000 = \text{USD } 5,000$$

### c. Double-declining-balance method:

$$2010: \text{USD } 45,000 \times 20 \text{ per cent} = \text{USD } 9,000$$

$$2011: (\text{USD } 45,000 - \text{USD } 9,000) \times 20 \text{ per cent} = \text{USD } 7,200$$

$$\text{d. Straight-line: } \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{10} \times \frac{1}{4} = \text{USD } 1,000$$

$$\text{Units-of-production: } (\text{USD } 30,000 - \text{USD } 0.04) = \text{USD } 1,200$$

$$\text{Double-declining-balance: } (\text{USD } 45,000 - \text{USD } 9,000 - \text{USD } 7,000) \times 0.2 \times \frac{1}{4} = \text{USD } 1,440$$

## Key terms

**Accelerated depreciation methods** Record higher amounts of depreciation during the early years of an asset's life and lower amounts in later years.

**Acquisition cost** Amount of cash and/or cash equivalents given up to acquire a plant asset and place it in operating condition at its proper location.

**Appraised value** An expert's opinion as to what an item's market price would be if the item were sold.

**Betterments (improvements)** Capital expenditures that are properly charged to asset accounts because they add to the service-rendering ability of the assets; they increase the quality of services obtained from an asset.

**Book value** An asset's recorded cost less its accumulated depreciation.

**Capital expenditures** Expenditures debited to an asset account or to an accumulated depreciation account.

**Depreciation** The amount of plant asset cost allocated to each accounting period benefiting from the plant asset's use. The **straight-line depreciation** method charges an equal amount of plant asset cost to each period. The **units-of-production depreciation** method assigns an equal amount of depreciation for each unit of product manufactured or service rendered by an asset. The **double-declining-balance (DDB)** method assigns decreasing amounts of depreciation to successive periods of time.

**Double-declining-balance (DDB) depreciation** See depreciation.

**Extraordinary repairs** Expenditures that cancel a part of the existing accumulated depreciation because they increase the quantity of services expected from an asset.

**Fair market value** The price that would be received for an item being sold in the normal course of business (not at a forced liquidation sale).

**Inadequacy** The inability of a plant asset to produce enough products or provide enough services to meet current demands.

**Land improvements** Attachments to land, such as driveways, landscaping, parking lots, fences, lighting systems, and sprinkler systems, that have limited lives and therefore are depreciable.

**Low-cost items** Items that provide years of service at a relatively low unit cost, such as hammers, paperweights, and drills.

**Obsolescence** Decline in usefulness of an asset brought about by inventions and technological progress.

**Physical deterioration** Results from use of the asset—wear and tear—and the action of the elements.

**Plant and equipment** A shorter title for property, plant, and equipment; also called plant assets. Included are land and manufactured or constructed assets such as buildings, machinery, vehicles, and furniture.

**Rate of return on operating assets** Net operating income/Operating assets. This ratio helps management determine how effectively it used assets to produce a profit.

**Revenue expenditures** Expenditures (on a plant asset) that are immediately expensed.

**Salvage value** The amount of money the company expects to recover, less disposal costs, on the date a plant asset is scrapped, sold, or traded in. Also called scrap value or residual value.

**Straight-line depreciation** See depreciation.

**Tangible assets** Assets that we can see and touch such as land, buildings, and equipment.

**Units-of-production depreciation** See depreciation.

**Useful life** Refers to the length of time the company owning the asset intends to use it.

#### Self-test

##### True-false

Indicate whether each of the following statements is true or false.

The cost of land includes its purchase price and other related costs, including the cost of removing an old unusable building that is on the land.

Depreciation is the process of valuation of an asset to arrive at its market value.

The purpose of depreciation accounting is to provide the cash required to replace plant assets.

Expenditures made on plant assets that increase the quality of services are debited to the accumulated depreciation account.

Plant asset subsidiary ledgers are used to increase control over plant assets.

##### Multiple-choice

Select the best answer for each of the following questions.

On 2010 January 1, Jackson Company purchased equipment for USD 400,000, and installation and testing costs totaled USD 40,000. The equipment has an estimated useful life of 10 years and an estimated salvage value of USD 40,000. If Jackson uses the straight-line depreciation method, the depreciation expense for 2010 is:

- a. USD 36,000.
- b. USD 40,000.
- c. USD 44,000.
- d. USD 80,000.
- e. USD 88,000.

In Question 1, if the equipment were purchased on 2010 July 1, and Jackson used the double-declining-balance method, the depreciation expense for 2010 would be:

- a. USD 88,000.
- b. USD 72,000.
- c. USD 36,000.
- d. USD 44,000.
- e. USD 40,000.

Hatfield Company purchased a computer on 2008 January 2, for USD 10,000. The computer had an estimated salvage value of USD 3,000 and an estimated useful life of five years. At the beginning of 2010, the estimated salvage value changed to USD 1,000, and the computer is expected to have a remaining useful life of two years. Using the straight-line method, the depreciation expense for 2010 is:

- a. USD 1,400.
- b. USD 1,750.
- c. USD 2,250.
- d. USD 1,800.

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e. USD 3,100.

The result of recording a capital expenditure as a revenue expenditure is an:

- a. Overstatement of current year's expense.
- b. Understatement of current year's expense.
- c. Understatement of subsequent year's net income.
- d. Overstatement of current year's net income.
- e. None of the above.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- What is the main distinction between inventory and a plant asset?
- Which of the following items are properly classifiable as plant assets on the balance sheet?
  - Advertising that will appear in the future to inform the public about new energy-saving programs at a manufacturing plant.
  - A truck acquired by a manufacturing company to be used to deliver the company's products to wholesalers.
  - An automobile acquired by an insurance company to be used by one of its salespersons.
  - Adding machines acquired by an office supply company to be sold to customers.
  - The cost of constructing and paving a driveway that has an estimated useful life of 10 years.
- In general terms, what does the cost of a plant asset include?
- In what way does the purchase of a plant asset resemble the prepayment of an expense?
- Brown Company purchased an old farm with a vacant building as a factory site for USD 1,040,000. Brown decided to use the building in its operations. How should Brown allocate the purchase price between the land and the building? How should this purchase be handled if the building is to be torn down?
- Describe how a company may determine the cost of a self-constructed asset.
- In any exchange of noncash assets, the accountant's task is to find the most appropriate valuation for the asset received. What is the general rule for determining the most appropriate valuation in such a situation?
- Why should periodic depreciation be recorded on all plant assets except land?
- Define the terms inadequacy and obsolescence as used in accounting for depreciable plant assets.
- What four factors must be known to compute depreciation on a plant asset? How objective is the calculation of depreciation?
- A friend, Mindy Jacobs, tells you her car depreciated USD 5,000 last year. Explain whether her concept of depreciation is the same as the accountant's concept.
- What does the term accelerated depreciation mean? Give an example showing how depreciation is accelerated.
- Provide a theoretical reason to support using an accelerated depreciation method.

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- Nancy Company purchased a machine that originally had an estimated eight years of useful life. At the end of the third year, Nancy determined that the machine would last only three more years. Does this revision affect past depreciation taken?
- What does the balance in the accumulated depreciation account represent? Does this balance represent cash that can be used to replace the related plant asset when it is completely depreciated?
- What is the justification for reporting plant assets on the balance sheet at undepreciated cost (book value) rather than market value?
- Distinguish between capital expenditures and revenue expenditures.
- For each of the following, state whether the expenditure made should be charged to an expense, an asset, or an accumulated depreciation account:
  - Cost of installing air-conditioning equipment in a building that was not air-conditioned.
  - Painting of an owned factory building every other year.
  - Cost of replacing the roof on a 10-year-old building that was purchased new and has an estimated total life of 40 years. The expenditure did not extend the life of the asset beyond the original estimate.
  - Cost of repairing an electric motor. The expenditure extended the estimated useful life beyond the original estimate.
- Indicate which type of account (asset, accumulated depreciation, or expense) would be debited for each of the following expenditures:
  - Painting an office building at a cost of USD 1,000. The building is painted every year.
  - Adding on a new plant wing at a cost of USD 24,000,000.
  - Expanding a paved parking lot at a cost of USD 144,000.
  - Replacing a stairway with an escalator at a cost of USD 20,000.
  - Replacing the transmission in an automobile at a cost of USD 1,600, thus extending its useful life two years beyond the original estimate.
  - Replacing a broken fan belt at a cost of USD 600.
- How do subsidiary records provide control over a company's plant assets?
- What advantages can accrue to a company that maintains plant asset subsidiary records?
- **Real world question** Based on the financial statements and the notes to those statements of The Limited, Inc., contained in the Annual report appendix, what was the 2000 ending net property and equipment balance? Did the company acquire any of these assets in 2000? What depreciation method did the company use?

### Exercises

**Exercise A** Stephon Company paid USD 640,000 cash for a tract of land on which it plans to erect a new warehouse, and paid USD 8,000 in legal fees related to the purchase. Stephon also agreed to assume responsibility for USD 25,600 of unpaid taxes on the property. The company incurred a cost of USD 28,800 to remove an old apartment building from the land. Prepare a schedule showing the cost of the land acquired.

**Exercise B** Laural Company paid USD 840,000 cash for real property consisting of a tract of land and a building. The company intended to remodel and use the old building. To allocate the cost of the property acquired,

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Laural had the property appraised. The appraised values were as follows: land, USD 576,000, and office building, USD 384,000. The cost of clearing the land was USD 18,000. The building was remodeled at a cost of USD 76,800. The cost of a new identical office building was estimated to be USD 432,000. Prepare a schedule showing the cost of the assets acquired.

**Exercise C** Fine Company purchased a heavy machine to be used in its factory for USD 720,000, less a 2 per cent cash discount. The company paid a fine of USD 3,600 because an employee hauled the machine over city streets without securing the required permits. The machine was installed at a cost of USD 21,600, and testing costs of USD 7,200 were incurred to place the machine in operation. Prepare a schedule showing the recorded cost of the machine.

**Exercise D** A machine is acquired in exchange for 50 shares of Marley Corporation capital stock. The stock recently traded at USD 400 per share. The machine cost USD 30,000 three years ago. At what amount should the machine be recorded?

**Exercise E** Keely Company purchased some office furniture for USD 29,760 cash on 2009 March 1. It also paid USD 480 cash for freight costs incurred. The furniture is being depreciated over four years under the straight-line method, assuming a salvage value of USD 1,440. The company employs a calendar-year accounting period. On 2010 July 1, it spent USD 192 to refinish the furniture. Prepare journal entries for the Keely Company to record all of the data, including the annual depreciation adjustments through 2010.

**Exercise F** On 2009 January 2, a new machine was acquired for USD 900,000. The machine has an estimated salvage value of USD 100,000 and an estimated useful life of 10 years. The machine is expected to produce a total of 500,000 units of product throughout its useful life. Compute depreciation for 2009 and 2010 using each of the following methods:

- a. Straight line.
- b. Units of production (assume 30,000 and 60,000 units were produced in 2009 and 2010, respectively).
- c. Double-declining balance.

**Exercise G** Terrill Company finds its records are incomplete concerning a piece of machinery used in its plant. According to the company records, the machinery has an estimated useful life of 10 years and an estimated salvage value of USD 24,000. It has recorded USD 12,000 in depreciation each year using the straight-line method. If the accumulated depreciation account shows a balance of USD 72,000, what is the original cost of the machinery and how many years remain to be depreciated?

**Exercise H** Katherine Company purchased a machine on 2009 April 1, for USD 72,000. The machine has an estimated useful life of five years with no expected salvage value. The company's accounting year ends on December 31.

Compute the depreciation expense for 2009 and 2010 under the double-declining-balance method.

**Exercise I** Australia Company purchased a machine for USD 3,200 and incurred installation costs of USD 800. The estimated salvage value of the machine is USD 200. The machine has an estimated useful life of four years. Compute the annual depreciation charges for this machine under the double-declining-balance method.

**Exercise J** Regal Company acquired a delivery truck on 2009 January 2, for USD 107,200. The truck had an estimated salvage value of USD 4,800 and an estimated useful life of eight years. At the beginning of 2009, a revised estimate shows that the truck has a remaining useful life of six years. The estimated salvage value changed to USD 1,600.

Compute the depreciation charge for 2009 and the revised depreciation charge for 2009 using the straight-line method.

**Exercise K** Assume that the truck described in the previous exercise was used 40 per cent of the time in 2010 to haul materials used in the construction of a building by Regal Company for its own use. (Remember that 2010 is before the revision was made on estimated life.) During the remaining time, Regal used the truck to deliver merchandise to its customers.

Prepare the journal entry to record straight-line depreciation on the truck for 2010.

**Exercise L** Vineland Company purchased a computer for USD 60,000 and placed it in operation on 2008 January 2. Depreciation was recorded for 2008 and 2009 using the straight-line method, a six-year life, and an expected salvage value of USD 2,400. The introduction of a new model of this computer in 2010 caused the company to revise its estimate of useful life to a total of four years and to reduce the estimated salvage value to zero.

Compute the depreciation expense on the computer for 2010.

**Exercise M** On 2009 January 2, a company purchased and placed in operation a new machine at a total cost of USD 60,000. Depreciation was recorded on the machine for 2009 and 2010 under the straight-line method using an estimated useful life of five years and no expected salvage value. Early in 2011, the machine was overhauled at a cost of USD 20,000. The estimated useful life of the machine was revised upward to a total of seven years.

Compute the depreciation expense on the machine for 2011.

**Exercise N** Lasky Company purchased a machine on 2009 January 3, at a cost of USD 50,000. It debited freight and installation charges of USD 10,000 to Repairs Expense. It recorded straight-line depreciation on the machine in 2009 and 2010 using an estimated life of 10 years and no expected salvage value.

Compute the amount of the error in net income for 2009 and 2010, and state whether net income is understated or overstated.

**Exercise O** Bragg Company owns a plant asset that originally cost USD 240,000 in 2006. The asset has been depreciated for three years assuming an eight-year useful life and no salvage value. During 2009, Bragg incorrectly capitalized USD 120,000 in repairs on the plant asset rather than expensing them. Describe the impact of this error on the asset's cost and Bragg's net income over the next five years.

### Problems

**Problem A** Bolt Company purchased a machine for use in its operations that had an invoice price of USD 80,000 excluding sales tax. A 4 per cent sales tax was levied on the sale. Terms were net 30. The company estimated the total cost of hauling the machine from the dealer's warehouse to the company's plant at USD 5,600, which did not include a fine of USD 1,600 for failure to secure the necessary permits to use city streets in transporting the machine. In delivering the machine to its plant, a Bolt employee damaged the truck used; repairs cost USD 3,600. The machine was also slightly damaged with repair costs amounting to USD 1,600.

Bolt incurred installation costs of USD 32,000 that included the USD 4,000 cost of shoring up the floor under the machine. Testing costs amounted to USD 2,400. Safety guards were installed on the machine at a cost of USD 640, and the machine was placed in operation.

Prepare a schedule showing the amount at which the machine should be recorded in Bolt's accounts.

**Problem B** Pressler Company planned to erect a new factory building and a new office building in Atlanta, Georgia, USA. A report on a suitable site showed an appraised value of USD 180,000 for land and orchard and USD 120,000 for a building.



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After considerable negotiation, the company and the owner reached the following agreement: Pressler Company was to pay USD 216,000 in cash, assume a USD 90,000 mortgage note on the property, assume the interest of USD 1,920 accrued on the mortgage note, and assume unpaid property taxes of USD 13,200. Pressler Company paid USD 18,000 cash for brokerage and legal services in acquiring the property.

Shortly after acquisition of the property, Pressler Company sold the fruit on the trees for USD 2,640, remodeled the building into an office building at a cost of USD 38,400, and removed the trees from the land at a cost of USD 9,000. Construction of the factory building was to begin in a week.

Prepare schedules showing the proper valuation of the assets acquired by Pressler Company.

**Problem C** Timothy Company acquired and placed into use a heavy factory machine on 2009 October 1. The machine had an invoice price of USD 360,000, but the company received a 3 per cent cash discount by paying the bill on the date of acquisition. An employee of Timothy Company hauled the machine down a city street without a permit. As a result, the company had to pay a USD 1,500 fine. Installation and testing costs totaled USD 35,800. The machine is estimated to have a USD 35,000 salvage value and a seven-year useful life. (A fraction should be used for the DDB calculation rather than a percentage.)

- a. Prepare the journal entry to record the acquisition of the machine.
- b. Prepare the journal entry to record depreciation for 2009 under the double-declining balance method.
- c. Assume Timothy Company used the straight-line depreciation method. At the beginning of 2009, it estimated the machine will last another six years. Prepare the journal entry to record depreciation for 2009. The estimated salvage value would not change.

**Problem D** Peach Company has the following entries in its Building account:

Debits		
2009		
May 5	Cost of land and building purchased	\$200,000
5	Broker fees incident to purchase of land and building	12,000
2010		
Jan. 3	Contract price of new wing added to south end	84,000
15	Cost of new machinery, estimated life 10 years	160,000
June 10	Real estate taxes for six months ended 2010/6/30	3,600
Aug. 10	Cost of building parking lot for employees in back of building	4,960
Sept. 6	Replacement of windows broken in August	160
Oct. 10	Repairs due to regular usage	2,240
Credits		
2009		
May 24	Transfer to Land account, per allocation of purchase cost authorized in minutes of board of directors	32,000
2010		
Jan. 5	Proceeds from leases of second floor for six months ended 2009/12/31	8,000

Peach acquired the original property on 2009 May 5. Orange immediately engaged a contractor to construct a new wing on the south end of the building. While the new wing was being constructed, the company leased the second floor as temporary warehouse space to Kellett Company. During this period (July 1 to 2009 December 31), the company installed new machinery costing USD 160,000 on the first floor of the building. Regular operations began on 2010 January 2.

a. Compute the correct balance for the Buildings account as of 2010 December 31. The company employs a calendar-year accounting period.

b. Prepare the necessary journal entries to correct the records of Peach Company at 2010 December 31. No depreciation entries are required.

**Problem E** Cardine Company acquired and placed into use equipment on 2009 January 2, at a cash cost of USD 935,000. Transportation charges amounted to USD 7,500, and installation and testing costs totaled USD 55,000.

The equipment was estimated to have a useful life of nine years and a salvage value of USD 37,500 at the end of its life. It was further estimated that the equipment would be used in the production of 1,920,000 units of product during its life. During 2009, 426,000 units of product were produced.

Compute the depreciation to the nearest dollar for the year ended December 31, using:

a. Straight-line method.

b. Units-of-production method.

c. Double-declining-balance method (use a fraction rather than a percentage).

**Problem F** Goodrich Company purchased a machine on 2009 October 1 for USD 100,000. The machine has an estimated salvage value of USD 30,000 and an estimated useful life of eight years.

Compute to the nearest dollar the amount of depreciation Goodrich should record on the machine for the years ending 2009 December 31, and 2010, under each of the following methods:

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- a. Straight-line.
- b. Double-declining-balance.

### Alternate problems

**Alternate problem A** Brite Company purchased a machine that had an invoice price of USD 400,000 excluding sales tax. Terms were net 30. A 4 per cent sales tax was levied on the sale. The company incurred and paid freight costs of USD 10,000. Special electrical connections were run to the machine at a cost of USD 14,000 and a special reinforced base for the machine was built at a cost of USD 18,000. The machine was dropped and damaged while being mounted on this base. Repairs cost USD 4,000. Raw materials with a cost of USD 1,000 were consumed in testing the machine. Safety guards were installed on the machine at a cost of USD 1,400, and the machine was placed in operation. In addition, USD 500 of costs were incurred in removing an old machine.

Prepare a schedule showing the amount at which the machine should be recorded in Brite Company's account.

**Alternate problem B** Maxwell Company purchased 2 square miles of farmland under the following terms: USD 968,000 cash; and liability assumed on mortgage note of USD 320,000 and interest accrued on mortgage note assumed, USD 12,800. The company paid USD 67,200 of legal and brokerage fees and also paid USD 3,200 for a title search on the property.

The company planned to use the land as a site for a new office building and a new factory. Maxwell paid clearing and leveling costs of USD 28,800. It sold crops on the land for USD 7,360 and sold one of the houses on the property for USD 19,200. The other buildings were torn down at a cost of USD 14,400; sale of salvaged materials yielded cash proceeds of USD 13,600. Approximately 1 per cent of the land acquired was deeded to the county for roads. The cost of excavating a basement for the office building amounted to USD 9,120.

Prepare a schedule showing the amount at which the land should be carried on Maxwell Company's books.

**Alternate problem C** Dawson Towing Company purchased a used panel truck for USD 28,800 cash. The next day the company's name and business were painted on the truck at a total cost of USD 1,488. The truck was then given a minor overhaul at a cost of USD 192, and new "super" tires were mounted on the truck at a cost of USD 1,920, less a trade-in allowance of USD 240 for the old tires. The truck was placed in service on 2009 April 1, at which time it had an estimated useful life of five years and a salvage value of USD 3,360.

- a. Prepare a schedule showing the cost to be recorded for the truck.
- b. Prepare the journal entry to record depreciation at the end of the calendar-year accounting period, 2009 December 31. Use the double-declining-balance method.
- c. Assume that the straight-line depreciation method has been used. At the beginning of 2009 it is estimated the truck will last another four years. The estimated salvage value changed to USD 1,920. Prepare the entry to record depreciation for 2012.

**Alternate problem D** You are the new controller for Jayson Company, which began operations on 2009 October 1, after a start-up period that ran from the middle of 2008. While reviewing the accounts, you find an account entitled "Fixed Assets", which contains the following items:

Cash paid to previous owner of land and old buildings	\$ 192,000
Cash given to construction company as partial payment for the new building	72,000
Legal and title search fees	2,400
Real estate commission	14,400
Cost of demolishing old building	16,800
Cost of leveling and grading	9,600
Architect's fee (90% of building and 10% improvements)	6,000
Cost of excavating (digging) basement for new building	21,600

Cash paid to construction company for new building	288,000
Repair damage done by vandals	7,200
Sprinkler system for lawn	31,200
Lighting system for parking lot	40,800
Paving of parking lot	60,000
Net invoice price of machinery	1,152,000
Freight cost incurred on machinery	50,400
Installation and testing of machinery	19,200
Medical bill paid for employee injured in installing machinery	3,600
Landscaping (permanent)	38,400
Repair damage to building in installation of machinery	4,800
Special assessment paid to city for water mains and sewer line	45,600
Account balance	\$2,106,000

In addition, you discover that cash receipts of USD 1,200 from selling materials salvaged from the old building were credited to Miscellaneous Revenues in 2009. Digging deeper, you find that the plant manager spent all of his time for the first nine months of 2009 supervising installation of land improvements (10 per cent), building construction (40 per cent), and installation of machinery (50 per cent). The plant manager's nine-month salary of USD 108,000 was debited to Officers' Salaries Expense.

a. List all items on a form containing columns for Land, Land Improvements, Building, and Machinery. Sort the items into the appropriate columns, omitting those items not properly included as an element of asset cost. Show negative amounts in parentheses. Total your columns.

b. Prepare one compound journal entry to reclassify and adjust the accounts and to eliminate the Fixed Assets account. Do not attempt to record depreciation for the partial year.

**Alternate problem E** Land Company acquired and put into use a machine on 2009 January 1, at a cash cost of USD 120,000 and immediately spent USD 5,000 to install it. The machine had an estimated useful life of eight years and an estimated salvage value of USD 15,000 at the end of this time. It was further estimated that the machine would produce 500,000 units of product during its life. In the first year, the machine produced 100,000 units.

Prepare journal entries to record depreciation to the nearest dollar for 2009, using:

- Straight-line method.
- Units-of-production method.
- Double-declining-balance method.

**Alternate problem F** Crawford Company paid USD 60,000 for a machine on 2009 April 1, and placed it in use on that same date. The machine has an estimated life of 10 years and an estimated salvage value of USD 10,000.

Compute the amount of depreciation to the nearest dollar the company should record on this asset for the years ending 2009 December 31, and 2010, under each of the following methods:

- Straight-line.
- Double-declining-balance.

### Beyond the numbers—Critical thinking

**Business decision case A** You are a new staff auditor assigned to audit Cray Company's Buildings account. You determine that Cray Company made the following entries in its Buildings account in 2009:

		Debits	
2009			
Jan.	2	Cost of land and old buildings purchased	\$ 720,000
	2	Legal fees incident to purchase	9,600
	2	Fee for title search	1,200
	12	Cost of demolishing old buildings on land	19,200
June	16	Cost of insurance during construction of new building	4,800

## 10. Property, plant, and equipment

July 30	Payment to contractor on completion of new building	1,080,000
Aug. 5	Architect's fees for design of new building	48,000
Sept. 15	City assessment for sewers and sidewalks (considered permanent)	16,800
Oct. 6	Cost of landscaping (considered permanent)	9,600
Nov. 1	Cost of driveways and parking lots	60,000
	Credits	
Jan. 15	Proceeds received upon sale of salvaged materials from old buildings	4,800

In addition to the entries in the account, you obtained the following information in your interview with the accountant in charge of the Buildings account:

The company began using the new building on 2009 September 1. The building is estimated to have a 40-year useful life and no salvage value.

The company began using the driveways and parking lots on 2009 November 1. The driveways and parking lots have an estimated 10-year useful life and no salvage value.

The company uses the straight-line depreciation method to depreciate all of its plant assets.

Using all of this information, do the following:

- Prepare a schedule that shows the separate cost of land, buildings, and land improvements.
- Compute the amount of depreciation expense for 2009.
- Complete the journal entries required to correct the accounts at 2009 December 31. Assume that closing entries have not been made.
- Write a brief statement describing to management why depreciation must be recorded and how recording depreciation affects net income.

**Business decision case B** On 2010 October 1, Besler Company acquired and placed into use new equipment costing USD 504,000. The equipment has an estimated useful life of five years and an estimated salvage value of USD 24,000. Besler estimates that the equipment will produce 2 million units of product during its life. In the last quarter of 2010, the equipment produced 120,000 units of product. As the company's accountant, management has asked you to do the following:

- Compute the depreciation for the last quarter of 2010, using each of the following methods:

Straight-line.

Units-of-production.

Double-declining-balance.

- Prepare a written report describing the conditions in which each of these four methods would be most appropriate.

**Business decision case C** The notes to the financial statements of Wolverine World Wide, Inc., in "A Broader Perspective", stated that substantially all fixed assets are depreciated using the straight-line method. Explain why the straight-line method of depreciation may be appropriate for this company.

**Business decision case D** Discuss the meaning of rate of return on operating assets, its elements, and what it means to investors and management.

Calculate the rate of return on operating assets for The Limited in the Annual report appendix for the two most recent years. Assume all assets are operating assets. Comment on the results.

**Annual report analysis E** The following footnote excerpted from a recent annual report of Kerr-McGee Corporation describes the company's accounting policies for property, plant, and equipment:

*Property, plant, and equipment is depreciated over its estimated life by the unit-of-production or the straight-line-method.*

- a. How many different depreciation methods are used by Kerr-McGee Corporation? Does this practice conform with generally accepted accounting principles?
- b. Discuss why management might select each of these methods to depreciate plant assets.

**Group project F** In a group of two or three students, visit a large company in your community and inquire about the subsidiary records it maintains to establish accounting control over its plant assets. Also inquire about physical controls used to protect its equipment that is movable, such as computers, copy machines, and so on. Write a report to your instructor summarizing your findings and be prepared to give a short report to your class.

**Group project G** With a team of two or three students, visit two companies in your community to inquire about why they use certain depreciation methods. Try to locate companies that use several depreciation methods in accounting for various depreciable fixed assets. Interview those who made the decision as to methods to use to find out the reasons for their choices. Write a report to your instructor summarizing your findings.

**Group project H** In a small group of students, visit a large company in your community to determine how it decides to account for expenditures on fixed assets made after the assets have been in use for some time. In other words, how does it decide whether to debit the asset account, the accumulated depreciation account, or an expense account? What role does materiality play in the decision? Evaluate the reasonableness of the decision model used. Write a report to your instructor summarizing your findings and be prepared to make a short presentation to your class.

#### Using the Internet—A view of the real world

Visit the CPA Review site at:

<http://www.beckerconviser.com>

Investigate this site. Identify the major types of employers. Make note of any interesting information at this site. Write a report to your instructor summarizing your findings. Be prepared to make a short presentation to the class.

Visit the Best Software website at:

<http://www.bestsoftware.com>

What types of software does the company sell? Why might a company buy a software package from Best Software? Study any other aspect of the information that looks interesting. Write a report to your instructor summarizing your findings.

#### Answers to self-test

##### **True-false**

**True.** The cost of land includes all normal, reasonable, and necessary expenditures to obtain the land and get it ready for use.

**False.** Depreciation is a process of allocation, not valuation, and the book value of an asset has little to do with its market value.

**False.** Depreciation accounting does not provide funds required to replace plant assets. Instead, accumulated depreciation simply shows how much of an asset's cost has been charged to expense since the asset was acquired.

**False.** Expenditures that improve the quality of services are charged to the asset account.

## 10. Property, plant, and equipment

**True.** Plant asset subsidiary ledgers provide detailed information that the general ledger account cannot provide and thus give better control over plant assets.

### Multiple-choice

**b.** The depreciation expense for 2010 using the straight-line method is computed as follows:

$$\frac{(\text{USD } 440,000 - \text{USD } 40,000)}{10} = \text{USD } 40,000$$

**d.** Double-declining balance rate =  $2 \times \left(\frac{100 \text{ per cent}}{10}\right) = 20 \text{ per cent}$

$$\text{Depreciation expense for 2010} = (2 \text{ per cent} \times \text{USD } 440,000) \times \frac{6}{12} = \text{USD } 44,000$$

**e.** At the beginning of 2010, the balance of accumulated depreciation is USD 2,800 (annual depreciation of USD 1,400 X 2) and book value is USD 7,200, or (USD 10,000 - USD 2,800). The revised annual depreciation expense is USD 3,100, or  $\left[\frac{(\text{USD } 7,200 - \text{USD } 1,000)}{2}\right]$ .

**a.** The error in recording a capital expenditure as a revenue expenditure results in an overstatement of current year's expense, as well as an understatement of current year's net income.

# 11. Plant asset disposals, natural resources, and intangible assets

## Learning objectives

After studying this chapter, you should be able to:

- Calculate and prepare entries for the sale, retirement, and destruction of plant assets.
- Describe and record exchanges of nonmonetary assets.
- Determine the periodic depletion cost of a natural resource and calculate depreciation of plant assets located on extractive industry property.
- Prepare entries for the acquisition and amortization of intangible assets.
- Analyze and use the financial results-total assets turnover.

## A company accountant's role in measuring intangibles

Many assets have no physical substance. These assets are referred to as intangible. Even though these assets have no substance, the accountant still must spend time measuring the value of these assets to corporation and how these assets contribute to the cash flow of the entity.

The accountant must first place a value on something that cannot be seen by the naked eye. Then the accountant must determine if the asset is making a contribution toward cash flow of the entity (if so and how long) and finally, the accountant must determine if and when this benefit has indeed expired.

As we move ever more toward an information based economy, the per cent of intangible assets to total assets also increases. In many cases, intangible assets compose a significant majority of total assets. Thus, the earning power of such companies is primarily based on the valuation of assets that cannot be seen or touched. Some intangible assets, such as human assets and internally generated intangibles, are not even recorded on the company's books. This makes it even more difficult to value the assets and determine their contribution to earnings.

Investors and analysts often compare book value per share with the market price per share for a corporation. This ratio is referred to as the price to book ratio (PB). It measures the market's beliefs about the value of net assets as compared to the recorded amount of net assets. In 1998 Tootsie Roll had a PB ratio of approximately 5.2. The recorded net assets were approximately USD 400 million, yet the market perceived Tootsie Roll to have net assets worth over USD 2,000 million. What is the nature of those unrecorded (intangible) assets? In 1998, Microsoft had a PB ratio of approximately 12.4. The real value of Microsoft's net assets exceeded those reported in the accounting records by a factor of 12.4. It is reasonable to assume that a large portion of the unrecorded assets of Microsoft must be intangible. How does the accountant value something that has no physical substance and in many cases has not been recorded? It is similar to walking around in a dark closet wearing a blindfold.



## 11. Plant asset disposals, natural resources, and intangible assets

This function is closely related to the work of the plant asset accountant. Many of the same questions must be addressed when accounting for intangible assets. The question still remains, how can you measure something you cannot see?

Your study of long-term assets—plant assets, natural resources, and intangible assets—began in Chapter 10, which focused on determining plant asset cost, computing depreciation, and distinguishing between capital and revenue expenditures. This chapter begins by discussing the disposal of plant assets. The next topic is accounting for natural resources such as ores, minerals, oil and gas, and timber. The final topic is accounting for intangible assets such as patents, copyrights, franchises, trademarks and trade names, leases, and goodwill.

Note that accounting for all the long-term assets discussed in these chapters is basically the same. A company that purchases a long-term asset records it at cost. As the company receives benefits from the asset and its future service potential decreases, the accountant transfers the cost from an asset account to an expense account. Finally, the asset is sold, retired, or traded in on a new asset. Because the lives of long-term assets can extend for many years, the methods accountants use in reporting such assets can have a dramatic effect on the financial statements of many accounting periods.

### Disposal of plant assets

All plant assets except land eventually wear out or become inadequate or obsolete and must be sold, retired, or traded for new assets. When disposing of a plant asset, a company must remove both the asset's cost and accumulated depreciation from the accounts. Overall, then, all plant asset disposals have the following steps in common:

- Bring the asset's depreciation up to date.
- Record the disposal by:
  - (a) Writing off the asset's cost.
  - (b) Writing off the accumulated depreciation.
  - (c) Recording any consideration (usually cash) received or paid or to be received or paid.
  - (d) Recording the gain or loss, if any.

As you study this section, remember these common procedures accountants use to record the disposal of plant assets. In the paragraphs that follow, we discuss accounting for the (1) sale of plant assets, (2) retirement of plant assets without sale, (3) destruction of plant assets, (4) exchange of plant assets, and (5) cost of dismantling and removing plant assets.

### Sale of plant assets

Companies frequently dispose of plant assets by selling them. By comparing an asset's book value (cost less accumulated depreciation) with its selling price (or net amount realized if there are selling expenses), the company may show either a gain or loss. If the sales price is greater than the asset's book value, the company shows a gain. If the sales price is less than the asset's book value, the company shows a loss. Of course, when the sales price equals the asset's book value, no gain or loss occurs.

To illustrate accounting for the sale of a plant asset, assume that a company sells equipment costing USD 45,000 with accumulated depreciation of USD 14,000 for USD 35,000. The firm realizes a gain of USD 4,000:

Equipment cost	\$ 45,000
Accumulated depreciation	14,000
Book value	\$ 31,000

Sales price	35,000
Gain realized	\$ 4,000

The journal entry to record the sale is:

Cash (+A)	35,000	
Accumulated Depreciation—Equipment (+A)	14,000	
Equipment (-A)		45,000
Gain on Disposal of Plant Assets (+SE)	4,000	

To record sale of equipment at a price greater than book value.

If on the other hand, the company sells the equipment for USD 28,000, it realizes a loss of USD 3,000 (USD 31,000 book value—USD 28,000 sales price). The journal entry to record the sale is:

Cash (+A)	28,000	
Accumulated Depreciation—Equipment (+A)	14,000	
Loss from Disposal of Plant Asset (-SE)	3,000	
Equipment (-A)		45,000

To record the sale of equipment at a price less than book value.

If a firm sells the equipment for USD 31,000, no gain or loss occurs. The journal entry to record the sale is:

Cash (+A)	31,000	
Accumulated Depreciation—Equipment (+A)	14,000	
Equipment (-A)		45,000

To record sale of equipment at a price equal to book value.

**Accounting for depreciation to date of disposal** When selling or otherwise disposing of a plant asset, a firm must record the depreciation up to the date of sale or disposal. For example, if it sold an asset on April 1 and last recorded depreciation on December 31, the company should record depreciation for three months (January 1–April 1). When depreciation is not recorded for the three months, operating expenses for that period are understated, and the gain on the sale of the asset is understated or the loss overstated.

To illustrate, assume that on 2011 August 1, Ray Company sold a machine for USD 1,500. When purchased on 2003 January 2, the machine cost USD 12,000; Ray was depreciating it at the straight-line rate of 10 per cent per year. As of 2010 December 31, after closing entries were made, the machine's accumulated depreciation account had a balance of USD 9,600. Before determining a gain or loss and before making an entry to record the sale, the firm must make the following entry to record depreciation for the seven months ended 2011 July 31:

July	31	Depreciation Expense—Machinery (-SE)	700	
		Accumulated Depreciation—Machinery (-A)		700
		To record depreciation for seven months		
		[\$12,000 X 0.10 X (7/12)]		

An accountant would compute the USD 200 loss on the sale as follows:

Machine cost	\$	12,00
		0
Accumulated depreciation (\$9,600 + \$700)		10,30
		0
Book value	\$	1,700
Sales price		1,500

## 11. Plant asset disposals, natural resources, and intangible assets

Loss realized \$ 200

The journal entry to record the sale is:

Cash (+A)	1,500	
Accumulated Depreciation—Machinery (+A)	10,300	
Loss from Disposal of Plant Assets (-SE)	200	
Machinery(-A)		12,000

To record the sale of machinery at a price less than book value.

When retiring a plant asset from service, a company removes the asset's cost and accumulated depreciation from its plant asset accounts. For example, Hayes Company would make the following journal entry when it retired a fully depreciated machine that cost USD 15,000 and had no salvage value:

Accumulated Depreciation—Machinery (+A)	15,000	
Machinery (-A)		15,000

To record the retirement of a fully depreciated machine.

Occasionally, a company continues to use a plant asset after it has been fully depreciated. In such a case, the firm should not remove the asset's cost and accumulated depreciation from the accounts until the asset is sold, traded, or retired from service. Of course, the company cannot record more depreciation on a fully depreciated asset because total depreciation expense taken on an asset may not exceed its cost.

Sometimes a business retires or discards a plant asset before fully depreciating it. When selling the asset as scrap (even if not immediately), the firm removes its cost and accumulated depreciation from the asset and accumulated depreciation accounts. In addition, the accountant records its estimated salvage value in a Salvaged Materials account and recognizes a gain or loss on disposal. To illustrate, assume that a firm retires a machine with a USD 10,000 original cost and USD 7,500 of accumulated depreciation. If the machine's estimated salvage value is USD 500, the following entry is required:

Salvaged materials (+A)	500	
Accumulated Depreciation—Machinery (+A)	7,500	
Loss from Disposal of Plant Assets (-SE)	2,000	
Machinery (-A)		10,000

To record the retirement of machinery, which will be sold for scrap at a later time.

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### An accounting perspective:

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#### Uses of technology

The main advantages that companies give for having a home page on the Internet are (1) increased efficiency in the work environment, (2) increased revenue, and (3) faster customer access. A home page can be developed for a small company for a few hundred dollars and can be maintained for a fairly low monthly fee. The Small Business Administration has a website at <http://www.sba.gov> that provides helpful information to small businesses. One concern that companies have regarding

Internet use by their employees is that they might visit interesting nonbusiness related sites on company time.

Sometimes accidents, fires, floods, and storms wreck or destroy plant assets, causing companies to incur losses. For example, assume that fire completely destroyed an uninsured building costing USD 40,000 with up-to-date accumulated depreciation of USD 12,000. The journal entry is:

Fire Loss (-SE)	28,000	
Accumulated Depreciation—Buildings (+A)	12,000	
Buildings (-A)		40,000
To record fire loss.		

If the building was insured, the company would debit only the amount of the fire loss exceeding the amount to be recovered from the insurance company to the Fire Loss account. To illustrate, assume the company partially insured the building and will recover USD 22,000 from the insurance company. The journal entry is:

Receivable from Insurance Company (+A)	22,000	
Fire Loss (-SE)	6,000	
Accumulated Depreciation—Buildings (+A)	12,000	
Buildings (-A)		40,000
To record fire loss and amount recoverable from insurance company.		

**Exchanges of nonmonetary assets** Until late 2004, the rules according to *APB Opinion No. 29* for recording exchanges of nonmonetary assets depended on whether they were exchanges of dissimilar assets such as a truck for a machine or were similar assets such as a truck for a truck<sup>32</sup>. If the exchange classified as an exchange of dissimilar assets, the acquired asset would be recorded at its fair value and any gain or loss would be recognized. In late 2004, the FASB issued a new standard, *Statement of Financial Accounting Standards No. 153*, "Exchanges of Nonoperating Assets: an amendment of APB Opinion No. 29"<sup>33</sup>. This new standard was issued to bring about greater agreement between US Generally Accepted Accounting Principles and International Financial Reporting Standards and is effective for exchanges occurring during fiscal periods beginning after 2005 June 15.

This change allows the financial statements of US companies to be more comparable to the financial statements of companies utilizing International Financial Reporting Standards.

The new FASB standard no longer distinguishes between dissimilar and similar asset exchanges. Instead it differentiates between exchanges that have commercial substance and those that do not have commercial substance. An exchange has **commercial substance** if, as a result of the exchange, future cash flows are expected to change significantly. For instance, if a company exchanges a building for land (a dissimilar exchange), the timing and the future cash flows are likely to be different than if the exchange had not occurred. Most exchanges qualify as having commercial substance. However, if the exchange is not expected to create a significant change in future cash flows, the exchange does not result in commercial substance. For example, if a company exchanges one truck for another truck (a similar exchange) that will perform the same function as the old truck and for the same time period so that the future cash flows are not significantly different, then the exchange does not result in commercial

<sup>32</sup> APB, *APB Opinion No. 29*, "Accounting for Nonmonetary Transactions" (New York: AICPA, May 1973).

<sup>33</sup> FASB, *FASB Statement No. 153*, "Exchanges of Nonmonetary Assets: an amendment of APB Opinion No. 29" (Norwalk, CT: FASB Board, December 2004).

## 11. Plant asset disposals, natural resources, and intangible assets

substance. However, if the future cash flows are likely to be significantly different, then the exchange of similar assets has commercial substance.

**Exchanges of nonmonetary assets having commercial substance** For exchanges of nonmonetary assets that have commercial substance, accountants record the new asset at the fair market value of the asset received or the asset(s) given up, whichever is more clearly evident. When the cash price of the new asset is stated, they use the cash price to record the new asset. If the cash price is not stated, they assume that the fair market value of the old asset plus any cash paid would equate to the cash price of the new asset and use that value to record the new asset. Thus, accountants would normally record the asset received at either (1) the stated cash price of the new asset or (2) a known fair market value of the asset given up plus any cash paid.

Debiting accumulated depreciation and crediting the old asset removes the book value of the old asset from the accounts. The firm credits the Cash account for any amount paid. If the amount at which the new asset is recorded exceeds the book value of the old asset plus any cash paid, a company records a gain to balance the journal entry. If the situation is reversed, it records a loss to balance the journal entry. To illustrate such an exchange having commercial substance, assume a company exchanges an old machine for a new delivery truck. The future cash flows from the exchange are expected to be significantly different and, therefore, the exchange has commercial substance. The machine cost USD 45,000 and had an up-to-date accumulated depreciation balance of USD 38,000. The truck had a USD 55,000 cash price and was acquired by trading in the machine with a fair value of USD 3,000 and paying USD 52,000 cash. The journal entry to record the exchange is:

Trucks (+A)	55,000	
Accumulated Depreciation—Machinery (+A)	38,000	
Loss from Disposal of Plant Assets (-SE)	4,000	
Machinery (-A)		45,000
Cash (-A)		52,000
To record loss on exchange of dissimilar plant assets.		

Another way to compute the USD 4,000 loss on the exchange is to use the book value of the old asset less the fair market value of the old asset. The calculation is as follows:

Machine cost	\$ 45,000
Accumulated depreciation	38,000
Book value	\$ 7,000
Fair market value of old asset (trade-in allowance)	3,000
Loss realized	\$ 4,000

To illustrate the recognition of a gain from such an exchange having commercial substance, assume that the fair market value of the machine was USD 9,000 instead of USD 3,000, and that only USD 46,000 was paid in cash. The journal entry to record the exchange would be:

Trucks (+A)	55,000	
Accumulated Depreciation—Machinery (+A)	38,000	
Machinery (-A)		45,000
Cash (-A)		46,000
Gain on Disposal of Plant Assets(+SE)		2,000
To record gain on exchange of dissimilar assets.		

Another way to compute the gain of USD 2,000 on the exchange is to use the fair market value of the old asset less the book value of the old asset. The calculation is as follows:

Machine cost	\$ 45,000
Accumulated depreciation	38,000
Book value	\$ 7,000
Fair market value of old asset	
(trade-in allowance)	9,000
Gain realized	\$ 2,000

Remember, when the book value and the market value of the old asset are different, companies always recognize a gain or a loss on an exchange of nonmonetary assets having commercial substance. As discussed earlier, they do not recognize a gain or loss on an exchange of nonmonetary assets not having commercial substance.

**Exchanges of nonmonetary assets not having commercial substance** Often firms exchange plant assets such as automobiles, trucks, and office equipment by trading the old asset for a similar new one. Once in a while, such an exchange does not result in an expected change in future cash flows and therefore lacks commercial substance. When such an exchange occurs, the company receives a trade-in allowance for the old asset, and pays the balance in cash.<sup>34</sup> Usually, the cash price of the new asset is stated. If not, accountants assume the cash price of the new asset is the fair market value of the old asset plus the cash paid.

When such assets are exchanged, we must modify the general rule that new assets are recorded at the fair market value of what is given up or received, whichever is clearer. Thus, companies record the new asset at the book value of the old asset plus the cash paid. When applying this rule to exchanges of assets where no commercial substance results, firms recognize no losses or gains.

To illustrate the accounting for exchanges of nonmonetary assets that do not have commercial substance, assume that a delivery service exchanged USD 50,000 cash and truck No. 1—which cost USD 45,000, had USD 38,000 of up-to-date accumulated depreciation, and had a USD 5,000 fair market value—for truck No. 2. The new truck has a cash price (fair market value) of USD 55,000. The delivery service realized a loss of USD 2,000 on the exchange which cannot be recorded. The loss is calculated as follows:

The journal entry to record the exchange is:

Cost of trunk No. 1	\$ 45,000
Accumulated depreciation	38,000
Book value	\$ 7,000
Fair market value of old asset	
(trade-in allowance)	5,000
Loss indicated (but not recorded)	\$ 2,000

However, if a loss is indicated and is added to the recorded value of the new asset, the asset may later be written down because of rules of impairment (as required by *FASB Standard No. 144*), a topic left to Intermediate Accounting texts.

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<sup>34</sup> Trade-in allowance is sometimes expressed as the difference between list price and cash paid, but we choose to define it as the difference between cash price and cash paid because this latter definition seems to agree with current practice for exchange transactions.

Truck (cost of No. 2) (+A)	57,000
Accumulated Depreciation—Trucks (+A)	38,000
Trucks (cost of No. 1) (-A)	45,000
Cash (-A)	50,000

To record the exchange of non-monetary assets with no commercial substance (no loss recorded).

Accounting for any gain resulting from exchanges of nonmonetary assets having no commercial substance is similar to the case where a loss is present but unrecorded. To illustrate, assume that in the preceding example, the delivery service gave truck No. 1 (now with a fair market value of USD 9,000) and USD 46,000 cash in exchange for truck No. 2. The gain on the exchange is USD 2,000, but would be unrecorded.

Book value of old truck (No. 1)	\$ 7,000	<b>1</b>
Cash paid	46,000	
Cost of new truck (No. 2)	\$ 53,000	
Fair market value of new truck (No. 2)	\$ 55,000	<b>1</b>
Less: Gain indicated	2,000	(equal)
Cost of new truck (No. 2)	\$ 53,000	<b>1</b>

The company would record the new asset at the book value of the old asset (USD 7,000) plus cash paid (USD 46,000). The company deducts the gain from the cost of the new asset (USD 55,000). Thus, the cost basis of the new delivery truck is equal to USD 55,000 less than the USD 2,000 gain, or USD 53,000. The delivery service uses this USD 53,000 cost basis in recording depreciation on the truck and determining any gain or loss on its disposal.

The journal entry to record the exchange is:

Cost of trunk No. 1	\$ 45,000
Accumulated depreciation	38,000
Book value	\$ 7,000
Fair market value of old asset (trade-in allowance)	5,000
Loss indicated (but not recorded)	\$ 2,000

Firms would realize the gain on an exchange of nonmonetary assets not having commercial substance in future accounting periods as increased net income resulting from smaller depreciation charges on the newly acquired asset. In the preceding example, annual depreciation expense is less if it is based on the truck's USD 53,000 cost basis than if it is based on the truck's USD 55,000 cash price. Thus, future net income per year will be larger.

<b>Trucks (cost of No. 2) (+A)</b>	<b>53,000</b>	
<b>Accumulated Depreciation—Trucks (+A)</b>	<b>38,000</b>	
<b>Trucks (cost of No. 1) (-A)</b>		<b>45,000</b>
<b>Cash (-A)</b>		<b>46,000</b>

**To record exchange of nonmonetary assets with no commercial substance (no gain recorded).**

In Exhibit 93, we summarize the rules for recording nonmonetary asset exchanges.

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### An accounting perspective:

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### Uses of technology

Although sophisticated computer systems automatically compute the gain or loss on the disposal of assets, such programs depend on human input. If an error was made in inputting the type of

## 11. Plant asset disposals, natural resources, and intangible assets

disposal or exchange, or if the life of the asset was estimated inaccurately, the calculated gain or loss would be incorrect.



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	<b>Exchanges Having Commercial Substance</b>	<b>Exchanges NOT Having Commercial Substance</b>
<b>Recognize Gains?</b>	Yes	No
<b>Recognize Losses?</b>	Yes	No
<b>Record New Asset At:</b>	Fair market value of asset received (new asset) or fair market value of asset given up (old asset), whichever is more clearly evident	Book value of old asset plus cash paid

Exhibit 93: Summary of rules for recording exchanges of plant assets

Companies incur removal costs when dismantling and removing old plant assets. They deduct these costs from salvage proceeds to determine the asset's net salvage value. (The removal costs could be greater than the salvage proceeds.) Accountants associate removal costs with the old asset, not the new asset acquired as a replacement.

The next section discusses natural resources. Note the underlying accounting principle of matching the expenses with the revenues earned in that same accounting period.

### Natural resources

Resources supplied by nature, such as ore deposits, mineral deposits, oil reserves, gas deposits, and timber stands, are **natural resources** or **wasting assets**. Natural resources represent inventories of raw materials that can be consumed (exhausted) through extraction or removal from their natural setting (e.g. removing oil from the ground).

On the balance sheet, we classify natural resources as a separate group among noncurrent assets under headings such as "Timber stands" and "Oil reserves". Typically, we record natural resources at their cost of acquisition plus exploration and development costs; on the balance sheet, we report them at total cost less accumulated depletion. (Accumulated depletion is similar to the accumulated depreciation used for plant assets.) When analyzing the financial condition of companies owning natural resources, exercise caution because the historical costs reported for the natural resources may be only a small fraction of their current value.

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### An accounting perspective:

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#### Business insight

Kerr-McGee Corporation is a global energy and chemical company engaged in oil and gas exploration and production, and the production and marketing of titanium dioxide pigment. In notes to its financial statements, Kerr-McGee states that the company's geologists and engineers in accordance with the Securities and Exchange Commission definitions have prepared estimates of proved reserves. These estimates include reserves that may be obtained in the future by improved recovery methods now in operation or for which successful testing has been exhibited.

**Depletion** is the exhaustion that results from the physical removal of a part of a natural resource. In each accounting period, the depletion recognized is an estimate of the cost of the natural resource that was removed from its natural setting during the period. To record depletion, debit a Depletion account and credit an Accumulated Depletion account, which is a contra account to the natural resource asset account.

## 11. Plant asset disposals, natural resources, and intangible assets

By crediting the Accumulated Depletion account instead of the asset account, we continue to report the original cost of the entire natural resource on the financial statements. Thus, statement users can see the percentage of the resource that has been removed. To determine the total cost of the resource available, we combine this depletion cost with other extraction, mining, or removal costs. We can assign this total cost to either the cost of natural resources sold or the inventory of the natural resource still on hand. Thus, we could expense all, some, or none of the depletion and removal costs recognized in an accounting period, depending on the portion sold. If all of the resource is sold, we expense all of the depletion and removal costs. The cost of any portion not yet sold is part of the cost of inventory.

**Computing periodic depletion cost** To compute depletion charges, companies usually use the units-of-production method. They divide total cost by the estimated number of units—tons, barrels, or board feet—that can be economically extracted from the property. This calculation provides a per-unit depletion cost. For example, assume that in 2010 a company paid USD 650,000 for a tract of land containing ore deposits. The company spent USD 100,000 in exploration costs. The results indicated that approximately 900,000 tons of ore can be removed economically from the land, after which the land will be worth USD 50,000. The company incurred costs of USD 200,000 to develop the site, including the cost of running power lines and building roads. Total cost subject to depletion is the net cost assignable to the natural resource plus the exploration and development costs. When the property is purchased, a journal entry assigns the purchase price to the two assets purchased—the natural resource and the land. The entry would be:

Land (+A)	50,000	
Ore Deposits (+A)	600,000	
Cash (-A)		650,000
To record purchase of land and mine.		

After the purchase, an entry debits all costs to develop the site (including exploration) to the natural resource account. The entry would be:

Ore Deposits (\$100,000 + \$200,000) (+A)	300,000	
Cash (-A)		300,000
To record costs of exploration and development.		

The formula for finding depletion cost per unit is:

$$\text{Depletion cost per unit} = \frac{\text{Cost of site} - \text{Residual value of land (if owned)} + \text{Costs develop site}}{\text{Estimated number of units that can be economically extracted}}$$

In some instances, companies buy only the right to extract the natural resource from someone else's land. When the land is not purchased, its residual value is irrelevant and should be ignored. If there is an obligation to restore the land to a usable condition, the firm adds these estimated restoration costs to the costs to develop the site.

In the example where the land was purchased, the total costs of the mineral deposits equal the cost of the site (USD 650,000) minus the residual value of land (USD 50,000) plus costs to develop the site (USD 300,000), or a total of USD 900,000. The unit (per ton) depletion charge is USD 1 (or USD 900,000/900,000 tons). The formula to compute the depletion cost of a period is:

$$\text{Depletion cost of a period} = \text{Depletion cost per unit} \times \text{Number of units extracted during period}$$

In this example, if 100,000 tons are mined in 2010, this entry records the depletion cost of USD 100,000 (USD 1 X 100,000) for the period:

Depletion (-SE)	100,000
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Accumulated Depletion—Ore Deposits<sup>4</sup> (-A) 100,000  
 To record depletion for 2010.

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The Depletion account contains the "in the ground" cost of the ore or natural resource mined. Combined with other extractive costs, this cost determines the total cost of the ore mined. To illustrate, assume that in addition to the USD 100,000 depletion cost, mining labor costs totaled USD 320,000, and other mining costs, such as depreciation, property taxes, power, and supplies, totaled USD 60,000. If 80,000 tons were sold and 20,000 remained on hand at the end of the period, the firm would allocate the total cost of USD 480,000 as follows:

Depletion cost	USD 100,000
Mining labor costs	320,000
Other mining costs	60,000
Total cost of 100,000 tons mined (USD 4.80 per ton)	USD 480,000
Less: One inventory (20,000 tons at USD 4.80)	96,000
Cost of ore sold (80,000 tons at USD 4.80)	USD 384,000

Note that the average cost per ton to mine 100,000 tons was USD 4.80 (or USD 480,000/100,000). The income statement would show cost of ore sold of USD 384,000. The mining company does not report depletion separately as an expense because depletion is included in cost of ore sold. The balance sheet would show inventory of ore on hand (a current asset) at USD 96,000 (or USD 4.80 X 20,000). Also, it would report the cost less accumulated depletion of the natural resource as follows:

One deposits	\$900,000
Less: Accumulated depletion	100,000      \$ 800,000

Another method of calculating depletion cost is the percentage of revenue method. Because firms use this method only for income tax purposes and not for financial statements, we do not discuss it in this text.

Companies depreciate plant assets erected on extractive industry property the same as other depreciable assets. If such assets will be abandoned when the natural resource is exhausted, they depreciate these assets over the shorter of the (a) physical life of the asset or (b) life of the natural resource. In many cases, firms compute periodic depreciation charges using the units-of-production method. Using this method matches the life of the plant asset with the life of the natural resource. This method is recommended where the physical life of the plant asset equals or exceeds the resource's life but its useful life is limited to the life of the natural resource.

Assume a mining company acquires mining property with a building it plans to use only in the mining operations. Also assume that the firm uses the units-of-production method for computing building depreciation.

Relevant facts are:

Building cost	\$310,000
Estimated physical life of building	20      year s
Estimated salvage value of building (after mine is exhausted)	\$ 10,000
Capacity of mine	1,000,000    tons
Expected life of mine	10      year s

<sup>35</sup> Instead of crediting the accumulated depletion account, the Ore Deposits account could have been credited directly. But for reasons indicated earlier, the credit is usually to an accumulated depletion account.

## 11. Plant asset disposals, natural resources, and intangible assets

Because the life of the mine (10 years or 1,000,000 tons) is shorter than the life of the building (20 years), the building should be depreciated over the life of the mine. The basis of the depreciation charge is tons of ore rather than years because the mine's life could be longer or shorter than 10 years, depending on how rapidly the ore is removed.

Suppose that during the first year of operations, workers extracted 150,000 tons of ore. Building depreciation for the first year is USD 45,000, computed as follows:

$$\begin{aligned} \text{Depreciation per unit} &= \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Total tons of ore in mine that can be economically extracted}} \\ &= \frac{\$310,000 - \$10,000}{1,000,000} \text{ tons} = \$0.30 \text{ per ton} \end{aligned}$$

$$\text{Depreciation for year} = \text{Depreciation per unit} \times \text{Units extracted}$$

$$\text{USD } 0.30 \text{ per ton} \times 150,000 \text{ tons} = \text{USD } 45,000$$

On the income statement, depreciation on the building appears as part of the cost of ore sold and is carried as part of inventory cost for ore not sold during the period. On the balance sheet, accumulated depreciation on the building appears with the related asset account.

Plant assets and natural resources are tangible assets used by a company to produce revenues. A company also may acquire intangible assets to assist in producing revenues.

### Intangible assets

Although they have no physical characteristics, **intangible assets** have value because of the advantages or exclusive privileges and rights they provide to a business. Intangible assets generally arise from two sources: (1) exclusive privileges granted by governmental authority or by legal contract, such as patents, copyrights, franchises, trademarks and trade names, and leases; and (2) superior entrepreneurial capacity or management know-how and customer loyalty, which is called goodwill.

All intangible assets are nonphysical, but not all nonphysical assets are intangibles. For example, accounts receivable and prepaid expenses are nonphysical, yet classified as current assets rather than intangible assets. Intangible assets are generally both nonphysical and noncurrent; they appear in a separate long-term section of the balance sheet entitled "Intangible assets".

Initially, firms record intangible assets at cost like most other assets. However, computing an intangible asset's acquisition cost differs from computing a plant asset's acquisition cost. Firms may include only outright purchase costs in the acquisition cost of an intangible asset; the acquisition cost does not include cost of internal development or self-creation of the asset. If an intangible asset is internally generated in its entirety, none of its costs are capitalized. Therefore, some companies have extremely valuable assets that may not even be recorded in their asset accounts. To explain the reasons for this practice, we discuss the history of accounting for research and development costs next.

**Research and development (R&D) costs** are costs incurred in a planned search for new knowledge and in translating such knowledge into new products or processes. Prior to 1975, businesses often capitalized research and development costs as intangible assets when future benefits were expected from their incurrence. Due to the difficulty of determining the costs applicable to future benefits, many companies expensed all such costs as incurred. Other companies capitalized those costs that related to proven products and expensed the rest as incurred.

As a result of these varied accounting practices, in 1974 the Financial Accounting Standards Board in *Statement No. 2* ruled that firms must expense all research and development costs when incurred, unless they were directly reimbursable by government agencies and others. Immediate expensing is justified on the grounds that (1) the amount of costs applicable to the future cannot be measured with any high degree of precision; (2) doubt exists as to whether any future benefits will be received; and (3) even if benefits are expected, they cannot be measured. Thus, research and development costs no longer appear as intangible assets on the balance sheet. The Board applies the same line of reasoning to other costs associated with internally generated intangible assets, such as the internal costs of developing a patent.

**Amortization** is the systematic write-off of the cost of an intangible asset to expense. A portion of an intangible asset's cost is allocated to each accounting period in the economic (useful) life of the asset. All intangible assets are not subject to amortization. Only recognized intangible assets with finite useful lives are amortized. The **finite useful life** of such an asset is considered to be the length of time it is expected to contribute to the cash flows of the reporting entity. (Pertinent factors that should be considered in estimating useful life include legal, regulatory, or contractual provisions that may limit the useful life). The method of amortization should be based upon the pattern in which the economic benefits are used up or consumed. If no pattern is apparent, the straight-line method of amortization should be used by the reporting entity.

Recognized intangible assets deemed to have indefinite useful lives are not to be amortized. Amortization will however begin when it is determined that the useful life is no longer indefinite. The method of amortization would follow the same rules as intangible assets with finite useful lives.<sup>36</sup>

Straight-line amortization is calculated the same was as straight-line depreciation for plant assets. Generally, we record amortization by debiting Amortization Expense and crediting the intangible asset account. An accumulated amortization account could be used to record amortization. However, the information gained from such accounting would not be significant because normally intangibles do not account for as many total asset dollars as do plant assets.

A **patent** is a right granted by the federal government. This exclusive right enables the owner to manufacture, sell, lease, or otherwise benefit from an invention for a limited period. The value of a patent lies in its ability to produce revenue. Patents have a legal life of 17 years. Protection for the patent owner begins at the time of patent application and lasts for 17 years from the date the patent is granted.

When purchasing a patent, a company records it in the Patents account at cost. The firm also debits the Patents account for the cost of the first successful defense of the patent in lawsuits (assuming an outside law firm was hired rather than using internal legal staff). Such a lawsuit establishes the validity of the patent and thereby increases its service potential. In addition, the firm debits the cost of any competing patents purchased to ensure the revenue-generating capability of its own patent to the Patents account.

The firm would amortize the cost of a purchased patent over its finite life which reasonably would not exceed its legal life. If a patent cost USD 40,000 and has a useful life of 10 years, the journal entries to record the patent and periodic amortization are:

Patents (+A)	40,000	
Cash (-A)		40,000
To record purchases of patent.		

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36 FASB, *SFAS No. 142*. "Goodwill and Other Intangible Assets" (CT: FASB, June 2001), par. 11.

## 11. Plant asset disposals, natural resources, and intangible assets

Patient Amortization Expense (-SE)	4,000	
Patents (-A)		4,000
To record annual patent amortization.		

For a patent that becomes worthless before it is fully amortized, the company expenses the unamortized balance in the Patents account.

As noted earlier, all R&D costs incurred in the internal development of a product, process, or idea that is later patented must be expensed, rather than capitalized. In the previous example, the company amortized the cost of the purchased patent over its useful life of 10 years. If the patent had been the result of an internally generated product or process, the firm would have expensed its cost of USD 40,000 as incurred, in accordance with *Statement No. 2* of the Financial Accounting Standards Board.

A **copyright** is an exclusive right granted by the federal government giving protection against the illegal reproduction by others of the creator's written works, designs, and literary productions. The finite useful life for a copyright extends to the life of the creator plus 50 years.<sup>37</sup> Most publications have a limited (finite) life; a creator may amortize the cost of the copyright to expense on a straight-line basis or based upon the pattern in which the economic benefits are used up or consumed.

A **franchise** is a contract between two parties granting the franchisee (the purchaser of the franchise) certain rights and privileges ranging from name identification to complete monopoly of service. In many instances, both parties are private businesses. For example, an individual who wishes to open a hamburger restaurant may purchase a McDonald's franchise; the two parties involved are the individual business owner and McDonald's Corporation. This franchise would allow the business owner to use the McDonald's name and golden arch, and would provide the owner with advertising and many other benefits. The legal life of a franchise may be limited by contract.

The parties involved in a franchise arrangement are not always private businesses. A government agency may grant a franchise to a private company. A city may give a franchise to a utility company, giving the utility company the exclusive right to provide service to a particular area.

In addition to providing benefits, a franchise usually places certain restrictions on the franchisee. These restrictions generally are related to rates or prices charged; also they may be in regard to product quality or to the particular supplier from whom supplies and inventory items must be purchased.

If periodic payments to the grantor of the franchise are required, the franchisee debits them to a Franchise Expense account. If a lump-sum payment is made to obtain the franchise, the franchisee records the cost in an asset account entitled Franchise and amortizes it over the finite useful life of the asset. The legal life (if limited by contract) and the economic life of the franchise may limit the finite useful life.

A **trademark** is a symbol, design, or logo used in conjunction with a particular product or company. A **trade name** is a brand name under which a product is sold or a company does business. Often trademarks and trade names are extremely valuable to a company, but if they have been internally developed, they have no recorded asset cost. However, when a business purchases such items from an external source, it records them at cost and amortizes them over their finite useful life.

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<sup>37</sup> In 1998 Congress changed the period from 50 to 70 years. At this writing, the Supreme Court was reviewing the constitutionality of this change.

A **lease** is a contract to rent property. The property owner is the grantor of the lease and is the lessor. The person or company obtaining rights to possess and use the property is the lessee. The rights granted under the lease are a **leasehold**. The accounting for a lease depends on whether it is a capital lease or an operating lease.

**Capital leases** A **capital lease** transfers to the lessee virtually all rewards and risks that accompany ownership of property. A lease is a capital lease if, among other provisions, it (1) transfers ownership of the leased property to the lessee at the end of the lease term or (2) contains a bargain purchase option that permits the lessee to buy the property at a price significantly below fair market value at the end of the lease term.

A capital lease is a means of financing property acquisitions; it has the same economic impact as a purchase made on an installment plan. Thus, the lessee in a capital lease must record the leased property as an asset and the lease obligation as a liability. Because a capital lease is an asset, the lessee depreciates the leased property over its useful life. The lessee records part of each lease payment as interest expense and the balance as a payment on the lease liability.

The proper accounting for capital leases for both lessees and lessors has been an extremely difficult problem. We leave further discussion of capital leases for an intermediate accounting text.

**Operating leases** A lease that does not qualify as a capital lease is an **operating lease**. A one-year lease on an apartment and a week's rental of an automobile are examples of operating leases. Such leases make no attempt to transfer any of the rewards and risks of ownership to the lessee. As a result, there may be no recordable transaction when a lease is signed.

In some situations, the lease may call for an immediate cash payment that must be recorded. Assume that a business signed a lease requiring the immediate payment of the annual rent of USD 15,000 for each of the first and fifth years of a five-year lease. The lessee would record the payment as follows:

Prepaid Rent (+A)	15,000	
Leasehold (+A)	15,000	
Cash (-A)		30,000
To record first and fifth years' rent on a five-year lease.		

Since the Leasehold account is actually a long-term prepaid rent account for the fifth year's annual rent, it is an intangible asset until the beginning of the fifth year. Then the Leasehold account becomes a current asset and may be transferred into a Prepaid Rent account. Accounting for the balance in the Leasehold account depends on the terms of the lease. In the previous example, the firm would charge the USD 15,000 in the Leasehold account to expense over the fifth year only. It would charge the balance in Prepaid Rent to expense in the first year. Thus, assuming the lease year and fiscal year coincide, the entry for the first year is:

Rent Expense (-SE)	15,000	
Prepaid Rent (-A)		15,000
To record rent expense.		

The entry in the fifth year is:

Rent Expense (-SE)	15,000	
Leasehold (-A)		15,000
To record rent expense.		

The accounting for the second, third, and fourth years would be the same as for the first year. The lessee records the rent in Prepaid Rent when paid in advance for the year and then expenses it. As stated above, the lessee may

## 11. Plant asset disposals, natural resources, and intangible assets

transfer the amount in the Leasehold account to Prepaid Rent at the beginning of the fifth year by debiting Prepaid Rent and crediting Leasehold. If this entry was made, the previous entry would have credited Prepaid Rent.

In some cases, when a lease is signed, the lump-sum payment does not cover a specific year's rent. The lessee debits this payment to the Leasehold account and amortizes it over the life of the lease. The straight-line method is required unless another method can be shown to be superior. Assume the USD 15,000 rent for the fifth year in the example was, instead, a lump-sum payment on the lease in addition to the annual rent payments. An annual adjusting entry to amortize the USD 15,000 over five years would read:

Rent Expense (-SE)	3,000	
Leasehold (-A)		3,000
To amortize leasehold.		

In this example, the annual rental expense is USD 18,000: USD 15,000 annual cash rent plus USD 3,000 amortization of leasehold (USD 15,000/5).

The lessee may base periodic rent on current-year sales or usage rather than being a constant amount. For example, if a lease called for rent equal to 5 per cent of current-year sales and sales were USD 400,000 in 2010, the rent for 2010 would be USD 20,000. The rent would either be paid or an adjusting entry would be made at the end of the year.

A **leasehold improvement** is any physical alteration made by the lessee to the leased property in which benefits are expected beyond the current accounting period. Leasehold improvements made by a lessee usually become the property of the lessor after the lease has expired. However, since leasehold improvements are an asset of the lessee during the lease period, the lessee debits them to a Leasehold Improvements account. The lessee then amortizes the leasehold improvements to expense over the period benefited by the improvements. The amortization period for leasehold improvements should be the shorter of the life of the improvements or the life of the lease. If the lease can (and probably will) be renewed at the option of the lessee, the life of the lease should include the option period.

As an illustration, assume that on 2010 January 2, Wolf Company leases a building for 20 years under a nonrenewable lease at an annual rental of USD 20,000, payable on each December 31. Wolf immediately incurs a cost of USD 80,000 for improvements to the building, such as interior walls for office separation, ceiling fans, and recessed lighting. The improvements have an estimated life of 30 years. The company should amortize the USD 80,000 over the 20-year lease period, since that period is shorter than the life of the improvements, and Wolf cannot use the improvements beyond the life of the lease. If only annual financial statements are prepared, the following journal entry properly records the rental expense for the year ended 2010 December 31:

Rent Expense (or Leasehold Improvement Expense) (-SE)	4,000	
Leasehold Improvements (-A)		4,000
To record amortization of leasehold improvement.		
Rent Expense (-SE)	20,000	
Cash (-A)		20,000
To record annual rent.		

Thus, the total cost to rent the building each year equals the USD 20,000 cash rent plus the amortization of the leasehold improvements.



Although leaseholds are intangible assets, leaseholds and leasehold improvements sometimes appear in the property, plant, and equipment section of the balance sheet.

In accounting, **goodwill** is an intangible value attached to a company resulting mainly from the company's management skill or know-how and a favorable reputation with customers. A company's value may be greater than the total of the fair market value of its tangible and identifiable intangible assets. This greater value means that the company generates an above-average income on each dollar invested in the business. Thus, proof of a company's goodwill is its ability to generate superior earnings or income.

A goodwill account appears in the accounting records only if goodwill has been purchased. A company cannot purchase goodwill by itself; it must buy an entire business or a part of a business to obtain the accompanying intangible asset, goodwill.

To illustrate, assume that Lenox Company purchased all of Martin Company's assets for USD 700,000. Lenox also agreed to assume responsibility for a USD 350,000 mortgage note payable owed by Martin. Goodwill is the difference between the amount paid for the business including the debt assumed (USD 700,000 + USD 350,000 = USD 1,050,000) and the fair market value of the assets purchased. Notice that Lenox would use the fair market value of the assets rather than book value to determine the amount of goodwill. The following computation is for the goodwill purchased by Lenox:

Cash paid		\$ 700,000
Mortgage note payable		350,000
Total price paid		\$1,050,000
Less fair market values of individually identifiable assets:		
Accounts receivable	\$ 95,000	
Merchandise inventory	100,000	
Land	240,000	
Buildings	275,000	
Equipment	200,000	
Patents	65,000	975,000
Goodwill		\$ 75,000

The USD 75,000 is the goodwill Lenox records as an intangible asset; it records all of the other assets at their fair market values, and the liability at the amount due.

**ANY COMPANY**

**Partial Balance Sheet**

**2010 June 30**

Property, plant, and equipment			
Land		\$ 30,000	
Buildings	\$ 75,000		
Less: Accumulated depreciation	45,000	30,000	
Equipment	\$ 9,000		
Less: Accumulated depreciation	1,500	7,500	
Total property, plant, and equipment			\$ 67,500
Natural resources:			
Mineral deposits		\$300,000	
Less: Accumulated depreciation		100,000	
Total natural resources			\$200,000
			0
Intangible assets:			
Patents		\$ 10,000	
Goodwill		20,000	\$ 30,000
Total intangible assets			

**Exhibit 94: Partial balance sheet**

Specific reasons for a company's goodwill include a good reputation, customer loyalty, superior product design, unrecorded intangible assets (because they were developed internally), and superior human resources. Since these positive factors are not individually quantifiable, when grouped together they constitute goodwill. The journal entry to record the purchase is:

Accounts Receivable (+A)	95,000	
Merchandise Inventory (+A)	100,000	
Land (+A)	240,000	
Buildings (+A)	275,000	
Equipment(+A)	200,000	
Patents (+A)	65,000	
Goodwill(+A)	75,000	
Cash (-A)		700,000
Mortgage Note Payable (+L)		350,000

To record the purchase of Martin Company's assets and assumption of mortgage note payable.

The intangible asset goodwill is not amortized. Goodwill is to be tested periodically for impairment. The amount of any goodwill impairment loss is to be recognized in the income statement as a separate line before the subtotal income from continuing operations (or similar caption).<sup>38</sup> The goodwill account would be reduced by the same amount.<sup>39</sup>

Look at Exhibit 94, a partial balance sheet for ANY company. Unlike plant assets or natural resources, intangible assets usually are a net amount in the balance sheet.

<sup>38</sup> Discussion of testing for impairment is beyond the scope of this text. For more information on such testing see *SFAS No. 142*.

<sup>39</sup> *SFAS No. 142*, par. 18.

## 11. Plant asset disposals, natural resources, and intangible assets

### Analyzing and using the financial results—Total assets turnover

In determining the productivity of assets, management may compare one year's assets turnover ratio to a previous year's. **Total assets turnover** shows the relationship between the dollar volume of sales and the average total assets used in the business. To calculate this ratio:

$$\text{Total assets turnover} = \frac{\text{Net sales}}{\text{Average total assets}}$$

This ratio indicates the efficiency with which a company uses its assets to generate sales. When the ratio is low relative to industry standards or the company's ratio in previous years, it could indicate an over-investment in assets, a slow year in sales, or both. Thus, if the ratio is relatively low and there was no significant decrease in sales during the current year, management should identify and dispose of any inefficient equipment.

The total assets turnover in a recent year for several actual companies was as follows:

Company	Net Sales (\$ thousands)	Total Assets (\$ thousands)		Average	Turnover
		Beginning of Year	End of Year		
Procter & Gamble	\$ 39,244,000	\$ 34,366,000	\$	\$	109.41%
Tyco International	28,931,900	32,344,300	40,404,300	36,374,300	79.54%
Kimball International	1,261,171	723,651	678,984	701,318	179.83%

These three companies compete in very different industries. However, they are all manufacturers. To see if each of these companies is performing above standard, management should compare its company's percentage to the industry's standard. In addition, calculating this ratio over approximately five years would help management see any trends indicating problems or confirm successful asset management.

This chapter concludes your study of accounting for long-term assets. In Chapter 12, you learn about classes of capital stock.

#### Understanding the learning objectives

- By comparing an asset's book value (cost less up-to-date accumulated depreciation) with its sales price, the company may show either a gain or a loss. If sales price is greater than book value, the company shows a gain. If sales price is less than book value, the company shows a loss. If sales price equals book value, no gain or loss results.
- When a plant asset is retired from service, the asset's cost and accumulated depreciation must be removed from the plant asset accounts.
- Plant assets are sometimes wrecked in accidents or destroyed by fire, flood, storm, and other causes. If the asset was not insured, the loss is equal to the book value. If the asset was insured, only the amount of the loss exceeding the amount to be recovered from the insurance company would be debited to a loss account.
- In exchanges of nonmonetary assets having commercial substance, the firm records the asset received at either (1) the stated cash price of the new asset or (if the cash price is not stated) (2) the known fair market value of the asset given up plus any cash paid.
- In exchanges of nonmonetary assets not having commercial substance, the firm records the new asset at the book value of the old asset plus the cash paid.

### An ethical perspective: ABC corporation

In 2010, prior to the tax law change permitting the amortization of goodwill for tax purposes, ABC Corporation acquired XYZ Company for USD 10,000,000 cash. ABC acquired the following assets:

	<b>Old Book Value</b>	<b>Fair Market Value</b>
Accounts receivable		\$80,000
Merchandise inventory	\$ 200,000	\$ 300,000
Buildings	3,000,000	4,000,000
Land	1,000,000	3,000,000
Equipment	500,000	700,000

An experienced appraiser with an excellent reputation established the fair market value of the assets. ABC also assumed the liability for paying XYZ's USD 50,000 of accounts payable.

John Gilbert, ABC's accountant, prepared the following journal entry to record the purchase: In explaining the entry to ABC's president, Gilbert said that the assets had to be recorded at their fair market values. He also stated that the goodwill could not be amortized for accounting purposes or tax purposes.

Accounts Receivable	80,000	
(+A)		
Merchandise Inventory	300,000	
(+A)		
Buildings (+A)	4,000,000	
Land (+A)	3,000,000	
Equipment (+A)	700,000	
Goodwill (+A)	1,970,000	
Accounts Payable (+L)		50,000
Cash (-A)		10,000,000
To record the purchase of XYZ Company.		

The president reacted with, "It is not fair that we are prohibited from amortizing goodwill when it is a part of the cost of the purchase. Besides, appraisals are very inexact, and maybe some of our other assets are worth more than the one appraiser indicated. I want you to reduce goodwill down to USD 470,000 and assign the other USD 1,500,000 to the buildings and equipment. Then, we can benefit from the depreciation on these assets. If I need to find an appraiser who will support the new allocations, I will."

When Gilbert protested, the president stated, "If you are going to have a future with us, you need to be a team player. We just cannot afford to lose those tax deductions." Gilbert feared that if he did not go along, he would soon be unemployed.

## 11. Plant asset disposals, natural resources, and intangible assets

- Depletion charges usually are computed by the units-of-production method. Total cost is divided by the estimated number of units that are economically extractable from the property. This calculation provides a per unit depletion cost that is multiplied by the units extracted each year to obtain the depletion cost for that year.
- Depreciable assets located on extractive industry property should be depreciated over the shorter of the (1) physical life of the asset or (2) life of the natural resource. The periodic depreciation charges usually are computed using the units-of-production method. Using this method matches the life of the plant asset with the life of the natural resource.
- Only outright purchase costs are included in the acquisition cost of an intangible asset. If an intangible asset is internally generated, its cost is immediately expensed.
- Intangibles should be amortized over their finite useful lives. The method of amortization should be based upon the pattern in which the economic benefits are used up. If no pattern is apparent, straight-line amortization should be used.
- $$\text{Total assets turnover} = \frac{\text{Net sales}}{\text{Average total assets}}$$
- This ratio indicates the efficiency with which a company uses its assets to generate sales.

### Demonstration problem

**Demonstration problem A** On 2007 January 2, Darton Company purchased a machine for USD 36,000 cash. The machine has an estimated useful life of six years and an estimated salvage value of USD 1,800. Darton uses the straight-line method of depreciation.

- Compute the book value of the machine as of 2010 July 1.
- Assume the machine was disposed of on 2010 July 1. Prepare the journal entries to record the disposal of the machine under each of the following unrelated assumptions:
  - The machine was sold for USD 12,000 cash.
  - The machine was sold for USD 18,000 cash.
  - The machine and USD 24,000 cash were exchanged for a new machine that had a cash price of USD 39,000. The exchange has commercial substance.
  - The machine was completely destroyed by fire. Darton expects to recover cash of USD 10,800 from the insurance company.

**Demonstration problem B** Howard Company acquired on 2010 January 1, a tract of property containing timber at a cost of USD 8,000,000. After the timber is removed, the land will be worth about USD 3,200,000 and will be sold to another party. Costs of developing the site were USD 800,000. A building was erected at a cost of USD 160,000. The building had an estimated physical life of 20 years and will have an estimated salvage value of USD 80,000 when the timber is gone. It was expected that 50,000,000 board feet of timber can be economically cut. During the first year, 16,000,000 board feet were cut. Howard uses the units-of-production basis to depreciate the building.

Prepare the entries to record:

- The acquisition of the property.
- The development costs.
- Depletion cost for the first year.
- Depreciation on the building for the first year.

**Demonstration problem C** On 2010 January 2, Bedford Company purchased a 10-year sublease on a warehouse for USD 30,000. Bedford will also pay annual rent of USD 6,000. Bedford immediately incurred costs of USD 20,000 for improvements to the warehouse, such as lighting fixtures, replacement of a ceiling, heating system, and loading dock. The improvements have an estimated life of 12 years and no residual value.

Prepare the entries to record:

- a. The payment for the sublease on a warehouse.
- b. The rent payment for the first year.
- c. The payment for the improvements.
- d. Amortization of the leasehold for the first year.
- e. Amortization of the leasehold improvements for the first year.

**Solution to demonstration problem**

**Solution to demonstration problem A**

a.	<b>DARTON COMPANY</b>		
	<b>Schedule to Compute Book Value</b>		
	<b>2010 July 1</b>		
	Cost	\$ 36,000	
	Less accumulated depreciation:		
	(\$35,000 - \$1,800)/6 years= \$5,700 per year	19,950	
	\$5,700 X 31 1/2 years = \$19,950	\$ 16,050	
	Book value		
b. (1)	Cash (+A)	12,000	
	Accumulated Depreciation—Machinery (+A)	19,950	
	Loss from Disposal of Plant Assets (-SE)	4,050	36,000
	Machinery (-A)		
	To record the sale of machinery at loss.		
(2)	Cash (+A)	18,000	
	Accumulated Depreciation—Machinery (+A)	19,950	36,000
	Machinery (-A)		1,950
	Gain on Disposal of Plant Assets (+SE)		
	To record sale of machinery at a gain.		

## 11. Plant asset disposals, natural resources, and intangible assets

Machinery (new) (+A)	39,000	
Accumulated Depreciation—Machinery (+A)	19,950	
Loss from Disposal of Plant Asset (-SE)	1,050	
Machinery (old) (-A)		36,000
Cash (-A)		24,000

To record exchange of machines.

The exchange has commercial substance.

Receivable from Insurance Company (+A)	10,800	
Accumulated Depreciation—Machinery (+A)	19,950	
Fire Loss (-SE)	5,250	
Machinery (-A)		36,000

To record loss of machinery.

### Solution to demonstration problem B

a.	Land (+A)	3,200,00	
	Timber Stands (+A)	0	
	Cash (-A)	4,800,00	8,000,00
	To record purchase of land and timber.	0	0
b.	Timber Stands (+A)	800,000	
	Cash (-A)		800,000
	To record costs of development of the site.		
c.	Depletion (-SE)	1,792,00	
	Accumulated Depletion—Timber Stands (-A)	0	1,792,00
	To record depletion for 2007.		0
	$(\$4,800,000 + \$800,000/50,000,000 = \$0.112 \text{ per board foot.})$		
	$\$0.112 \times 16,000,000 = \$1,792,000.$		
d.	Depreciation Expense—Buildings (-SE)	25,600	
	Accumulated Depreciation—Buildings (-A)		25,600
	To record depreciation expense:		
	$(\$160,000 - \$80,000)/50,000,000 \text{ board feet} = \$0.0016$		
	per board foot.		
	$\$0.0016 \times 16,000,000 = \$25,600.$		

### Solution to demonstration problem C

a.	Leasehold (+A)	30,000	
	Cash (-A)		30,000
	To record purchase of sublease on warehouse.		
b.	Rent Expense (-SE)	6,000	
	Cash (-A)		6,000
	To record annual rent payment.		
c.	Leasehold Improvements (+A)	20,000	
	Cash (-A)		20,000
	To record payment for leasehold improvements.		
d.	Rent Expense(-SE)	3,000	
	Leasehold (-A)		3,000
	To record leasehold amortization for 2007:		
	Annual amortization = $\$30,000/10 \text{ years}$		
	= $\$3,000$		
e.	Rent Expense (-SE)	2,000	
	Leasehold Improvements (+A)		2,000
	To amortize leasehold improvements:		
	Annual amortization = $\$20,000/10\text{years}$		
	= $\$2,000$		

## Key terms

**Amortization** The term used to describe the systematic write-off of the cost of an intangible asset to expense.

**Capital lease** A lease that transfers to the lessee virtually all of the rewards and risks that accompany ownership of property.

**Commercial substance** The result if an exchange of nonmonetary assets causes future cash flows to differ significantly.

**Copyright** An exclusive right granted by the federal government giving protection against the illegal reproduction by others of the creator's written works, designs, and literary productions.

**Depletion** The exhaustion of a natural resource; an estimate of the cost of the resource that was removed from its natural setting during the period.

**Finite Useful Life** Length of time an intangible asset is expected to contribute to the cash flows of the entity.

**Franchise** A contract between two parties granting the franchisee (the purchaser of the franchise) certain rights and privileges ranging from name identification to complete monopoly of service.

**Goodwill** An intangible value attached to a company resulting mainly from the company's management skill or know-how and a favorable reputation with customers. Evidenced by the ability to generate an above-average rate of income on each dollar invested in the business.

**Intangible assets** Items that have no physical characteristics but are of value because of the advantages or exclusive privileges and rights they provide to a business.

**Lease** A contract to rent property. Grantor of the lease is the lessor; the party obtaining the rights to possess and use property is the lessee.

**Leasehold** The rights granted under a lease.

**Leasehold improvement** Any physical alteration made by the lessee to the leased property in which benefits are expected beyond the current accounting period.

**Natural resources** Resources supplied by nature, such as ore deposits, mineral deposits, oil reserves, gas deposits, and timber stands supplied by nature.

**Operating lease** A lease that does not qualify as a capital lease.

**Patent** A right granted by the federal government giving the owner the exclusive right to manufacture, sell, lease, or otherwise benefit from an invention for a limited period.

**Research and development (R&D) costs** Costs incurred in a planned search for new knowledge and in translating such knowledge into a new product or process.

**Total assets turnover** Equal to Net sales/Average total assets. This ratio indicates the efficiency with which a company uses its assets to generate sales.

**Trademark** A symbol, design, or logo used in conjunction with a particular product or company.

**Trade name** A brand name under which a product is sold or a company does business.

**Wasting assets** See Natural resources.

## Self-test

### True-false

Indicate whether each of the following statements is true or false.

When a plant asset is still being used after it has been fully depreciated, depreciation can be taken in excess of its cost.

In an exchange of nonmonetary assets having commercial substance, the new asset is recorded at the fair market value of the asset received or the fair market value of the asset given up plus cash paid, whichever is more clearly evident.

In calculating depletion, the residual value of acquired land containing an ore deposit is included in total costs subject to depletion.

All recorded intangible assets are subject to amortization.



## 11. Plant asset disposals, natural resources, and intangible assets

### Multiple-choice

Select the best answer for each of the following questions.

When a fully depreciated asset is still in use:

- a. Prior years' depreciation should be adjusted.
- b. The cost should be adjusted to market value.
- c. Part of the depreciation should be reversed.
- d. The cost and accumulated depreciation should remain in the ledger and no more depreciation should be taken.
- e. It should be written off the books.

A truck costing USD 45,000 and having an estimated salvage value of USD 4,500 and an original life of five years is exchanged for a new truck. The cash price of the new truck is USD 57,000, and a trade-in allowance of USD 22,500 is received. The old truck has been depreciated for three years using the straight-line method. The new truck would be recorded at:

- a. USD 55,200.
- b. USD 57,000.
- c. USD 34,500.
- d. USD 43,200.
- e. None of the above.

Land containing a mine having an estimated 1,000,000 tons of economically extractable ore is purchased for USD 375,000. After the ore deposit is removed, the land will be worth USD 75,000. If 100,000 tons of ore are mined and sold during the first year, the depletion cost charged to expense for the year is:

- a. USD 300,000.
- b. USD 37,500.
- c. USD 30,000.
- d. USD 375,000.
- e. None of the above.

Bren Company purchased a patent for USD 36,000. The patent is expected to have a finite life of 10 years even though its legal life is 17 years. The amortization for the first year is:

- a. USD 36,000.
- b. USD 3,600.
- c. USD 2,118.
- d. USD 3,240.
- e. None of the above.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- When depreciable plant assets are sold for cash, how is the gain or loss measured?
- A plant asset that cost USD 27,000 and has a related accumulated depreciation account balance of USD 27,000 is still being used in business operations. Would it be appropriate to continue recording

depreciation on this asset? Explain. When should the asset's cost and accumulated depreciation be removed from the accounting records?

- A machine and USD 22,500 cash were exchanged for a delivery truck. The exchange has commercial substance. How should the cost basis of the delivery truck be measured?
- A plant asset was exchanged for a new asset of a similar type. How is the cost of the new asset determined?
- When nonmonetary assets not having commercial substance are exchanged, a resulting gain is not recognized. Discuss why this is so.
- What is the proper accounting treatment for the costs of removing or dismantling a company's old plant assets?
  - Distinguish between depreciation, depletion, and amortization. Name two assets that are subject to depreciation, to depletion, and to amortization.
  - Distinguish between tangible and intangible assets, and classify the assets named in part (a) accordingly.
- A building with an estimated physical life of 40 years was constructed at the site of a coal mine. The coal mine is expected to be completely exhausted within 20 years. Over what length of time should the building be depreciated, assuming the building will be abandoned after all the coal has been extracted?
- What are the characteristics of intangible assets? Give an example of an asset that has no physical existence but is not classified as an intangible asset.
- What reasons justify the immediate expensing of most research and development costs?
- Over what length of time should intangible assets be amortized?
- Should costs incurred on internally generated intangible assets be capitalized in asset accounts?
- Describe the typical accounting for a patent.
- During 2010, Hardy Company incurred USD 123,000 of research and development costs in its laboratory to develop a patent that was granted on 2010 December 29. Legal fees (outside counsel) and other costs associated with registration of the patent totaled USD 22,800. What amount should be recorded as a patent on 2010 December 29?
- What is a capital lease? What features may characterize a capital lease?
- What is the difference between a leasehold (under an operating lease contract) and a leasehold improvement? Is there any difference in the accounting procedures applicable to each?
- Walt Company leased a tract of land for 40 years at an agreed annual rental fee of USD 18,000. The effective date of the lease was 2009 July 1. During the last six months of 2009, Walt constructed a building on the land at a cost of USD 450,000. The building was placed in operation on 2010 January 2, at which time it was estimated to have a physical life of 50 years. Over what period should the building be depreciated? Why?
- You note that a certain store seems to have a steady stream of regular customers, a favorable location, courteous employees, high-quality merchandise, and a reputation for fairness in dealing with customers, employees, and suppliers. Does it follow automatically that this business should have goodwill recorded as an asset? Explain.

## 11. Plant asset disposals, natural resources, and intangible assets

### Exercises

**Exercise A** Plant equipment originally costing USD 32,400, on which USD 21,600 of up-to-date depreciation has been accumulated, was sold for USD 8,100.

- Prepare the journal entry to record the sale.
- Prepare the entry to record the sale of the equipment if USD 90 of removal costs were incurred to allow the equipment to be moved.

**Exercise B** On 2009 August 31, Hutch Company sold a truck for USD 6,900 cash. The truck was acquired on 2006 January 1, at a cost of USD 17,400. Depreciation of USD 10,800 on the truck has been recorded through 2008 December 31, using the straight-line method, four-year expected useful life, and an expected salvage value of USD 3,000.

Prepare the journal entries to update the depreciation on the truck on 2009 August 31, and to record the sale of the truck.

**Exercise C** A machine costing USD 120,000, on which USD 90,000 of up-to-date depreciation has been accumulated, was completely destroyed by fire. What journal entry should record the machine's destruction and the resulting fire loss under each of the following unrelated assumptions?

- The machine was not insured.
- The machine was insured, and it is estimated that USD 22,500 will be recovered from the insurance company.

**Exercise D** Kale Company owned an automobile acquired on 2007 January 1, at a cash cost of USD 35,100; at that time, the automobile was estimated to have a useful life of four years and a USD 2,700 salvage value. Depreciation has been recorded through 2009 December 31, on a straight-line basis. On 2010 January 1, the automobile was traded for a new automobile. The old automobile had a fair market value (trade-in allowance) of USD 6,750. Cash of USD 31,050 was paid. The exchange has commercial substance.

Prepare the journal entry to record the trade-in under generally accepted accounting principles.

**Exercise E** Equipment costing USD 330,000, on which USD 225,000 of up-to-date accumulated depreciation has been recorded, was disposed of on 2009 January 2. What journal entries are required to record the equipment's disposal under each of the following unrelated assumptions?

- The equipment was sold for USD 120,000 cash.
- The equipment was sold for USD 87,000 cash.
- The equipment was retired from service and hauled to the junkyard. No material was salvaged.
- The equipment was exchanged for similar equipment having a cash price of USD 450,000. A trade-in allowance of USD 150,000 from the cash price was received, and the balance was paid in cash. The exchange has no commercial substance.
- The equipment was exchanged for similar equipment having a cash price of USD 450,000. A trade-in allowance of USD 75,000 was received, and the balance was paid in cash. The exchange has commercial substance.

**Exercise F** Nola Mining Company purchased a tract of land containing ore for USD 630,000. After spending USD 90,000 in exploration costs, the company determined that 600,000 tons of ore existed on the tract but only 500,000 tons could be economically removed. No other costs were incurred. When the company finishes with the tract, it estimates the land will be worth USD 180,000. Determine the depletion cost per ton.

**Exercise G** Boyd Company paid USD 7,200,000 for the right to extract all of the mineral-bearing ore, estimated at 10 million tons, that can be economically extracted from a certain tract of land. During the first year,

Boyd Company extracted 1,000,000 tons of the ore and sold 800,000 tons. What part of the USD 7,200,000 should be charged to expense during the first year?

**Exercise H** The Slate Mining Company acquired a tract of land for mining purposes and erected a building on-site at a cost of USD 675,000 and having no salvage value. Though the building has a useful life of 10 years, the mining operations are expected to last only 6 years. The company has determined that 800,000 tons of ore exist on the tract but only 600,000 tons can be economically removed. If 100,000 tons of ore are extracted in the first year of operations, what is the appropriate depreciation charge using the units-of-production method?

**Exercise I** Talse Company purchased a patent on 1995 January 1, at a total cost of USD 61,200. In 2006 January, the company hired an outside law firm and successfully defended the patent in a lawsuit. The legal fees amounted to USD 13,500. What will be the amount of patent cost amortized in 2009? (The finite useful life of the patent is the same as its legal life—17 years.)

**Exercise J** Don Jackson paid Hungry Hannah's Hamburgers USD 54,000 for the right to operate a fast-food restaurant in Thomasville under the Hungry Hannah's name. Jackson also agreed to pay an operating fee of 0.5 per cent of sales for advertising and other services rendered by Hungry Hannah's. Jackson began operations on 2009 January 2. Sales for 2009 amounted to USD 540,000. The finite useful life of the franchise is 40 years.

Give the entries to record the payment of the USD 54,000 and to record expenses incurred relating to the right to use the Hungry Hannah's name.

**Exercise K** Lem Company leased the first three floors in a building under an operating lease contract for a 10-year period beginning 2009 January 1. The company paid USD 240,000 in cash (not representing a specific period's rent) and agreed to make annual payments equal to 1 per cent of the first USD 1,500,000 of sales and 0.5 per cent of all sales over USD 1,500,000. Sales for 2009 amounted to USD 4,500,000. Payment of the annual amount will be made in January 2010.

Prepare journal entries to record the cash payment of 2009 January 1, and the proper expense to be recognized for the use of the space in the leased building for 2009.

**Exercise L** Rye Company purchased all of the assets of Shef Company for USD 900,000. Rye Company also agreed to assume responsibility for Shef Company's liabilities of USD 90,000. The fair market value of the assets acquired was USD 810,000. How much goodwill should be recorded in this transaction? Give the journal entry to record this transaction.

### Problems

**Problem A** Orr Company traded in an automobile that cost USD 18,000 and on which USD 15,000 of up-to-date depreciation has been recorded for a new automobile with a cash price of USD 34,500. The company received a trade-in allowance (its fair value) for the old automobile of USD 2,100 and paid the balance in cash. The exchange has commercial substance.

Record the exchange of automobiles.

**Problem B** On 2007 January 2, Blake Company purchased a delivery truck for USD 78,750 cash. The truck has an estimated useful life of six years and an estimated salvage value of USD 6,750. The straight-line method of depreciation is being used.

a. Prepare a schedule showing the computation of the book value of the truck on 2009 December 31.

b. Assume the truck is to be disposed of on 2010 July 1. Prepare the journal entry to record depreciation for the six months ended 2010 June 30.

11. Plant asset disposals, natural resources, and intangible assets

c. Prepare the journal entries to record the disposal of the truck on 2010 July 1, under each of the following unrelated assumptions:

- i. The truck was sold for USD 26,250 cash.
- ii. The truck was sold for USD 48,000 cash.
- iii. The truck was retired from service, and it is expected that USD 20,625 will be received from the sale of salvaged materials.
- iv. The truck and USD 60,000 cash were exchanged for office equipment that had a cash price of USD 105,000. The exchange has commercial substance.
- v. The truck and USD 67,500 cash were exchanged for a new delivery truck that had a cash price of USD 112,500. The exchange has no commercial substance.
- vi. The truck was completely destroyed in an accident. Cash of USD 25,500 is expected to be recovered from the insurance company.

**Problem C** Eagle Moving Company purchased a new moving van on 2009 October 1. The cash price of the new van was USD 33,750, and the company received a trade-in allowance of USD 5,600 for a 2007 model. The balance was paid in cash. The 2007 model had been acquired on 2007 January 1, at a cost of USD 22,500. Depreciation has been recorded through 2008 December 31, on a straight-line basis, with three years of expected useful life and no expected salvage value. The exchange has no commercial substance.

Prepare journal entries to update the depreciation and to record the exchange of the moving vans.

**Problem D** On 2009 January 1, Moyer Company had the following balances in some of its accounts:

	Asset	Accumulated Depreciation
Land	\$ 624,000	
Leasehold	780,000	
Buildings	3,425,760	\$ 286,650
Equipment	2,995,200	1,389,960
Trucks	449,280	158,790

- The leasehold covers a plot of ground leased on 2005 January 1, for a period of 20 years.
- Building No. 1 is on the owned land and was completed on 2008 July 1, at a cost of USD 1,965,600; its life is set at 40 years with no salvage value. Building No. 2 is on the leased land and was completed on 2005 July 1, at a cost of USD 1,460,160; its life is also set at 40 years with no expected salvage value.
- The equipment had an expected useful life of eight years with no estimated salvage value.
- Truck A, purchased on 2007 January 1, at a cost of USD 149,760, had an expected useful life of 2 1/2 years and a salvage value of USD 9,360. Truck B, purchased on 2007 July 1, at a cost of USD 131,040, had an expected life of two years and an estimated salvage value of USD 21,840. Truck C, purchased on 2008 July 1, at a cost of USD 168,480, had an expected life of three years and an estimated salvage value of USD 21,060.

The following transactions occurred in 2009:

Jan. 2 Rent for 2009 on leased land was paid, USD 87,360.

April 1 Truck B was traded in for truck D. The cash price of the new truck was USD 149,760. A trade-in allowance of USD 28,080 was granted from the cash price. The balance was paid in cash. Truck D has an expected life of 20 years and an estimated salvage value of USD 9,360. The exchange has commercial substance.

1 Truck A was sold for USD 28,080 cash.

Prepare journal entries to record the 2009 transactions and the necessary 2009 December 31, adjusting entries, assuming a calendar-year accounting period. Use the straight-line depreciation method.

**Problem D** On 2009 January 2, York Mining Company acquired land with ore deposits at a cash cost of USD 1,800,000. Exploration and development costs amounted to USD 192,000. The residual value of the land is expected to be USD 360,000. The ore deposits contain an estimated 6 million tons. Present technology will allow the economical extraction of only 85 per cent of the total deposit. Machinery, equipment, and temporary sheds were installed at a cost of USD 255,000. The assets will have no further value to the company when the ore body is exhausted; they have a physical life of 12 years. In 2007, 200,000 tons of ore were extracted. The company expects the mine to be exhausted in 10 years, with sharp variations in annual production.

- Compute the depletion charge for 2009. Round to the nearest cent.
- Compute the depreciation charge for 2009 under the units-of-production method.
- If all other mining costs, except depletion, amounted to USD 1,260,000, what was the average cost per ton mined in 2009? (The depreciation calculated in b is included in the USD 1,260,000.)

**Problem E** East Company spent USD 249,900 to purchase a patent on 2009 January 2. Management assumes that the patent's finite useful life is 17 years. In January 2010, the company hired an outside law firm and successfully defended the patent in a lawsuit at a cost of USD 48,000. Also, in January 2010, the company paid USD 72,000 to obtain patents that could, if used by competitors, make the earlier East patent useless. The purchased patents will never be used.

Give the entries for 2009 and 2010 to record the information relating to the patents.

**Problem F** Following are selected transactions and other data relating to Long Company for the year ended 2009 December 31.

- The company rented the second floor of a building for five years on 2009 January 2, and paid the annual rent of USD 18,000 for the first and fifth years in advance.
- In 2008, the company incurred legal fees of USD 54,000 paid to an outside law firm in applying for a patent and paid a fee of USD 18,000 to a former employee who conceived a device that substantially reduced the cost of manufacturing one of the company's products. The patent on the device has a market value of USD 540,000 and is expected to be useful for 10 years.
- In 2008, the company entered into a 10-year operating lease on several floors of a building, paying USD 36,000 in cash immediately and agreeing to pay USD 18,000 at the end of each of the 10 years of life in the lease. The company then incurred costs of USD 72,000 to install partitions, shelving, and fixtures. These items would normally last 25 years.
- The company spent USD 21,600 promoting a trademark in a manner that it believed enhanced the value of the trademark considerably. The trademark has an indefinite life.
- The company incurred costs amounting to USD 180,000 in 2008 and USD 234,000 in 2009 for research and development of new products that are expected to enhance the company's revenues for at least five years.
- The company paid USD 180,000 to the author of a book that the company published on 2009 July 2. Sales of the book are expected to be made over a two-year period from that date.

For each of the situations just described, prepare only the journal entries to record the expense applicable to 2009.

## 11. Plant asset disposals, natural resources, and intangible assets

### Alternate problems

**Alternate problem A** Ray, Inc., purchased a new 2010 model automobile on 2010 December 31. The cash price of the new automobile was USD 28,080, from which Ray received a trade-in allowance of USD 4,320 for a 2008 model traded in. The 2008 model had been acquired on 2008 January 1, at a cost of USD 20,700. Depreciation has been recorded on the 2008 model through 2009 December 31, using the straight-line method, an expected four-year useful life, and an expected salvage value of USD 2,700. The exchange has commercial substance.

- a. Record depreciation expense for 2010.
- b. Prepare the journal entries needed to record the exchange of automobiles.

**Alternate problem B** On 2007 January 1, Wood Company purchased a truck for USD 43,200 cash. The truck has an estimated useful life of six years and an expected salvage value of USD 5,400. Depreciation on the truck was computed using the straight-line method.

- a. Prepare a schedule showing the computation of the book value of the truck on 2009 December 31.
- b. Prepare the journal entry to record depreciation for the six months ended 2010 June 30.
- c. Prepare journal entries to record the disposal of the truck on 2010 June 30, under each of the following unrelated assumptions:

- (a) The truck was sold for USD 3,600 cash.
- (b) The truck was sold for USD 25,200 cash.
- (c) The truck was scrapped. Used parts valued at USD 6,660 were salvaged.
- (d) The truck (which has a fair market value of USD 10,800) and USD 32,400 of cash were exchanged for a used back hoe that did not have a known market value. The transaction has commercial substance.
- (e) The truck and USD 29,700 cash were exchanged for another truck that had a cash price of USD 51,300. The exchange has no commercial substance.
- (f) The truck was stolen July 1, and insurance proceeds of USD 7,560 were expected.

**Alternate problem C** Kine Company purchased a new Model II computer 2009 October 1. Cash price of the new computer was USD 24,960; Jackson received a trade-in allowance of USD 9,300 from the cash price for a Model I computer. The old computer was acquired on 2007 January 1, at a cost of USD 23,040. Depreciation has been recorded through 2008 December 31, on a straight-line basis, with an estimated useful life of four years and USD 3,840 expected salvage value. The exchange has commercial substance.

Prepare the journal entries to record the exchange.

**Alternate problem D** On 2009 July 1, Morgan Company had the following balances in some of its accounts:

	<b>Asset</b>	<b>Accumulated Depreciation</b>
Land	\$ 672,000	
Leasehold	252,000	
Buildings	3,151,680	\$369,768
Equipment	1,370,880	436,800
Trucks	238,560	71,652

The leasehold covers a plot of ground leased on 2004 July 1, for a period of 25 years under an operating lease.

The office building is on the leased land and was completed on 2005 July 1, at a cost of USD 967,680; its physical life is set at 40 years. The factory building is on the owned land and was completed on 2004 July 1, at a cost of USD 2,184,000; its life is also set at 40 years with no expected salvage value.

The equipment has a 15-year useful life with no expected salvage value.

The company owns three trucks—A, B, and C. Truck A, purchased on 2007 July 1, at a cost of USD 53,760, had an expected useful life of three years and a salvage value of USD 3,360. Truck B, purchased on 2008 January 2, at a cost of USD 84,000, had an expected life of four years and an estimated salvage value of USD 6,720. Truck C, purchased on 2009 January 2, at a cost of USD 100,800, had an expected life of five years and an estimated salvage value of USD 10,080.

The following transactions occurred in the fiscal year ended 2010 June 30:

2009

July 1 Rent for 2009 July 1, through 2010 June 30, on leased land was paid, USD 31,920.

Oct. 1 Truck A was traded in on truck D. Cash price of the new truck was USD 107,520. Cash of USD 90,720 was paid. Truck D has an expected life of four years and a salvage value of USD 5,880. The exchange has no commercial substance.

2010

Feb. 2 Truck B was sold for USD 47,040 cash.

June 1 Truck C was completely demolished in an accident. The truck was not insured.

Prepare journal entries to record these transactions and the necessary 2010 June 30, adjusting entries. Use the straight-line depreciation method.

**Alternate problem E** In December 2008, Brown Company acquired a mine for USD 2,700,000. The mine contained an estimated 10 million tons of ore. It was also estimated that the land would have a value of USD 240,000 when the mine was exhausted and that only 4 million tons of ore could be economically extracted. A building was erected on the property at a cost of USD 360,000. The building had an estimated useful life of 35 years and no salvage value. Specialized mining equipment was installed at a cost of USD 495,000. This equipment had an estimated useful life of seven years and an estimated USD 33,000 salvage value. The company began operating on 2009 January 1, and put all of its assets into use on that date. During the year ended 2009 December 31, 400,000 tons of ore were extracted. The company decided to use the units-of-production method to record depreciation on the building and the straight-line method to record depreciation on the equipment.

Prepare journal entries to record the depletion and depreciation charges for the year ended 2009 December 31. Show calculations.

**Alternate problem F** Trask Company purchased a patent for USD 108,000 on 2009 January 2. The patent was estimated to have a finite life of 10 years. The USD 108,000 cost was properly charged to an asset account and amortized in 2009. On 2010 January 1, the company incurred legal and court costs of USD 32,400 in a successful defense of the patent in a lawsuit. The legal work was performed by an outside law firm.

- Compute the patent amortization expense for 2009 and give the entry to record it.
- Compute the patent amortization expense for 2010 and give the entry to record it.

**Alternate problem G** Selected transactions and other data for Grant Company:



## 11. Plant asset disposals, natural resources, and intangible assets

a. The company purchased a patent in early January 2006 for USD 144,000 and began amortizing it over its finite life of 10 years. In early January 2008, the company hired an outside law firm and successfully defended the patent in an infringement suit at a cost of USD 38,400.

b. Research and development costs incurred in 2008 of USD 43,200 were expected to provide benefits over the three succeeding years.

c. On 2009 January 2, the company rented space in a warehouse for five years at an annual fee of USD 9,600. Rent for the first and last years was paid in advance.

d. A total of USD 96,000 was spent uniformly throughout 2009 by the company in promoting its lesser known trademark, which is expected to have a finite useful life of 20 years.

e. In January 2007, the company purchased all of the assets and assumed all of the liabilities of another company, paying USD 192,000 more than the fair market value of all identifiable assets acquired, less the liabilities assumed. The company expects the cash flow benefits for which it paid the USD 192,000 to last 10 years (finite useful life).

For each of these unrelated transactions, prepare journal entries to record only those entries (required for 2009). Note any items that do not require an entry in 2009.

### Beyond the numbers-Critical thinking

**Business decision case A** During your audit examination of the Shirley Company's Plant, Property, and Equipment accounts, the following transaction came to your attention. On 2009 January 2, machine A was exchanged for machine B. Shirley Company acquired machine A for USD 90,000 on 2007 January 2. Machine A had an estimated useful life of four years and no salvage value, and the machine was depreciated on the straight-line basis. Machine B had a cash price of USD 108,000. In addition to machine A, cash of USD 30,000 was given up in the exchange. Machine B has an estimated useful life of five years and no salvage value, and the machine is being depreciated using the straight-line method. The exchange has no commercial substance. Upon further analysis, you discover that the company recorded the transaction as an exchange of nonmonetary assets having commercial substance instead of one not having commercial substance. You must now determine the following:

a. What journal entry did the Shirley Company make when it recorded the exchange of machines? (Show computations.)

b. What journal entry should the Shirley Company have made to record the exchange of machines?

c. Assume the error was discovered on 2010 December 31, before adjusting journal entries have been made. What journal entries should be made to correct the accounting records? (Adjustments of prior years' net income because of errors should be debited or credited to Retained Earnings.) What adjusting journal entry should be made to record depreciation for 2010? (Ignore income taxes.)

d. What effect did the error have on reported net income for 2009? (Ignore income taxes.)

e. How should machine B be reported on the 2010 December 31, balance sheet?

**Business decision case B** Currently, many corporations are looking for acquisition opportunities. Tyre, Inc., is trying to decide whether to buy Amite Company or Beauman Company. Tyre, Inc., has hired you as a consultant to analyze the two companies' financial information and to determine the more advantageous acquisition. Your review of the companies' books has revealed that both Amite and Beauman have assets with the following book values and fair market values:

11. Plant asset disposals, natural resources, and intangible assets

	Book Value	Fair Market Value
Accounts receivable	\$150,000	\$ 150,000
Inventories	450,000	750,000
Land	375,000	675,000
Buildings	450,000	1,050,000
Equipment	180,000	300,000
Patents	120,000	150,000

Liabilities assumed on the purchase of either company include accounts payable, USD 300,000, and notes payable, USD 75,000.

The only difference between the companies is that Amite has net income that is about average for the industry, while Beauman's net income is greatly above average for the industry.

Top-level management at Tyre, Inc., has asked you to respond in writing to the following possible situations:

- a. Assume Tyre, Inc., can buy Amite Company for USD 2,700,000 or Beauman Company for USD 3,450,000. Prepare the journal entries to record the acquisition of Amite Company and Beauman Company. What accounts for the difference between the purchase price of the two companies?
- b. Assume Tyre, Inc., can buy either company for USD 2,700,000. Write a report for Tyre, Inc., advising which company to buy.

**Annual report analysis C** The mission of Rational Software Corporation is to ensure the success of customers constructing the software systems that they depend on.

Using the following excerpts from Rational Software's annual reports, calculate the firm's total assets turnover for 2004 and 2003. (Amounts are in USD thousands.)

	2004	2003	2002
Net sales	\$ 814,935	\$ 572,190	\$ 411,816
Total assets	1,709,323	1,225,776	453,956

In a written report, discuss the meaning of the total assets turnover ratio and what the ratio means to management and investors. Use the total assets turnover ratios you computed for Rational Software as an example in your report.

**Ethics case D** Based on the situation described in the ethics case regarding ABC Corporation, respond in writing to the following questions.

- a. Depending on his actions, what are the possible consequences for John Gilbert in this situation?
- b. Assuming that the president cannot find another appraiser to support the new allocations, what would you do if you were Gilbert?
- c. If the president can find a reputable appraiser to support these new allocations, what would you do if you were Gilbert?

**Group project E** In teams of two or three students, find a recent annual report that includes intangible assets on the balance sheet. Select one member of each team to give an informal presentation discussing intangible asset disclosures on the face of the statements and in the notes to the financial statements. All members should be prepared to discuss intangible asset disclosures from their annual report in detail.

**Group project F** In a group of one or two other students, go to the library and locate *Statement of Financial Accounting Standards No. 2, "Accounting for Research and Development Costs"*, published by the Financial Accounting Standards Board. Write a report to your instructor giving the highlights of the standard. For instance,

what alternatives were considered and why did the board conclude that all research and development costs should be expensed when incurred?

**Group project G** In a group of one or two other students, go to the library and locate *Statement of Financial Accounting Standards No. 121*, "Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of", published by the Financial Accounting Standards Board. Write a report to your instructor giving the highlights of the standard. For instance, what does "impairment" mean and what are its causes? How can one determine that impairment of an asset has possibly occurred? Also review some of the background information as to why this was important enough for the FASB to act.

#### Using the Internet—A view of the real world

Visit the Accounting News Network at Microsoft's website:

<http://sba.microsoft.com/apnews/default.asp>

Click on each icon to investigate the information available at this site. Browse any of the areas that look interesting. How would accounting practitioners make good use of this site? In a report to your instructor, summarize the features available at this site.

Visit the Small Business Administration site at:

<http://www.sba.gov>

Suppose you wanted to start a small business. What helpful information would you find at this site? Would this site provide information on how to finance the business? Browse around this site to see what it offers. Then write a report to your instructor summarizing the types of helpful information this site provides.

#### Answers to self-test

##### True-false

**False.** No more depreciation can be taken on a fully depreciated plant asset.

**True.** The new asset is recorded at the fair market value of the asset received or given up, whichever is more clearly evident.

**False.** The residual value of land should be deducted from total costs subject to depletion.

**False.** Only intangible assets with finite useful lives should be amortized.

##### Multiple-choice

**d.** The cost and accumulated depreciation should not be removed from the accounts until the disposal of the asset.

**a.** On the date of exchange, the book value of the old truck is USD 20,700 (USD 45,000 minus accumulated depreciation of USD 24,300). The trade-in allowance of USD 22,500 indicates a gain on exchange of USD 1,800. In an exchange of nonmonetary assets not having commercial substance, a gain is not recognized, but reduces the cost of a new asset. Therefore, the cost of the new truck is USD 55,200 (USD 57,000 minus USD 1,800), and no gain is recognized.

**c.** The depletion charge for the first year is:

$$\text{Depletion charge per ton} = \frac{(\text{USD } 375,000 - \text{USD } 75,000)}{1,000,000}$$

= USD 0.30

$$\text{Depletion charge for the year} = \text{USD } 0.30 \times 100,000$$

= USD 30,000

## 11. Plant asset disposals, natural resources, and intangible assets

Since all of the ore that was extracted was sold, all of the USD 30,000 is expensed as cost of ore sold.

**b.** The patent is amortized over 10 years:

$$\begin{aligned} \text{Annual amortization expense} &= \frac{\text{USD } 36,000}{10} \\ &= \text{USD } 3,600 \end{aligned}$$

# 12. Stockholders' equity: Classes of capital stock

## Learning objectives

After studying this chapter, you should be able to:

- State the advantages and disadvantages of the corporate form of business.
- List the values commonly associated with capital stock and give their definitions.
- List the various kinds of stock and describe the differences between them.
- Present in proper form the stockholders' equity section of a balance sheet.
- Account for the issuances of stock for cash and other assets.
- Determine book values of both preferred and common stock.
- Analyze and use the financial results—return on average common stockholders' equity.

## The accountant as a corporate treasurer

Most people think of the stock market as a place to buy and sell stock. However, few people give much thought to the other side of this transaction. The original purpose of the stock market is to allow corporations to raise the money needed to expand into new markets, invent new products, open new stores, and create new jobs. The initial public issuance of stock (i.e. going public) is one of the most significant milestones in the life of a public company.

For most individual investors, trading is done by stockbrokers. Who handles the stock transactions within a company? The treasurer or the person that performs the treasury functions is this person. This role requires someone with a strong background in accounting and finance.

When a company decides to issue bonds or additional shares of stock, the treasurer is the person responsible for executing the transaction at the lowest cost to the entity. The treasurer works closely with investment bankers and lawyers to get the stocks or bonds marketed and issued in accordance with state and federal laws. When a company issues stock for the first time (initial public offering, or IPO), the task requires a thorough review of the financial position of the company and the public disclosure of this information for perhaps the first time. The treasurer/accountant must prepare what is called a prospectus. Among other things, the prospectus includes financial accounting information that is used in setting the price of the IPO.

The treasurer maintains custody of, or has access to, stocks owned by an entity and stock that is under the control of the entity. The treasurer also plays a pivotal role in the distribution of cash and stock dividends. The primary function of this position is controlling the cash inflows and outflows of the entity. A career as a corporate treasurer can involve the oversight of billions of dollars of stock, and the individual can earn a six-figure salary.

In this chapter, you study the corporate form of business organization in greater detail than in preceding chapters. Although corporations are fewer in number than single proprietorships and partnerships, corporations possess the bulk of our business capital and currently supply us with most of our goods and services.

## 12. Stockholders' equity: Classes of capital stock

This chapter discusses the advantages and disadvantages of the corporation, how to form and direct a corporation, and some of the unique situations encountered in accounting for and reporting on the different classes of capital stock. It is written from a US perspective, so you should be aware that laws and common practices may be different in other countries.

### The corporation

A **corporation** is an entity recognized by law as possessing an existence separate and distinct from its owners; that is, it is a separate legal entity. Endowed with many of the rights and obligations possessed by a person, a corporation can enter into contracts in its own name; buy, sell, or hold property; borrow money; hire and fire employees; and sue and be sued.

Corporations have a remarkable ability to obtain the huge amounts of capital necessary for large-scale business operations. Corporations acquire their capital by issuing **shares of stock**; these are the units into which corporations divide their ownership. Investors buy shares of stock in a corporation for two basic reasons. First, investors expect the value of their shares to increase over time so that the stock may be sold in the future at a profit. Second, while investors hold stock, they expect the corporation to pay them dividends (usually in cash) in return for using their money. Chapter 13 discusses the various kinds of dividends and their accounting treatment.

### Advantages of the corporate form of business

Corporations have many advantages over single proprietorships and partnerships. The major advantages a corporation has over a single proprietorship are the same advantages a partnership has over a single proprietorship. Although corporations have more owners than partnerships, both have a broader base for investment, risk, responsibilities, and talent than do single proprietorships. Since corporations are more comparable to partnerships than to single proprietorships, the following discussion of advantages contrasts the partnership with the corporation.

- **Easy transfer of ownership.** In a partnership, a partner cannot transfer ownership in the business to another person if the other partners do not want the new person involved in the partnership. In a publicly held (owned by many stockholders) corporation, shares of stock are traded on a stock exchange between unknown parties; one owner usually cannot dictate to whom another owner can or cannot sell shares.

- **Limited liability.** Each partner in a partnership is personally responsible for all the debts of the business. In a corporation, the stockholders are not personally responsible for its debts; the maximum amount a stockholder can lose is the amount of his or her investment. However, when a small, closely held corporation (owned by only a few stockholders) borrows money, banks and lending institutions often require an officer of the small corporation to sign the loan agreement. Then, the officer has to repay the loan if the corporation does not.

- **Continuous existence of the entity.** In a partnership, many circumstances, such as the death of a partner, can terminate the business entity. These same circumstances have no effect on a corporation because it is a legal entity, separate and distinct from its owners.

- **Easy capital generation.** The easy transfer of ownership and the limited liability of stockholders are attractive features to potential investors. Thus, it is relatively easy for a corporation to raise capital by issuing shares of stock to many investors. Corporations with thousands of stockholders are not uncommon.

- **Professional management.** Generally, the partners in a partnership are also the managers of that business, regardless of whether they have the necessary expertise to manage a business. In a publicly held corporation, most of the owners (stockholders) do not participate in the day-to-day operations and management of the entity. They hire professionals to run the business on a daily basis.

- **Separation of owners and entity.** Since the corporation is a separate legal entity, the owners do not have the power to bind the corporation to business contracts. This feature eliminates the potential problem of mutual agency that exists between partners in a partnership. In a corporation, one stockholder cannot jeopardize other stockholders through poor decision making.

The corporate form of business has the following disadvantages:

- **Double taxation.** Because a corporation is a separate legal entity, its net income is subject to double taxation. The corporation pays a tax on its income, and stockholders pay a tax on corporate income received as dividends.

- **Government regulation.** Because corporations are created by law, they are subject to greater regulation and control than single proprietorships and partnerships.

- **Entrenched, inefficient management.** A corporation may be burdened with an inefficient management that remains in control by using corporate funds to solicit the needed stockholder votes to back its positions. Stockholders scattered across the country, who individually own only small portions of a corporation's stock, find it difficult to organize and oppose existing management.

- **Limited ability to raise creditor capital.** The limited liability of stockholders makes a corporation an attractive means for accumulating stockholder capital. At the same time, this limited liability feature restrains the amount of creditor capital a corporation can amass because creditors cannot look to stockholders to pay the debts of a corporation. Thus, beyond a certain point, creditors do not lend some corporations money without the personal guarantee of a stockholder or officer of the corporation to repay the loan if the corporation does not.

Corporations are chartered by the state. Each state has a corporation act that permits the formation of corporations by qualified persons. **Incorporators** are persons seeking to bring a corporation into existence. Most state corporation laws require a minimum of three incorporators, each of whom must be of legal age, and a majority of whom must be citizens of the United States.

The laws of each state view a corporation organized in that state as a **domestic corporation** and a corporation organized in any other state as a **foreign corporation**. If a corporation intends to conduct business solely within one state, it normally seeks incorporation in that state because most state laws are not as severe for domestic corporations as for foreign corporations. Corporations conducting interstate business usually incorporate in the state that has laws most advantageous to the corporation being formed. Important considerations in choosing a state are the powers granted to the corporation, the taxes levied, the defenses permitted against hostile takeover attempts by others, and the reports required by the state.

Once incorporators agree on the state in which to incorporate, they apply for a corporate charter. A **corporate charter** is a contract between the state and the incorporators, and their successors, granting the corporation its legal existence. The application for the corporation's charter is called the **articles of incorporation**.

## 12. Stockholders' equity: Classes of capital stock

After supplying the information requested in the incorporation application form, incorporators file the articles with the proper office in the state of incorporation. Each state requires different information in the articles of incorporation, but most states ask for the following:

- Name of corporation.
- Location of principal offices.
- Purposes of business.
- Number of shares of stock authorized, class or classes of shares, and voting and dividend rights of each class of shares.
- Value of assets paid in by the incorporators (the stockholders who organize the corporation).
- Limitations on authority of the management and owners of the corporation.

On approving the articles, the state office (frequently the secretary of state's office) grants the charter and creates the corporation.

As soon as the corporation obtains the charter, it is authorized to operate its business. The incorporators call the first meeting of the stockholders. Two of the purposes of this meeting are to elect a board of directors and to adopt the bylaws of the corporation.

The **bylaws** are a set of rules or regulations adopted by the board of directors of a corporation to govern the conduct of corporate affairs. The bylaws must be in agreement with the laws of the state and the policies and purposes in the corporate charter. The bylaws contain, along with other information, provisions for: (1) the place, date, and manner of calling the annual stockholders' meeting; (2) the number of directors and the method for electing them; (3) the duties and powers of the directors; and (4) the method for selecting officers of the corporation.

**Organization costs** are the costs of organizing a corporation, such as state incorporation fees and legal fees applicable to incorporation. The firm debits these costs to an account called Organization Costs. The Organization Costs account is an asset because the costs yield benefits over the life of the corporation; if the fees had not been paid, no corporate entity would exist. Since the account is classified on the balance sheet as an intangible asset, it is amortized over its finite useful life. Most organizations write off these costs fairly rapidly because they are small in amount.

As an illustration, assume that De-Leed Corporation pays state incorporation fees of USD 10,000 and attorney's fees of USD 5,000 for services rendered related to the acquisition of a charter with the state. The entry to record these costs is:

<b>Organization Costs (+A)</b>	<b>15,000</b>	
<b>Cash (-A)</b>		<b>15,000</b>
<b>To record costs incurred in organizing corporation.</b>		

Assuming the corporation amortizes the organization costs over a 10-year period, this entry records amortization at the end of the year:

<b>Amortization Expense—Organization Costs (-SE)</b>	<b>1,500</b>	
<b>Organization Costs (-A)</b>		<b>1,500</b>
<b>To record organization costs amortization expense.</b>		
<b>(15,000/10 years = \$1,500).</b>		

Management of the corporation is through the delegation of authority from the stockholders to the directors to the officers, as shown in the organization chart in Exhibit 95. The stockholders elect the board of directors. The



board of directors formulates the broad policies of the company and selects the principal officers, who execute the policies.

**Stockholders** Stockholders do not have the right to participate actively in the management of the business unless they serve as directors and/or officers. However, stockholders do have certain basic rights, including the right to (1) dispose of their shares, (2) buy additional newly issued shares in a proportion equal to the percentage of shares they already own (called the **preemptive right**), (3) share in dividends when declared, (4) share in assets in case of liquidation, and (5) participate in management indirectly by voting at the stockholders' meeting.

The preemptive right allows stockholders to maintain their percentage of ownership in a corporation when additional shares are issued. For example, assume Joe Thornton owns 10 per cent of the outstanding shares of Corporation X. When Corporation X decides to issue 1,000 additional shares of stock, Joe Thornton has the right to buy 100 (10 per cent) of the new shares. Should he decide to do so, he maintains his 10 per cent interest in the corporation. If he does not wish to exercise his preemptive right, the corporation may sell the shares to others.<sup>40</sup>

**Illustration 12.1** Typical Corporation's Organization Chart

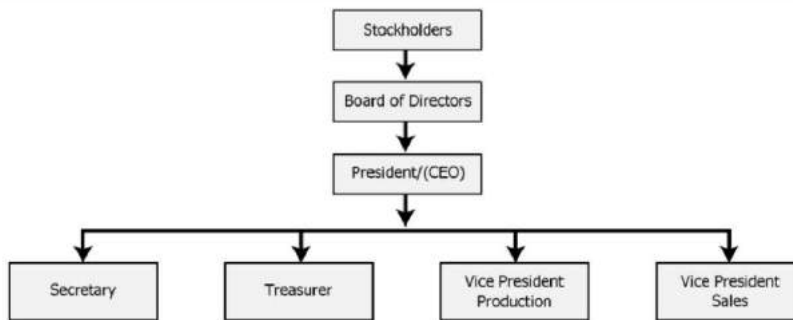


Exhibit 95: Typical corporation's organization chart

Normally, companies hold stockholders' meetings annually. At the annual stockholders' meeting, stockholders indirectly share in management by voting on such issues as changing the charter, increasing the number of authorized shares of stock to be issued, approving pension plans, selecting the independent auditor, and other related matters.

At stockholders' meetings, each stockholder is entitled to one vote for each share of voting stock held. Stockholders who do not personally attend the stockholders' meeting may vote by proxy. A **proxy** is a legal document signed by a stockholder, giving a designated person the authority to vote the stockholder's shares at a stockholders' meeting.

**Board of directors** Elected by the stockholders, the **board of directors** is primarily responsible for formulating policies for the corporation. The board appoints administrative officers and delegates to them the execution of the policies established by the board. The board's more specific duties include: (1) authorizing contracts, (2) declaring dividends, (3) establishing executive salaries, and (4) granting authorization to borrow money. The decisions of the board are recorded in the minutes of its meetings. The minutes are an important

<sup>40</sup> Some corporations have eliminated the preemptive right because the preemptive right makes it difficult to issue large blocks of stock to the stockholders of another corporation to acquire that corporation.

## 12. Stockholders' equity: Classes of capital stock

source of information to an independent auditor, since they may serve as notice to record transactions (such as a dividend declaration) or to identify certain future transactions (such as a large loan).

**Corporate officers** A corporation's bylaws usually specify the titles and duties of the officers of a corporation. The number of officers and their exact titles vary from corporation to corporation, but most have a president, several vice presidents, a secretary, a treasurer, and a controller.

The president is the chief executive officer (CEO) of the corporation. He or she is empowered by the bylaws to hire all necessary employees except those appointed by the board of directors.

Most corporations have more than one vice president. Each vice president is responsible for one particular corporate operation, such as sales, engineering, or production. The corporate secretary maintains the official records of the company and records the proceedings of meetings of stockholders and directors. The treasurer is accountable for corporate funds and may supervise the accounting function within the company. A controller carries out the accounting function. The controller usually reports to the treasurer of the corporation.

### Documents, books, and records relating to capital stock

**Capital stock** consists of transferable units of ownership in a corporation. Each unit of ownership is called a share of stock. Typically, traders sell between 100 and 400 million shares of corporate capital stock every business day on stock exchanges, such as the New York Stock Exchange and the American Stock Exchange, and on the over-the-counter market. These sales (or trades) seldom involve the corporation issuing the stock as a party to the exchange. Existing stockholders sell their shares to other individual or institutional investors. The physical transfer of the stock certificates follows these trades.

A **stock certificate** is a printed or engraved document serving as evidence that the holder owns a certain number of shares of capital stock. When selling shares of stock, the stockholder signs over the stock certificate to the new owner, who presents it to the issuing corporation. When the old certificate arrives, the issuing corporation cancels the certificate and attaches it to its corresponding stub in the stock certificate book. The issuer prepares a new certificate for the new owner. To determine the number of shares of stock outstanding at any time, the issuer sums the shares shown on the open stubs (stubs without certificates attached) in the stock certificate book.

Among the more important records maintained by a corporation is the stockholders' ledger. The **stockholders' ledger** contains a group of subsidiary accounts showing the number of shares of stock currently held by each stockholder. Since the ledger contains an account for each stockholder, in a large corporation this ledger may have more than a million individual accounts. Each stockholder's account shows the number of shares currently or previously owned, their certificate numbers, and the dates on which shares were acquired or sold. Entries are made in the number of shares rather than in dollars.

The stockholders' ledger and the stock certificate book contain the same information, but the stockholders' ledger summarizes it alphabetically by stockholder. Since a stockholder may own a dozen or more certificates, each representing a number of shares, this summary enables a corporation to (1) determine the number of shares a stockholder is entitled to vote at a stockholders' meeting and (2) prepare one dividend check per stockholder rather than one per stock certificate.

Many large corporations with actively traded shares turn the task of maintaining reliable stock records over to an outside stock-transfer agent and a stock registrar. The **stock-transfer agent**, usually a bank or trust company, transfers stock between buyers and sellers for a corporation. The stock-transfer agent cancels the certificates

covering shares sold, issues new stock certificates, and makes appropriate entries in the stockholders' ledger. It sends new certificates to the **stock registrar**, typically another bank, that maintains separate records of the shares outstanding. This control system makes it difficult for a corporate employee to issue stock certificates fraudulently and steal the proceeds.

The **minutes book**, kept by the secretary of the corporation, is (1) a record book of the actions taken at stockholders' and board of directors' meetings and (2) the written authorization for many actions taken by corporate officers. Remember that all actions taken by the board of directors and the stockholders must be in accordance with the provisions in the corporate charter and the bylaws. The minutes book contains a variety of data, including:

- A copy of the corporate charter.
- A copy of the bylaws.
- Dividends declared by the board of directors.
- Authorization for the acquisition of major assets.
- Authorization for borrowing.
- Authorization for increases or decreases in capital stock.

### Par value and no-par capital stock

Many times, companies issue par value stock. **Par value** is an arbitrary amount assigned to each share of a given class of stock and printed on the stock certificate. Par value per share is no indication of the amount for which the stock sells; it is simply the amount per share credited to the capital stock account for each share issued. Also, the total par value of all issued stock often constitutes the legal capital of the corporation. The concept of legal capital protects creditors from losses. **Legal capital**, or **stated capital**, is an amount prescribed by law (usually the par value or stated value of shares issued) below which a corporation may not reduce stockholders' equity through declaration of dividends or other payments to stockholders. Stated value relates to no-par stock and is explained below. Legal capital does not guarantee that a company can pay its debts, but it does keep a company from compensating owners to the detriment of creditors. The formula for determining legal capital is:

$$\text{Legal Capital} = \text{Shares Issued} \times \text{Par (Stated) Value}$$

In 1912, the state of New York first enacted laws permitting the issuance of **no-par stock (stock without par value)**. Many other states have passed similar, but not uniform, legislation.

A corporation might issue no-par stock for two reasons. One reason is to avoid confusion. The use of a par value may confuse some investors because the par value usually does not conform to the market value. Issuing a stock with no par value avoids this source of confusion.

A second reason is related to state laws regarding the original issue price per share. A **discount on capital stock** is the amount by which the shares' par value exceeds their issue price. Thus, if stock with a par value of USD 100 is issued at USD 80, the discount is USD 20. Most states do not permit the original issuance of stock at a discount. Only Maryland, Georgia, and California allow its issuance. The original purchasers of the shares are contingently liable for the discount unless they have transferred (by contract) the discount liability to subsequent holders. If the contingent liability has been transferred, the present stockholders are contingently liable to creditors for the difference between par value and issue price. Although this contingent liability seldom becomes an actual liability, the issuance of no-par stock avoids such a possibility.

## 12. Stockholders' equity: Classes of capital stock

The board of directors of a corporation issuing no-par stock may assign a stated value to each share of capital stock. **Stated value** is an arbitrary amount assigned by the board to each share of a given class of no-par stock. The board may set this stated value, like par value, at any amount, although some state statutes specify a minimum amount, such as USD 5 per share. If not specified by applicable state law, the board may establish stated value either before or after the shares are issued.

### Other values commonly associated with capital stock

**Market value** is the price of shares of capital stock bought and sold by investors in the market; it is the value of greatest interest to investors. Market price is directly affected by (1) all the factors that influence general economic conditions, (2) investors' expectations concerning the corporation, and (3) the corporation's earnings.

**Book value per share** is the amount per share that each stockholder would receive if the corporation were liquidated without incurring any further expenses and if assets were sold and liabilities liquidated at their recorded amounts. A later section discusses book value per share in greater detail.

**Liquidation value** is the amount a stockholder would receive if a corporation discontinued operations and liquidated by selling its assets, paying its liabilities, and distributing the remaining cash among the stockholders. Since the assets might be sold for more or less than the amounts at which they are recorded in the corporation's accounts, liquidation value may be more or less than book value. If only one class of capital stock is outstanding, each stockholder would receive, per share, the amount obtained by dividing the remaining cash by the number of outstanding shares. If two or more classes of stock are outstanding, liquidation value depends on the rights of the various classes.

A corporation issues certain capital stock with the stipulation that it has the right to redeem it. **Redemption value** is the price per share at which a corporation may call in (or redeem) its capital stock for retirement.

### Capital stock authorized and outstanding

The corporate charter states the number of shares and the par value, if any, per share of each class of stock that the corporation is permitted to issue. **Capital stock authorized** is the number of shares of stock that a corporation is entitled to issue as designated in its charter.

A corporation might not issue all of its authorized stock immediately; it might hold some stock for future issuance when additional funds are needed. If all authorized stock has been issued and more funds are needed, the state of incorporation must consent to an increase in authorized shares.

The authorization to issue stock does not trigger a journal entry. Instead, companies note the authorization in the capital stock account in the ledger (and often in the general journal) as a reminder of the number of shares authorized. **Capital stock issued** is the number of shares of stock sold and issued to stockholders.

**Capital stock outstanding** is the number of authorized shares of stock issued and currently held by stockholders. The total ownership of a corporation rests with the holders of the capital stock outstanding. For example, when a corporation authorized to issue 10,000 shares of capital stock has issued only 8,000 shares, the holders of the 8,000 shares own 100 per cent of the corporation.

Each outstanding share of stock of a given class carries rights and privileges identical to any other outstanding share of that class. Shares authorized but not yet issued are referred to as **unissued shares** (the previous example had 2,000 unissued shares). No rights or privileges are attached to these shares until they are issued; they are not entitled to dividends, nor can they be voted at stockholders' meetings.

The number of shares issued and the number of shares outstanding may be different. Issued stock has been issued at some time, while outstanding shares are currently held by stockholders. All outstanding stock is issued stock, but the reverse is not necessarily true. The difference is due to shares returned to the corporation by stockholders; it is called treasury stock. Chapter 13 discusses treasury stock.

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### An accounting perspective:

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#### Business insight

SCI Systems, Inc., designs, manufactures, and distributes electronic products for a wide variety of industries. The following illustration is adapted from the company's balance sheet. The stockholders' equity section shows the actual number of shares of common stock authorized and outstanding and shows the dollar amounts in thousands:

	June 30 2001	2000
Common stock, USD0.10 par value; authorized 500,000,000 common shares, issued 147,132,428 shares in 2001 and 144,996,374 shares in 2000.	USD 14,713	USD 14,500

#### Classes of capital stock

A corporation may issue two basic classes or types of capital stock—common and preferred.

If a corporation issues only one class of stock, this stock is common stock. All of the stockholders enjoy equal rights. **Common stock** is usually the residual equity in the corporation. This term means that all other claims against the corporation rank ahead of the claims of the common stockholder.

**Preferred stock** is a class of capital stock that carries certain features or rights not carried by common stock. Within the basic class of preferred stock, a company may have several specific classes of preferred stock, each with different dividend rates or other features.

Companies issue preferred stock to avoid: (1) using bonds with fixed interest charges that must be paid regardless of the amount of net income; (2) issuing so many additional shares of common stock that earnings per share are less in the current year than in prior years; and (3) diluting the common stockholders' control of the corporation, since preferred stockholders usually have no voting rights.

Unlike common stock, which has no set maximum or minimum dividend, the dividend return on preferred stock is usually stated at an amount per share or as a percentage of par value. Therefore, the firm fixes the dividend per share. Exhibit 96 shows the various classes and combinations of capital stock outstanding for a sample of 600 companies.

## 12. Stockholders' equity: Classes of capital stock

	2006	2005	2004	2003
<b>Common stock with:</b>				
<i>No preferred stock</i>	516	502	507	514
<i>One class of preferred stock</i>	73	81	80	71
<i>Two classes of p referred stock</i>	9	14	10	10
<i>Three or more classes of preferred stock</i>	2	3	3	5
<b>Total Companies</b>	<b>600</b>	<b>600</b>	<b>600</b>	<b>600</b>
 <i>Companies included above with two or more classes of common stock</i>				
	62	70	59	66

### Exhibit 96: Capital structures

Source: Based on American Institute of Certified Public Accountants, *Accounting Trends & Techniques* (New York: AICPA, 2004), p. 307.

### Types of preferred stock

When a corporation issues both preferred and common stock, the preferred stock may be:

- Preferred as to dividends. It may be noncumulative or cumulative.
- Preferred as to assets in the event of liquidation.
- Convertible or nonconvertible.
- Callable.

A **dividend** is a distribution of assets (usually cash) that represents a withdrawal of earnings by the owners. Dividends are normally paid in cash.

**Stock preferred as to dividends** means that the preferred stockholders receive a specified dividend per share before common stockholders receive any dividends. A **dividend on preferred stock** is the amount paid to preferred stockholders as a return for the use of their money. For no-par preferred stock, the dividend is a specific dollar amount per share per year, such as USD 4.40. For par value preferred stock, the dividend is usually stated as a percentage of the par value, such as 8 per cent of par value; occasionally, it is a specific dollar amount per share. Most preferred stock has a par value.

Usually, stockholders receive dividends on preferred stock quarterly. Such dividends—in full or in part—must be declared by the board of directors before paid. In some states, corporations can declare preferred stock dividends only if they have retained earnings (income that has been retained in the business) at least equal to the dividend declared.

**Noncumulative preferred stock** **Noncumulative preferred stock** is preferred stock on which the right to receive a dividend expires whenever the dividend is not declared. When noncumulative preferred stock is outstanding, a dividend omitted or not paid in any one year need not be paid in any future year. Because omitted dividends are lost forever, noncumulative preferred stocks are not attractive to investors and are rarely issued.

**Cumulative preferred stock** **Cumulative preferred stock** is preferred stock for which the right to receive a basic dividend, usually each quarter, accumulates if the dividend is not paid. Companies must pay unpaid cumulative preferred dividends before paying any dividends on the common stock. For example, assume a company has cumulative, USD 10 par value, 10 per cent preferred stock outstanding of USD 100,000, common stock

outstanding of USD 100,000, and retained earnings of USD 30,000. It has paid no dividends for two years. The company would pay the preferred stockholders dividends of USD 20,000 (USD 10,000 per year times two years) before paying any dividends to the common stockholders.

**Dividends in arrears** are cumulative unpaid dividends, including the quarterly dividends not declared for the current year. Dividends in arrears never appear as a liability of the corporation because they are not a legal liability until declared by the board of directors. However, since the amount of dividends in arrears may influence the decisions of users of a corporation's financial statements, firms disclose such dividends in a footnote. An appropriate footnote might read: "Dividends in the amount of USD 20,000, representing two years' dividends on the company's 10 per cent, cumulative preferred stock, were in arrears as of 2007 December 31".

Most preferred stocks are preferred as to assets in the event of liquidation of the corporation. **Stock preferred as to assets** is preferred stock that receives special treatment in liquidation. Preferred stockholders receive the par value (or a larger stipulated liquidation value) per share before any assets are distributed to common stockholders. A corporation's cumulative preferred dividends in arrears at liquidation are payable even if there are not enough accumulated earnings to cover the dividends. Also, the cumulative dividend for the current year is payable. Stock may be preferred as to assets, dividends, or both.

**Convertible preferred stock** is preferred stock that is convertible into common stock of the issuing corporation. Many preferred stocks do not carry this special feature; they are nonconvertible. Holders of convertible preferred stock shares may exchange them, at their option, for a certain number of shares of common stock of the same corporation.

Investors find convertible preferred stock attractive for two reasons: First, there is a greater probability that the dividends on the preferred stock will be paid (as compared to dividends on common shares). Second, the conversion privilege may be the source of substantial price appreciation. To illustrate this latter feature, assume that Olsen Company issued 1,000 shares of 6 per cent, USD 100 par value convertible preferred stock at USD 100 per share. The stock is convertible at any time into four shares of Olsen USD 10 par value common stock, which has a current market value of USD 20 per share. In the next several years, the company reported much higher net income and increased the dividend on the common stock from USD 1 to USD 2 per share. Assume that the common stock now sells at USD 40 per share. The preferred stockholders can: (1) convert each share of preferred stock into four shares of common stock and increase the annual dividend they receive from USD 6 to USD 8; (2) sell their preferred stock at a substantial gain, since it sells in the market at approximately USD 160 per share, the market value of the four shares of common stock into which it is convertible; or (3) continue to hold their preferred shares in the expectation of realizing an even larger gain at a later date.

If all 1,000 shares of USD 100 par value Olsen Company preferred stock are converted into 4,000 shares of USD 10 par value common stock, the entry is:

<i>Preferred Stock (-SE)</i>	<i>100,000</i>	
<i>Common Stock (+SE)</i>		<i>40,000</i>
<i>Paid-In Capital in Excess of Par Value—Common (+SE)</i>		<i>60,000</i>
<i>To record the conversion of preferred stock into common stock.</i>		

## 12. Stockholders' equity: Classes of capital stock

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### An accounting perspective:

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#### Business insight

In the early 1970s, only about 10 per cent of undergraduate degrees in accounting were awarded to women. This percentage increased steadily, and by the mid-1980s approximately half of all undergraduate accounting degrees were earned by women. By 1996, the rate increased to slightly more than half. This rate is more than twice the rate in the medical and legal professions. For more information see "Accounting's Big Gender Switch," *Business Week*, January 20, 1997, p. 20.

Most preferred stocks are callable at the option of the issuing corporation. **Callable preferred stock** means that the corporation can inform nonconvertible preferred stockholders that they must surrender their stock to the company. Also, convertible preferred stockholders must either surrender their stock or convert it to common shares.

Preferred shares are usually callable at par value plus a small premium of 3 or 4 per cent of the par value of the stock. This **call premium** is the difference between the amount at which a corporation calls its preferred stock for redemption and the par value of the stock.

An issuing corporation may force conversion of convertible preferred stock by calling in the preferred stock for redemption. Stockholders who do not want to surrender their stock have to convert it to common shares. When preferred stockholders surrender their stock, the corporation pays these stockholders par value plus the call premium, any dividends in arrears from past years, and a prorated portion of the current period's dividend. If the market value of common shares into which the preferred stock could be converted is higher than the amount the stockholders would receive in redemption, they should convert their preferred shares to common shares. For instance, assume that a stockholder owns 1,000 shares of convertible preferred stock. Each share is callable at USD 104 per share, convertible to two common shares (currently selling at USD 62 per share), and entitled to USD 10 of unpaid dividends. If the issuing corporation calls in its preferred stock, it would give the stockholder either (1) USD 114,000 [(USD 104 + USD 10) X 1,000] if the shares are surrendered or (2) common shares worth USD 124,000 (USD 62 X 2,000) if the shares are converted. Obviously, the stockholder should convert these preferred shares to common shares.

Why would a corporation call in its preferred stock? Corporations call in preferred stock for many reasons: (1) the outstanding preferred stock may require a 12 per cent annual dividend at a time when the company can secure capital to retire the stock by issuing a new 8 per cent preferred stock; (2) the issuing company may have been sufficiently profitable to retire the preferred stock out of earnings; or (3) the company may wish to force conversion of its convertible preferred stock because the cash dividend on the equivalent common shares is less than the dividend on the preferred shares.

#### Balance sheet presentation of stock

The stockholders' equity section of a corporation's balance sheet contains two main elements: paid-in capital and retained earnings. **Paid-in capital** is the part of stockholders' equity that normally results from cash or other assets invested by owners. Paid-in capital also results from services performed for the corporation in exchange for



capital stock and from certain other transactions discussed in Chapter 13. As stated earlier, **retained earnings** is the part of stockholders' equity resulting from accumulated net income, reduced by dividends and net losses. Net income increases the Retained Earnings account balance and net losses decrease it. In addition, dividends declared to stockholders decrease Retained Earnings. Since Retained Earnings is a stockholders' equity account and represents accumulated net income retained by the company, it normally has a credit balance. We discuss retained earnings in more detail in Chapter 13.

The following illustration shows the proper financial reporting for preferred and common stock. Assume that a corporation is authorized to issue 10,000 shares of USD 100 par value, 6 per cent, cumulative, convertible preferred stock (five common for one preferred), all of which have been issued and are outstanding; and 200,000 shares of USD 10 par value common stock, of which 80,000 shares are issued and outstanding. The stockholders' equity section of the balance sheet (assuming USD 450,000 of retained earnings) is:

Stockholders' equity:		
Paid-in capital:		
Preferred stock – USD 100 par value, 6 per cent cumulative, convertible (5 common for 1 preferred); authorized, issued, and outstanding, 10,000 shares	\$ 1,000,000	
Common stock – USD 10 par value; authorized, 200,000 shares; issued and outstanding 80,000 shares	800,000	
Total paid-in capital		\$ 1,800,000
Retained earnings		450,000
Total stockholders' equity		2,250,000

Notice that the balance sheet lists preferred stock before common stock because the preferred stock is preferred as to dividends, assets, or both. The company discloses the conversion rate in a parenthetical note within the description of preferred stock or in a footnote.

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### An accounting perspective:

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#### Business insight

WHX corporation in its 1999 annual report provided the following presentation of preferred stock in the stockholders' equity second of its balance sheet:

1999

<b>Stockholders' equity:</b>	
<b>Preferred stock—\$.10 par value:</b>	
<b>authorized 10,000 shares; issued</b>	
<b>and outstanding: 5,883 shares</b>	<b>\$588.3M</b>

#### Stock issuances for cash

Each share of common or preferred capital stock either has a par value or lacks one. The corporation's charter determines the par value printed on the stock certificates issued. Par value may be any amount—1 cent, 10 cents, 16 cents, USD 1, USD 5, or USD 100. Low par values of USD 10 or less are common in our economy.

As previously mentioned, par value gives no clue as to the stock's market value. Shares with a par value of USD 5 have traded (sold) in the market for more than USD 600, and many USD 100 par value preferred stocks have traded for considerably less than par. Par value is not even a reliable indicator of the price at which shares can be issued. New corporations can issue shares at prices well in excess of par value or for less than par value if state laws

## 12. Stockholders' equity: Classes of capital stock

permit. Par value gives the accountant a constant amount at which to record capital stock issuances in the capital stock accounts. As stated earlier, the total par value of all issued shares is generally the legal capital of the corporation.

To illustrate the issuance of stock for cash, assume a company issues 10,000 authorized shares of USD 20 par value common stock at USD 22 per share. The following entry records the issuance:

<b>Cash (+A)</b>	<b>220,00</b>	
	<b>0</b>	
<b>Common Stock (+SE)</b>		<b>200,000</b>
<b>Paid-In Capital in Excess of Par Value—Common (+SE)</b>		<b>20,000</b>
<b>To record the issuance of 10,000 shares of stock for cash.</b>		

Notice that the credit to the Common Stock account is the par value (USD 20) times the number of shares issued. The accountant credits the excess over par value (USD 20,000) to Paid-In Capital in Excess of Par Value; it is part of the paid-in capital contributed by the stockholders. Thus, **paid-in capital in excess of par (or stated) value** represents capital contributed to a corporation in addition to that assigned to the shares issued and recorded in capital stock accounts. The paid-in capital section of the balance sheet appears as follows:

<b>Paid-in capital:</b>	
<b>Common stock—par value, \$20; 10,000 shares authorized, issued and outstanding</b>	<b>\$ 200,000</b>
<b>Paid-in capital in excess of par value—common</b>	<b>20,000</b>
<b>Total paid-in capital</b>	<b>\$ 220,000</b>

When it issues no-par stock with a stated value, a company carries the shares in the capital stock account at the stated value. Any amounts received in excess of the stated value per share represent a part of the paid-in capital of the corporation and the company credits them to Paid-In Capital in Excess of Stated Value. The legal capital of a corporation issuing no-par shares with a stated value is usually equal to the total stated value of the shares issued.

To illustrate, assume that the DeWitt Corporation, which is authorized to issue 10,000 shares of common stock without par value, assigns a stated value of USD 20 per share to its stock. DeWitt issues the 10,000 authorized shares for cash at USD 22 per share. The entry to record this transaction is:

<b>Cash (+A)</b>	<b>220,000</b>	
<b>Common Stock (+SE)</b>		<b>200,000</b>
<b>Paid-In Capital in Excess of Stated Value—Common (+SE)</b>		<b>20,000</b>
<b>To record issuance of 10,000 shares of stock for cash.</b>		

The paid-in capital section of the balance sheet appears as follows:

<b>Paid-in capital:</b>	
<b>Common stock—par value, \$20; 10,000 shares authorized, issued and outstanding</b>	<b>\$ 200,000</b>
<b>Paid-in capital in excess of stated value—common</b>	<b>20,000</b>
<b>Total paid-in capital</b>	<b>\$ 220,000</b>

DeWitt carries the USD 20,000 received over and above the stated value of USD 200,000 permanently as paid-in capital because it is a part of the capital originally contributed by the stockholders. However, the legal capital of the DeWitt Corporation is USD 200,000.

A corporation that issues no-par stock without a stated value credits the entire amount received to the capital stock account. For instance, consider the DeWitt Corporation's issuance of no-par stock. If no stated value had been assigned, the entry would have been as follows:

<b>Cash (+A)</b>	<b>220,000</b>
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**Common Stock (+SE) 200,000**  
**To record issuance of 10,000 shares for cash.**

Since the company may issue shares at different times and at differing amounts, its credits to the capital stock account are not uniform amounts per share. This contrasts with issuing par value shares or shares with a stated value.

To continue our example, the paid-in capital section of the company's balance sheet would be as follows:

Paid-in capital:  
 Common stock—without par or stated value; 10,000  
 shares authorized, issued and outstanding \$ 220,000  
 Total paid-in capital \$ 220,000

The actual capital contributed by stockholders is USD 220,000. In some states, the entire amount received for shares without par or stated value is the amount of legal capital. The legal capital in this example would then be equal to USD 220,000.

### Capital stock issued for property or services

When issuing capital stock for property or services, companies must determine the dollar amount of the exchange. Accountants generally record the transaction at the fair value of (1) the property or services received or (2) the stock issued, whichever is more clearly evident.

To illustrate, assume that the owners of a tract of land deeded it to a corporation in exchange for 1,000 shares of USD 12 par value common stock. The firm can only estimate the fair market value of the land. At the time of the exchange, the stock has an established total market value of USD 14,000. The required entry is:

<b>Land (+A)</b>	<b>14,000</b>	
<b>Common Stock (+SE)</b>		<b>12,000</b>
<b>Paid-In Capital in Excess of Par Value—</b>		<b>2,000</b>
<b>Common (+SE)</b>		

**To record the receipt of land for capital stock.**

As another example, assume a firm issues 100 shares of common stock with a par value of USD 40 per share in exchange for legal services received in organizing as a corporation. No shares have been traded recently, so there is no established market value. The attorney previously agreed to a price of USD 5,000 for these legal services but decided to accept stock in lieu of cash. In this example, the correct entry is:

<b>Organization Costs (+A)</b>	<b>5,000</b>	
<b>Common Stock (+SE)</b>		<b>4,000</b>
<b>Paid-In Capital in Excess of Par Value—Common</b>		<b>1,000</b>

**(+SE)**  
**To record the receipt of legal services for capital stock.**

The company should value the services at the price previously agreed on since that value is more clearly evident than the market value of the shares. It should debit an intangible asset account because these services benefit the corporation throughout its entire life. The company credits the amount by which the value of the services received exceeds the par value of the shares issued to a Paid-In Capital in Excess of Par Value—Common account.

### Balance sheet presentation of paid-in capital in excess of par (or stated) value—Common or preferred

Accountants credit amounts received in excess of the par or stated value of shares to a Paid-In Capital in Excess of Par (or Stated) Value—Common (or Preferred) account. They carry the amounts received in excess of par or stated value in separate accounts for each class of stock issued. Using the following assumed data, the stockholders'

## 12. Stockholders' equity: Classes of capital stock

equity section of the balance sheet of a company with both preferred and common stock outstanding would appear as follows:

Stockholders' equity:			
Paid-in capital:			
Preferred stock—\$100 par value, 6% cumulative; 1,000 shares authorized, issued, and outstanding	\$100,000		
Common stock—without par value, stated value, \$5; 100,000 shares authorized, 80,000 shares; issued and outstanding	400,000	\$ 500,000	
Paid-in capital in excess of par (or stated) value:			
From preferred stock issuances	\$ 5,000		
From common stock issuances	20,000	25,000	
Total paid-in capital			\$ 525,000
Retained earnings			200,000
Total stockholders' equity			\$ 725,000

The total book value of a corporation's outstanding shares is equal to its recorded net asset value—that is, assets minus liabilities. Quite simply, the amount of net assets is equal to stockholders' equity. When only common stock is outstanding, companies compute the **book value per share** by dividing total stockholders' equity by the number of common shares outstanding. In calculating book value, they assume that (1) the corporation could be liquidated without incurring any further expenses, (2) the assets could be sold at their recorded amounts, and (3) the liabilities could be satisfied at their recorded amounts. Assume the stockholders' equity of a corporation is as follows:

Stockholders' equity:			
Paid-in capital:			
Common stock—without par value, stated value, \$10; authorized, 20,000 shares; issued and outstanding, 15,000 shares	\$ 150,000		
Paid-in capital in excess of stated value	10,000		
Total paid-in capital			\$ 160,000
Retained earnings			50,000
Total stockholders' equity			\$ 210,000
To determine the book value per share of the stock:			
Total stockholders' equity	\$210,000		
Total shares outstanding	÷15,000		
Book value per share	\$ 14		

When two or more classes of capital stock are outstanding, the computation of book value per share is more complex. The book value for each share of stock depends on the rights of the preferred stockholders. Preferred stockholders typically are entitled to a specified liquidation value per share, plus cumulative dividends in arrears, since most preferred stocks are preferred as to assets and are cumulative. In each case, the specific provisions in the preferred stock contract govern. To illustrate, assume the Celoron Corporation's stockholders' equity is as follows:

Stockholders' equity:			
Paid-in capital:			
Preferred stock—\$100 par value, 6% cumulative; 5,000 shares authorized, issued, and outstanding	\$ 500,000		
Common stock—\$10 par value, 200,000 shares authorized, issued and outstanding	2,000,000		
Paid-in capital in excess of par value—preferred	200,000		
Total paid-in capital			\$2,700,000
Retained earnings			400,000
Total stockholders' equity			\$3,100,000

The preferred stock is 6 per cent, cumulative. It is preferred as to dividends and as to assets in liquidation to the extent of the liquidation value of USD 100 per share, plus any cumulative dividends on the preferred stock. Dividends for four years (including the current year) are unpaid. You would calculate the book values of each class of stock as follows:

Total stockholders' equity		Total	Per Share
		\$3,100,000	
Book value of preferred stock (5,000 shares)	\$ 500,000	120,000	\$124.00*
Liquidation value (5,000 shares X \$100)		\$2,480,000	12.40 <sup>T</sup>
Dividends (4 years at \$30,000)			
Book value of common stock (200,000 shares)			
	* \$620,000 ÷ 5,000 shares.		
	<sup>T</sup> \$2,480,000 ÷ 200,000 shares.		

Notice that Celoron did not assign the paid-in capital in excess of par value—preferred to the preferred stock in determining the book values. Celoron assigned only the liquidation value and cumulative dividends on the preferred stock to the preferred stock.

Assume now that the features attached to the preferred stock are the same except that the preferred stockholders have the right to receive USD 103 per share in liquidation. The book values of each class of stock would be:

Total stockholders' equity		Total	Per Share
		\$3,100,000	
Book value of preferred stock (5,000 shares)			
Liquidation value (5,000 shares X \$103)	\$ 515,000		
Dividends (4 years at \$30,000)	120,000	635,000	\$ 127.00
Book value of common stock (200,000 shares)		\$2,465,000	12.33

Book value rarely equals market value of a stock because many of the assets have changed in value due to inflation. Thus, the market prices of the shares of many corporations traded regularly are different from their book values.

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### An accounting perspective:

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#### Business insight

*The Wall Street Journal* publishes the New York Stock Exchange (NYSE) Composite Transactions each Monday through Friday except when the exchange is closed. For each stock listed on the NYSE, it lists the following data. We use data for the Kellogg Company, which produces ready-to-eat cereals and other food products, as recently reported in *The Wall Street Journal* as an example:

**52 Weeks**

Ytd per cent chg	Hi	Lo	Stock	Sym	Div	Ytd per cent	PE	Vol 100s	Last	Net Chg
+ 12.5	34	23.19	Kellogg	K	1.01	3.4	27	9957	29.54	+0.04

The first column reflects the stock price percentage change for the calendar year to date, adjusted for stock splits and dividends over 10 per cent. The next two columns show the high and low price

## 12. Stockholders' equity: Classes of capital stock

over the preceding 52 weeks plus the current week. The next two columns show the company name (Kellogg) and the NYSE's symbol (K) for that company. The Div column is the annual dividend based on the last quarterly, semiannual, or annual declaration. Yield per cent is calculated as dividends paid divided by the current market price. The PE ratio is the closing market price divided by the total earnings per share for the most recent four quarters. The Vol 100s column shows the unofficial daily total of shares traded, quoted in hundreds. Thus, 995,700 shares of Kellogg's were traded that day. The next to last column shows the closing price for that day. The final column shows the change in the closing price as compared to the closing price of the preceding day.

### Analyzing and using the financial results—Return on average common stockholders' equity

Stockholders' equity is particularly important to managers, creditors, and investors in determining the return on equity, which is the return on average common stockholders' equity.

The **return on average common stockholders' equity** measures what a given company earned for its common stockholders from all sources as a percentage of the common stockholders' investment. From the common stockholders' point of view, it is an important measure of the income-producing ability of the company. The ratio's formula is:

$$\text{Return on average common stockholders' equity} = \frac{\text{Net income available for common stockholders}}{\text{Average common stockholders' equity}}$$

If preferred stock is outstanding, the numerator is net income minus the annual dividend on preferred stock, and the denominator is the average total book value of common stock. If no preferred stock is outstanding, the numerator is net income, and the denominator is average stockholders' equity.

The Procter & Gamble Company reported the following information in its 2001 financial statements (USD millions):

	<b>2001</b>
Net earnings	\$ 2,922
Stockholders' equity, beginning	12,287
Stockholders' equity, ending	12,010

The return on average common stockholders' equity for Procter & Gamble is 24.1 per cent, or USD 2,922/[(USD 12,287 + USD 12,010)/2]. Investors view any increase from year to year as favorable and any decrease as unfavorable.

Since the stock market is frequently referred to as an economic indicator, the knowledge you now have on corporate stock issuances should help you relate to stocks traded in the market. Chapter 13 continues the discussion of paid-in capital and also discusses treasury stock, retained earnings, and dividends.

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### An ethical perspective: Belex corporation

Joe Morrison is the controller for Belex Corporation. He is involved in a discussion with other members of management concerning how to get rid of some potentially harmful toxic waste materials that are a by-product of the company's manufacturing process.

There are two alternative methods of disposing of the materials. The first alternative is to bury the waste in steel drums on a tract of land adjacent to the factory building. There is currently no legal prohibition against doing this. The cost of disposing of the materials in this way is estimated to be USD 50,000 per year. The best estimate is that the steel drums would not leak for at least 50 years, but probably would begin leaking after that time. The second alternative is to seal the materials in lead drums that would be disposed of at sea by a waste management company. The cost of this alternative is estimated to be USD 400,000 per year. The federal government has certified this method as the preferred method of disposal. The best estimate is that the lead drums would never rupture or leak.

Belex Corporation has seen some tough economic times. The company suffered losses until last year, when it showed a profit of USD 750,000 as a result of a new manufacturing project. So far, the waste materials from that project have been accumulating in two large vats on the company's land. However, these vats are almost full, so soon management must decide how to dispose of the materials.

One group of managers is arguing in favor of the first alternative because it is legally permissible and results in annual profits of about USD 700,000. They point out that using the second alternative would reduce profits to about USD 350,000 per year and cut managers' bonuses in half. They also claim that some of their competitors are now using the first alternative, and to use the second alternative would place the company at a serious competitive disadvantage.

Another group of managers argues that the second alternative is the only safe alternative to pursue. They claim that when the steel drums start leaking they will contaminate the ground water and could cause serious health problems. When this contamination occurs, the company will lose public support and may even have to pay for the cleanup. The cost of that cleanup could run into the millions.

### Understanding the learning objectives

- Advantages:
  - (a) Easy transfer of ownership.
  - (b) Limited liability.
  - (c) Continuous existence of the entity.
  - (d) Easy capital generation.
  - (e) Professional management.
  - (f) Separation of owners and entity.
- Disadvantages:
  - (a) Double taxation.
  - (b) Government regulation.
  - (c) Entrenched, inefficient management.
  - (d) Limited ability to raise creditor capital.

## 12. Stockholders' equity: Classes of capital stock

- Par value—an arbitrary amount assigned to each share of a given class of stock and printed on the stock certificate.
- Stated value—an arbitrary amount assigned by the board of directors to each share of a given class of no-par stock.
- Market value—the price at which shares of capital stock are bought and sold in the market.
- Book value—the amount per share that each stockholder would receive if the corporation were liquidated without incurring any further expenses and if assets were sold and liabilities liquidated at their recorded amounts.
- Liquidation value—the amount a stockholder would receive if a corporation discontinues operations, pays its liabilities, and distributes the remaining cash among the stockholders.
- Redemption value—the price per share at which a corporation may call in (redeem) its capital stock for retirement.
- Capital stock authorized—the number of shares of stock that a corporation is entitled to issue as designated in its charter.
- Capital stock issued—the number of shares of stock that have been sold and issued to stockholders.
- Capital stock outstanding—the number of authorized shares of stock that have been issued and that are still currently held by stockholders.
- Two basic classes of capital stock:
  - (a) Common stock—represents the residual equity.
  - (b) Preferred stock—may be preferred as to dividends and/or assets. Also may be cumulative and/or callable.
- If the company has paid-in capital in excess of par value, the proper form would be:

Stockholders' equity:

Paid-in capital:			
Preferred stock—\$100 par value, 6% cumulative; 1,000 shares authorized, issued, and outstanding		\$ 100,000	
Common stock—without par value, stated value, \$5; 100,000 shares authorized, 80,000 shares; issued and outstanding	400,000		\$ 500,000
Paid-in capital in excess of par (or stated) value:			
From preferred stock issuances		\$ 5,000	
From common stock issuances	20,000		25,000
Total paid-in capital			\$ 525,000
Retained earnings			200,000
Total stockholders' equity			\$ 725,000

The following examples illustrate the issuance for cash of: (1) stock with a par value, (2) no-par value stock with a stated value, and (3) no-par value stock without a stated value.

- Issuance of par value stock for cash—10,000 shares of USD 20 par value common stock issued for USD 22 per share.

<b>Cash (+A)</b>	<b>220,000</b>	
<b>Common Stock (+SE)</b>		<b>200,000</b>
<b>Paid-In Capital in Excess of Par</b>		<b>20,000</b>



**Value—Common (+SE)**

- Issuance of no-par, stated value stock for cash—10,000 shares (no-par value) with USD 20 per share stated value issued for USD 22 per share.

<b>Cash (+A)</b>	<b>220,000</b>	
<b>Common Stock (+SE)</b>		<b>200,000</b>
<b>Paid-In Capital in Excess of Stated Value—Common (+SE)</b>		<b>20,000</b>

- Issuance of no-par stock without a stated value for cash—10,000 shares (no-par value) issued at USD 22 per share.

<b>Cash (+A)</b>	<b>220,000</b>	
<b>Common Stock (+SE)</b>		<b>220,000</b>

- Example: A corporation has 200,000 shares of common stock and 5,000 shares of preferred stock outstanding. Preferred stock is 6 per cent and cumulative. It is preferred as to dividends and as to assets in liquidation to the extent of the liquidation value of USD 100 per share, plus any cumulative dividends on the preferred stock. Dividends for three years are unpaid. Total stockholders' equity is USD 4,100,000. Calculations are as follows:

	<b>Total</b>	<b>Per Share</b>
Total stockholders' equity	\$4,100,000	
Book value of preferred stock (5,000 shares)		
Liquidation value (5,000 shares X \$100)	\$ 500,000	
Dividends (3 years at \$30,000)	90,000	\$ 118.00
Book value of common stock (200,000 shares)	\$3,510,000	17.55

- The return on average common stockholders' equity equals net income available to common stockholders divided by average common stockholders' equity.
- The return on average common stockholders' equity is an important measure of the income-producing ability of the company.

**Demonstration problem**

**Demonstration problem A** Violet Company has paid all required preferred dividends through 2004 December 31. Its outstanding stock consists of 10,000 shares of USD 125 par value common stock and 4,000 shares of 6 per cent, USD 125 par value preferred stock. During five successive years, the company's dividend declarations were as follows:

<b>2005</b>	<b>\$85,000</b>
<b>2006</b>	<b>52,500</b>
<b>2007</b>	<b>7,500</b>
<b>2008</b>	<b>15,000</b>
<b>2009</b>	<b>67,500</b>

Compute the amount of dividends that would have been paid to each class of stock in each of the last five years assuming the preferred stock is:

- Cumulative.
- Noncumulative.

**Demonstration problem B** Terrier Company has been authorized to issue 100,000 shares of USD 6 par value common stock and 1,000 shares of 14 per cent, cumulative, preferred stock with a par value of USD 12.

- Prepare the entries for the following transactions that all took place in June 2009:
  - 50,000 shares of common stock are issued for cash at USD 24 per share.

## 12. Stockholders' equity: Classes of capital stock

- 750 shares of preferred stock are issued for cash at USD 18 per share.
- 1,000 shares of common stock are issued in exchange for legal services received in the incorporation process. The fair market value of the legal services is USD 9,000.

b. Prepare the paid-in capital section of Terrier's balance sheet as of 2009 June 30.

### Solution to demonstration problem A

VIOLET COMPANY		Assumptions	
Year	Dividends to	a	b
<b>2005</b>	<b>Preferred</b>	<b>\$30,000*</b>	<b>\$30,000</b>
	<b>Common</b>	<b>55,000</b>	<b>55,000</b>
<b>2006</b>	<b>Preferred</b>	<b>30,000</b>	<b>30,000</b>
	<b>Common</b>	<b>22,500</b>	<b>22,500</b>
<b>2007</b>	<b>Preferred</b>	<b>7,500</b>	<b>7,500</b>
	<b>Common</b>	<b>-0-</b>	<b>-0-</b>
<b>2008</b>	<b>Preferred</b>	<b>15,000</b>	<b>15,000</b>
	<b>Common</b>	<b>-0-</b>	<b>-0-</b>
<b>2009</b>	<b>Preferred</b>	<b>67,500†</b>	<b>30,000‡</b>
	<b>Common</b>	<b>-0-</b>	<b>37,500</b>

\*  $4,000 \text{ shares} \times \$125 \times 0.06 = \$30,000$

†  $\$30,000 + \$22,500$  preferred dividend missed in 2007 +  $\$15,000$  preferred dividend missed in 2008.

‡ Only the basic  $\$30,000$  dividend is paid because the stock is noncumulative.

### Solution to demonstration problem B

a. (1)	<b>Cash (+A)</b>	<b>1,200,000</b>
	<b>Common Stock (+SE)</b>	<b>300,000</b>
	<b>Paid-In Capital in Excess of Par Value—Common Stock (+SE)</b>	<b>900,000</b>
	<b>To record issuance of 50,000 shares at \$24 per share.</b>	

## 12. Stockholders' equity: Classes of capital stock

(2)	Cash (+A)	13,500	
	Preferred Stock (+SE)		9,000
	Paid-In Capital in Excess of Par Value—Preferred (+SE)		4,500
	To record the issuance of 750 shares for cash, at \$18 per share.		
(3)	Organization Costs (+A)	9,000	
	Common Stock (+SE)		6,000
	Paid-In Capital in Excess of Par Value—Common (+SE)		3,000
	To record the issuance of 1,000 shares in exchange for legal services.		

b. *TERRIER COMPANY*  
Partial Balance Sheet  
2009 June 30

<i>Paid-in Capital:</i>			
Preferred stock—\$12 par value, 14% cumulative; 1,000 shares authorized; issued and outstanding, 750 shares	\$ 9,000		
Common stock—\$6 par value per share; 100,000 shares authorized; issued and outstanding, 51,000 shares	306,000	\$ 315,000	
<i>Paid-in capital in excess of par value:</i>			
From preferred stock issuances	\$ 4,500		
From common stock issuances	903,000	907,500	
Total paid-in capital		\$1,222,500	0

## Key Terms

**Articles of incorporation** The application for the corporation's charter.

**Board of directors** Elected by the stockholders to have primary responsibility for formulating policies for the corporation. The board also authorizes contracts, declares dividends, establishes executive salaries, and grants authorization to borrow money.

**Book value per share** Stockholders' equity per share; the amount per share each stockholder would receive if the corporation were liquidated without incurring any further expenses and if assets were sold and liabilities liquidated at their recorded amounts.

**Bylaws** A set of rules or regulations adopted by the board of directors of a corporation to govern the conduct of corporate affairs. The bylaws must be in agreement with the laws of the state and the policies and purposes in the corporate charter.

**Callable preferred stock** If the stock is nonconvertible, it must be surrendered to the company when the holder is requested to do so. If the stock is convertible, it may be either surrendered or converted into common shares when called.

**Call premium (on preferred stock)** The difference between the amount at which a corporation calls its preferred stock for redemption and the par value of the stock.

**Capital stock** Transferable units of ownership in a corporation.

**Capital stock authorized** The number of shares of stock that a corporation is entitled to issue as designated in its charter.

**Capital stock issued** The number of shares of stock that have been sold and issued to stockholders.

**Capital stock outstanding** The number of shares of authorized stock issued and currently held by stockholders.

**Common stock** Shares of stock representing the residual equity in the corporation. If only one class of stock is issued, it is known as common stock. All other claims rank ahead of common stockholders' claims.

**Convertible preferred stock** Preferred stock that is convertible into common stock of the issuing corporation.

**Corporate charter** The contract between the state and the incorporators of a corporation, and their successors, granting the corporation its legal existence.

**Corporation** An entity recognized by law as possessing an existence separate and distinct from its owners; that is, it is a separate legal entity. A corporation is granted many of the rights, and placed under many of the obligations, of a natural person. In any given state, all corporations organized under the laws of that state are domestic corporations; all others are foreign corporations.

**Cumulative preferred stock** Preferred stock for which the right to receive a basic dividend accumulates if any dividends have not been paid; unpaid cumulative preferred dividends must be paid before any dividends can be paid on the common stock.

**Discount on capital stock** The amount by which the par value of shares issued exceeds their issue price. The original issuance of shares at a discount is illegal in most states.

**Dividend** A distribution of assets (usually cash) that represents a withdrawal of earnings by the owners.

**Dividend on preferred stock** The amount paid to preferred stockholders as a return for the use of their money; usually a fixed or stated amount expressed in dollars per share or as a percentage of par value per share.

**Dividends in arrears** Cumulative unpaid dividends, including quarterly dividends not declared for the current year.

**Domestic corporation** See corporation.

**Foreign corporation** See corporation.

**Incorporators** Persons seeking to bring a corporation into existence.

**Legal capital (stated capital)** An amount prescribed by law (usually the par value or stated value of shares issued) below which a corporation may not reduce stockholders' equity through the declaration of dividends or other payments to stockholders.

**Liquidation value** The amount a stockholder will receive if a corporation discontinues operations and liquidates by selling its assets, paying its liabilities, and distributing the remaining cash among the stockholders.

**Market value** The price at which shares of capital stock are bought and sold in the market.

**Minutes book** The record book in which actions taken at stockholders' and board of directors' meetings are recorded; the written authorization for many actions taken by corporate officers.

**Noncumulative preferred stock** Preferred stock on which the right to receive a dividend expires if the dividend is not declared.

**No-par stock** Capital stock without par value, to which a stated value may or may not be assigned.

**Organization costs** Costs of organizing a corporation, such as incorporation fees and legal fees applicable to incorporation.

**Paid-in capital** Amount of stockholders' equity that normally results from the cash or other assets invested by owners; it may also result from services provided for shares of stock and certain other transactions.

**Paid-in capital in excess of par (or stated) value—common or preferred** Capital contributed to a corporation in addition to that assigned to the shares issued and recorded in capital stock accounts.

**Par value** An arbitrary amount assigned to each share of a given class of stock and printed on the stock certificate.

**Preemptive right** The right of stockholders to buy additional shares in a proportion equal to the percentage of shares already owned.

**Preferred stock** Capital stock that carries certain features or rights not carried by common stock. Preferred stock may be preferred as to dividends, as to assets, or as to both dividends and assets. Preferred stock may be callable and/or convertible and may be cumulative or noncumulative.

**Proxy** A legal document signed by a stockholder, giving another person the authority to vote the stockholder's shares at a stockholders' meeting.

**Redemption value** The price per share at which a corporation may call in (or redeem) its capital stock for retirement.

**Retained earnings** The part of stockholders' equity resulting from net income, reduced by dividends and net losses.

## 12. Stockholders' equity: Classes of capital stock

**Return on average common stockholders' equity** A measure of the income-producing ability of the company. It is the ratio of net income available to common stockholders divided by average common stockholders' equity.

**Shares of stock** Units of ownership in a corporation.

**Stated value** An arbitrary amount assigned by the board of directors to each share of a given class of no-par stock.

**Stock certificate** A printed or engraved document serving as evidence that the holder owns a certain number of shares of capital stock.

**Stockholders' ledger** Contains a group of subsidiary accounts showing the number of shares of stock currently held by each stockholder.

**Stock preferred as to assets** Means that in liquidation, the preferred stockholders are entitled to receive the par value (or a larger stipulated liquidation value) per share before any assets may be distributed to common stockholders.

**Stock preferred as to dividends** Means that the preferred stockholders are entitled to receive a specified dividend per share before any dividend on common stock is paid.

**Stock registrar** Typically, a bank that maintains records of the shares outstanding for a company.

**Stock-transfer agent** Typically, a bank or trust company employed by a corporation to transfer stock between buyers and sellers.

**Stock without par value** See no-par stock.

**Unissued shares** Capital stock authorized but not yet issued.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

A person may favor the corporate form of organization for a risky business enterprise primarily because a corporation's shares can be easily transferred.

In the event of corporate liquidation, stockholders whose stock is preferred as to assets are entitled to receive the par value of their shares before any amounts are distributed to creditors or common stockholders.

The par value of a share of capital stock is no indication of the market value or book value of the share of stock.

When 10,000 shares of USD 20 par value common stock are issued in payment for a parcel of land with a fair market value of USD 300,000, the Common Stock account is credited for USD 200,000, and the Paid-In Capital in Excess of Par Value—Common account is credited for USD 100,000.

#### Multiple-choice

Select the best answer for each of the following questions.

Which of the following is not an advantage of the corporate form of organization?

- Continuous existence of the entity.
- Limited liability of stockholders.
- Government regulation.
- Easy transfer of ownership.

An arbitrary amount assigned by the board of directors to each share of a given class of no-par stock is:

- Quasi-par value.
- Stated value.
- Redemption value.
- Liquidation value.

Preferred stock that has dividends in arrears is:

- a. Noncumulative preferred stock.
- b. Noncumulative and callable preferred stock.
- c. Noncumulative and convertible preferred stock.
- d. Cumulative preferred stock.

Quinn Corporation issued 10,000 shares of USD 20 par value common stock at USD 50 per share. The amount that would be credited to Paid-In Capital in Excess of Par Value—Common is:

- a. USD 200,000.
- b. USD 300,000.
- c. USD 500,000.
- d. USD 700,000.
- e. None of the above.

You are given the following information: Capital Stock, USD 80,000 (USD 80 par); Paid-In Capital in Excess of Par Value—Common, USD 200,000; and Retained Earnings, USD 400,000. Assuming only one class of stock, the book value per share is:

- a. USD 680.
- b. USD 280.
- c. USD 80.
- d. USD 400.
- e. None of the above.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- Cite the major advantages of the corporate form of business organization and indicate why each is considered an advantage.
- What is meant by the statement that corporate income is subject to double taxation? Cite several other disadvantages of the corporate form of organization.
- Why is Organization Expense not a good title for the account that records the costs of organizing a corporation? Could you justify leaving the balance of an Organization Costs account intact throughout the life of a corporation?
- What are the basic rights associated with a share of capital stock if there is only one class of stock outstanding?
- Explain the purpose or function of: (a) the stockholders' ledger, (b) the minutes book, (c) the stock-transfer agent, and (d) the stock registrar.
- What are the differences between par value stock and stock with no-par value?
- Corporate capital stock is seldom issued for less than par value. Give two reasons why this statement is true.
- Explain the terms liquidation value and redemption value.
- What are the meanings of the terms stock preferred as to dividends and stock preferred as to assets?
- What do the terms cumulative and noncumulative mean in regard to preferred stock?
- What are dividends in arrears, and how should they be disclosed in the financial statements?

## 12. Stockholders' equity: Classes of capital stock

- A corporation has 1,000 shares of 8 per cent, USD 200 par value, cumulative, preferred stock outstanding. Dividends on this stock have not been declared for three years. Is the corporation legally liable to its preferred stockholders for these dividends? How should this fact be shown in the balance sheet, if at all?
- Explain why a corporation might issue a preferred stock that is both convertible into common stock and callable.
- Explain the nature of the account entitled Paid-In Capital in Excess of Par Value. Under what circumstances is this account credited?
- Blake Corporation issued 5,000 shares of USD 100 par value common stock at USD 120 per share. What is the legal capital of Blake Corporation, and why is the amount of legal capital important?
- What is the general approach of the accountant in determining the dollar amount at which to record the issuance of capital stock for services or property other than cash?
- What assumptions are made in determining book value?
- Assuming there is no preferred stock outstanding, how can the book value per share of common stock be determined? Of what significance is the book value per share? What is the relationship of book value per share to market value per share?

### Exercises

**Exercise A** Winters Corporation has outstanding 1,000 shares of noncumulative preferred stock and 2,000 shares of common stock. The preferred stock is entitled to an annual dividend of USD 100 per share before dividends are declared on common stock. What are the total dividends received by each class of stock if Winters Corporation distributes USD 280,000 in dividends in 2010?

**Exercise B** Zeff Corporation has 2,000 shares outstanding of cumulative preferred stock and 6,000 shares of common stock. The preferred stock is entitled to an annual dividend of USD 18 per share before dividends are declared on common stock. No preferred dividends were paid for last year and the current year. What are the total dividends received by each class of stock if Zeff Corporation distributes USD 108,000 in dividends?

**Exercise C** Gordon Company issued 10,000 shares of common stock for USD 1,120,000 cash. The common stock has a par value of USD 100 per share. Give the journal entry for the stock issuance.

**Exercise D** Thore Company issued 30,000 shares of USD 20 par value common stock for USD 680,000. What is the journal entry for this transaction? What would the journal entry be if the common stock had no-par or stated value?

**Exercise E** Li & Tu, Inc., needed land for a plant site. It issued 100 shares of USD 480 par value common stock to the incorporators of their corporation in exchange for land, which cost USD 56,000 one year ago. Experienced appraisers recently valued the land at USD 72,000. What journal entry would be appropriate to record the acquisition of the land?

**Exercise F** Smart Corporation owes a trade creditor USD 30,000 on open account which the corporation does not have sufficient cash to pay. The trade creditor suggests that Smart Corporation issue to him 750 shares of the USD 24 par value common stock, which is currently selling on the market at USD 40. Present the entry or entries that should be made on Smart Corporation's books.

**Exercise G** Why would a law firm ever consider accepting stock of a new corporation having a total par value of USD 320,000 as payment in full of a USD 480,000 bill for legal services rendered? If such a transaction occurred, give the journal entry the issuing company would make on its books.

**Exercise H** The stockholders' equity of Graf Company's balance is as follows:

<b>Stockholders' equity:</b>	
<b>Paid-in capital:</b>	
<b>Common stock—without par value, \$12 stated value; authorized 100,000 shares;</b>	
<b>issued and outstanding, 70,000 shares</b>	<b>\$ 840,000</b>
<b>Paid-in capital in excess of stated value</b>	<b>340,000</b>
<b>Total paid-in capital</b>	<b>\$1,180,000</b>
	<b>0</b>
<b>Retained earnings</b>	<b>80,000</b>
<b>Total stockholders' equity</b>	<b>\$1,260,000</b>
	<b>0</b>

Compute the average price at which the 70,000 issued shares of common stock were sold. Compute the book value per share of common stock.

### Problems

**Problem A** The outstanding capital stock of Robbins Corporation consisted of 3,000 shares of 10 per cent preferred stock, USD 250 par value, and 30,000 shares of no-par common stock with a stated value of USD 250. The preferred was issued at USD 412, the common at USD 480 per share. On 2005 January 1, the retained earnings of the company were USD 250,000. During the succeeding five years, net income was as follows:

<b>2005</b>	<b>\$767,500</b>
<b>2006</b>	<b>510,000</b>
<b>2007</b>	<b>48,000</b>
<b>2008</b>	<b>160,000</b>
<b>2009</b>	<b>662,500</b>

No dividends were in arrears as of 2005 January 1, and during the five years 2005-2009, the board of directors declared dividends in each year equal to net income of the year.

Prepare a schedule showing the dividends declared each year on each class of stock assuming the preferred stock is:

- Cumulative.
- Noncumulative.

**Problem B** On 2008 December 27, Glade Company was authorized to issue 250,000 shares of USD 24 par value common stock. It then completed the following transactions:

2009

Jan. 14 Issued 45,000 shares of common stock at USD 30 per share for cash.

29 Gave the promoters of the corporation 25,000 shares of common stock for their services in organizing the company. The board of directors valued these services at USD 744,000.

19 Exchanged 50,000 shares of common stock for the following assets at the indicated fair market values:

Land	USD 216,000
Building	528,000
Machinery	720,000

- Prepare general journal entries to record the transactions.
- Prepare the balance sheet of the company as of 2009 March 1.



## 12. Stockholders' equity: Classes of capital stock

**Problem C** In the corporate charter that it received on 2009 May 1, Norris Company was authorized to issue 15,000 shares of common stock. The company issued 1,000 shares immediately for USD 82 per share, cash.

On July 2, the company issued 100 shares of stock to a lawyer to satisfy a USD 8,400 bill for legal services rendered in organizing the corporation.

On July 5, the company issued 1,000 shares to the principal promoter of the corporation in exchange for a patent. Another 200 shares were issued to this same person for costs incurred and services rendered in bringing the corporation into existence. The market value of the stock was USD 84 per share.

a. Set up T-accounts, and post these transactions. Then prepare a balance sheet for the Norris Company as of 2009 July 5, assuming the authorized stock has a par value of USD 75 per share.

b. Repeat part (a) for the stockholders' equity accounts, and prepare the stockholders' equity section of the July 5 balance sheet assuming the stock authorized has no par value but has a USD 30 per share stated value.

c. Repeat part (a) for the stockholders' equity accounts assuming the stock authorized has neither par nor stated value. Prepare the stockholders' equity section of the balance sheet.

**Problem D** On 2009 May 1, Farmington Company received a charter that authorized it to issue:

- 4,000 shares of no-par preferred stock to which a stated value of USD 12 per share is assigned. The stock is entitled to a cumulative dividend of USD 9.60, convertible into two shares of common stock, callable at USD 208, and entitled to USD 200 per share in liquidation.

- 1,500 shares of USD 400 par value, USD 20 cumulative preferred stock, which is callable at USD 420 and entitled to USD 412 in liquidation.

- 60,000 shares of no-par common stock to which a stated value of USD 40 is assigned.

May 1 All of the USD 9.60 cumulative preferred was issued at USD 204 per share, cash.

2 All of the USD 20 cumulative preferred was exchanged for merchandise inventory, land, and buildings valued at USD 128,000, USD 160,000, and USD 425,000, respectively.

3 Cash of USD 15,000 was paid to reimburse promoters for costs incurred for accounting, legal, and printing services. In addition, 1,000 shares of common stock were issued to the promoters for their services. The value of all of the services (including those paid in cash) was USD 55,000.

a. Prepare journal entries for these transactions.

b. Assume that retained earnings were USD 200,000. Prepare the stockholders' equity section of the 2009 May 31, balance sheet.

**Problem E** On 2008 January 2, the King Company received its charter. It issued all of its authorized 3,000 shares of no-par preferred stock at USD 104 and all of its 12,000 authorized shares of no-par common stock at USD 40 per share. The preferred stock has a stated value of USD 50 per share, is entitled to a basic cumulative dividend of USD 6 per share, is callable at USD 106 beginning in 2010, and is entitled to USD 100 per share plus cumulative dividends in the event of liquidation. The common stock has a stated value of USD 10 per share.

On 2009 December 31, the end of the second year of operations, retained earnings were USD 90,000. No dividends have been declared or paid on either class of stock.

a. Prepare the stockholders' equity section of King Company's 2009 December 31, balance sheet.

b. Compute the book value of each class of stock.

c. If USD 42,000 of dividends were declared as of 2009 December 31, compute the amount paid to each class of stock.

**Problem F** The common stock of Lang Corporation is selling on a stock exchange for USD 90 per share. The stockholders' equity of the corporation at 2009 December 31, consists of:

<b>Stockholders' equity:</b>	
<b>Paid-in capital:</b>	<b>\$ 360,000</b>
<b>Preferred stock—9% cumulative, \$120 par value, \$120 liquidation value, 3,000 shares authorized, issued, and outstanding</b>	
<b>Common stock—\$72 par value, 30,000 shares authorized, issued and outstanding</b>	<b>2,160,000</b>
<b>Total paid-in capital</b>	<b>\$2,520,000</b>
<b>Retained earnings</b>	<b>354,000</b>
<b>Total stockholders' equity</b>	<b>\$2,874,000</b>

Assume that in liquidation the preferred stock is entitled to par value plus cumulative unpaid dividends.

- What is the total market value of all of the corporation's common stock?
- If all dividends have been paid on the preferred stock as of 2009 December 31, what are the book values of the preferred stock and the common stock?
- If two years' dividends were due on the preferred stock as of 2009 December 31, what are the book values of the preferred stock and common stock?

**Problem G** Haft Corporation has an agreement with each of its 15 preferred and 30 common stockholders that in the event of the death of a stockholder, it will purchase at book value from the stockholder's estate or heirs the shares of Haft Corporation stock held by the deceased at the time of death. The book value is to be computed in accordance with generally accepted accounting principles.

Following is the stockholders' equity section of the Haft Corporation's 2009 December 31, balance sheet.

<b>Stockholders' equity:</b>	
<b>Paid-in capital:</b>	
Preferred stock—without par value, \$50 stated value, \$15 cumulative; 3,000 shares authorized, issued, and outstanding	\$ 150,000
Common stock—\$62.50 par value, 60,000 shares authorized, issued and outstanding	3,750,000
Paid-in capital in excess of stated value—preferred	840,000
Paid-in capital in excess of par value—common	30,000
<b>Total paid-in capital</b>	<b>\$4,770,000</b>
<b>Retained earnings</b>	<b>1,800,000</b>
<b>Total stockholders' equity</b>	<b>\$6,570,000</b>

The preferred stock is cumulative and entitled to USD 300 per share plus cumulative dividends in liquidation. No dividends have been paid for 1 year.

A stockholder who owned 100 shares of preferred stock and 1,000 shares of common stock died on 2009 December 31. You have been employed by the stockholder's executor to compute the book value of each class of stock and to determine the price to be paid for the stock held by her late husband.

Prepare a schedule showing the computation of the amount to be paid for the deceased stockholder's preferred and common stock.

### Alternate problems

**Alternate problem A** On 2005 January 1, the retained earnings of Quigley Company were USD 432,000. Net income for the succeeding five years was as follows:

2005	\$288,000
2006	216,000
2007	4,800
2008	48,000
2009	264,000

## 12. Stockholders' equity: Classes of capital stock

The outstanding capital stock of the corporation consisted of 2,000 shares of preferred stock with a par value of USD 480 per share that pays a dividend of USD 19.20 per year and 8,000 shares of no-par common stock with a stated value of USD 240 per share. No dividends were in arrears as of 2005 January 1.

Prepare schedules showing how the net income for these five years was distributed to the two classes of stock if in each of the years the entire current net income was distributed as dividends and the preferred stock was:

- a. Cumulative.
- b. Noncumulative.

**Alternate problem B** On 2009 January 1, Cowling Company was authorized to issue 500,000 shares of USD 5 par value common stock. It then completed the following transactions:

2009

Jan. 14 Issued 90,000 shares of common stock at USD 24 per share for cash.

29 Gave the promoters of the corporation 50,000 shares of common stock for their services in organizing the company. The board of directors valued these services at USD 620,000.

Feb. 19 Exchanged 100,000 shares of common stock for the following assets at the indicated fair market values:

Equipment	USD 180,000
Building	440,000
Land	600,000

- a. Prepare general journal entries to record the transactions.
- b. Prepare the balance sheet of the company as of 2009 March 1.

**Alternate problem C** On 2009 July 3, Barr Company was authorized to issue 15,000 shares of common stock; 3,000 shares were issued immediately to the incorporators of the company for cash at USD 320 per share. On July 5 of that year, an additional 300 shares were issued to the incorporators for services rendered in organizing the company. The board valued these services at USD 96,000. On 2009 July 6, legal and printing costs of USD 12,000 were paid. These costs related to securing the corporate charter and the stock certificates.

- a. Set up T-accounts and post these transactions. Then prepare the balance sheet of the Barr Company as of the close of 2009 July 10, assuming the authorized stock has a USD 160 par value.
- b. Repeat (a) for the T-accounts involving stockholders' equity, assuming the stock is no-par stock with a USD 240 stated value. Prepare the stockholders' equity section of the balance sheet.
- c. Repeat (a) for the T-accounts involving stockholders' equity, assuming the stock is no-par stock with no stated value. Prepare the stockholders' equity section of the balance sheet.

**Alternate problem D** Tempo Company received its charter on 2009 April 1, authorizing it to issue: (1) 10,000 shares of USD 400 par value, USD 32 cumulative, convertible preferred stock; (2) 10,000 shares of USD 12 cumulative no-par preferred stock having a stated value of USD 20 per share and a liquidation value of USD 100 per share; and (3) 100,000 shares of no-par common stock without a stated value.

On April 2, incorporators of the corporation acquired 50,000 shares of the common stock for cash at USD 80 per share, and 200 shares were issued to an attorney for services rendered in organizing the corporation. On April 3, the company issued all of its authorized shares of USD 32 convertible preferred stock for land valued at USD 1,600,000 and a building valued at USD 4,800,000. The property was subject to a mortgage of USD 2,400,000. On April 8, the company issued 5,000 shares of the USD 12 preferred stock in exchange for a patent valued at USD 1,040,000. On April 10, the company issued 1,000 shares of common stock for cash at USD 80 per share.

- a. Prepare general journal entries for these transactions.

b. Prepare the stockholders' equity section of the 2009 April 30, balance sheet. Assume retained earnings were USD 80,000.

c. Assume that each share of the USD 32 convertible preferred stock is convertible into six shares of common stock and that one-half of the preferred is converted on 2009 September 1. Give the required journal entry.

**Alternate problem E** Kane Company issued all of its 5,000 shares of authorized preferred stock on 2008 January 1, at USD 100 per share. The preferred stock is no-par stock, has a stated value of USD 5 per share, is entitled to a cumulative basic preference dividend of USD 6 per share, is callable at USD 110 beginning in 2009, and is entitled to USD 100 per share in liquidation plus cumulative dividends. On this same date, Kane also issued 10,000 authorized shares of no-par common stock with a USD 10 stated value at USD 50 per share.

On 2009 December 31, the end of its second year of operations, the company's retained earnings amounted to USD 160,000. No dividends have been declared or paid on either class of stock since the date of issue.

a. Prepare the stockholders' equity section of Kane Company's 2009 December 31, balance sheet.

b. Compute the book value in total and per share of each class of stock as of 2009 December 31.

c. If USD 110,000 of dividends are to be declared as of 2009 December 31, compute the amount payable to each class of stock.

The stockholders' equity sections from three different corporations' balance sheets follow.

1) **Stockholders' equity:**

**Paid-in capital:**

<b>Preferred stock—7% cumulative, \$240 par value, 500 shares authorized, issued, and outstanding</b>	<b>\$ 120,000</b>	
<b>Common stock—\$48 par value, 10,000 shares authorized, issued and outstanding</b>	<b>480,000</b>	
<b>Total paid-in capital</b>		<b>\$ 600,000</b>
<b>Retained earnings</b>		<b>422,400</b>
<b>Total stockholders' equity</b>		<b>\$1,022,400</b>

(All dividends have been paid.)

2) **Stockholders' equity:**

**Paid-in capital:**

<b>Preferred stock—6% cumulative, \$80 par value, 10,000 shares authorized, issued, and outstanding</b>	<b>\$ 800,000</b>	
<b>Common stock—\$240 par value, 30,000 shares authorized, issued and outstanding</b>	<b>7,200,000</b>	
<b>Total paid-in capital</b>		<b>\$8,000,000</b>
<b>Retained earnings</b>		<b>88,000</b>
<b>Total stockholders' equity</b>		<b>\$8,088,000</b>

(The current year's dividends have not been paid.)

3) **Stockholders' equity:**

**Paid-in capital:**

<b>Preferred stock—7% cumulative, \$480 par value, 10,000 shares authorized, issued, and outstanding</b>	<b>\$ 4,800,000</b>	
<b>Common stock—\$240 par value, 50,000 shares authorized, issued and outstanding</b>	<b>12,000,000</b>	
<b>Total paid-in capital</b>		<b>\$16,800,000</b>
<b>Retained earnings deficit</b>		<b>(1,872,000)</b>
<b>Total stockholders' equity</b>		<b>\$14,928,000</b>

(Dividends have not been paid for 2 previous years or the current year.)

Compute the book values per share of the preferred and common stock of each corporation assuming that in a liquidation the preferred stock receives par value plus dividends in arrears.

## 12. Stockholders' equity: Classes of capital stock

**Alternate problem G** Mendell, Inc., is a corporation in which all of the outstanding preferred and common stock is held by the four Lehman brothers. The brothers have an agreement stating that the remaining brothers will, upon the death of a brother, purchase from the estate his holdings of stock in the company at book value.

The stockholders' equity section of the balance sheet for the company on 2009 December 31, the date of the death of James Lehman, shows:

Stockholders' equity:		
Paid-in capital:		
Preferred stock—6%; \$320 par value; \$320 liquidation value, 4,000 shares authorized, issued, and outstanding	\$1,280,000	
Paid-in capital in excess of par—preferred	64,000	
Common stock—without par value, \$16 stated value, 60,000 shares authorized, issued and outstanding	960,000	
Paid-in capital in excess of par value—common	960,000	
Total paid-in capital		\$3,264,000
Retained earnings		128,000
Total stockholders' equity		\$3,392,000

No dividends have been paid for the last year on the preferred stock, which is cumulative. At the time of his death, James Lehman held 2,000 shares of preferred stock and 10,000 shares of common stock of the company.

- Compute the book value of the preferred stock.
- Compute the book value of the common stock.
- Compute the amount the remaining brothers must pay to the estate of James Lehman for the preferred and common stock that he held at the time of his death.

### Beyond the numbers—Critical thinking

**Business decision case A** Rudd Company and Clay Company have extremely stable net income amounts of USD 4,800,000 and USD 3,200,000, respectively. Both companies distribute all their net income as dividends each year. Rudd Company has 100,000 shares of USD 80 par value, 6 per cent preferred stock, and 500,000 shares of USD 8 par value common stock outstanding. Clay Company has 50,000 shares of USD 40 par value, 8 per cent preferred stock, and 400,000 shares of USD 8 par value common stock outstanding. Both preferred stocks are cumulative.

- Compute the annual dividend per share of preferred stock and per share of common stock for each company.
- Based solely on the preceding information, which common stock would you predict to have the higher market price per share? Why?
- Which company's stock would you buy? Why?

**Business decision case B** Jesse Waltrip recently inherited USD 480,000 cash that he wishes to invest in the common stock of either the West Corporation or the East Corporation. Both corporations have manufactured the same types of products for five years. The stockholders' equity sections of the two corporations' latest balance sheets follow:

## 12. Stockholders' equity: Classes of capital stock

WEST CORPORATION		
<i>Stockholders' equity:</i>		
<i>Paid-in capital:</i>		
<i>Common stock—\$125 par value, 30,000 shares authorized, issued and outstanding</i>		<i>\$3,750,000</i>
<i>Retained earnings</i>		<i>3,450,000</i>
<i>Total stockholders' equity</i>		<i>\$7,200,000</i>
EAST CORPORATION		
<i>Stockholders' equity:</i>		
<i>Paid-in capital:</i>		
<i>Preferred stock—8%, \$500 par value, cumulative 4,000 shares authorized, issued and outstanding</i>	<i>\$2,000,000</i>	
<i>Common stock—\$125 par value, 40,000 shares authorized, issued and outstanding</i>	<i>5,000,000</i>	<i>\$7,000,000</i>
<i>Retained earnings</i>		<i>560,000</i>
<i>Total stockholders' equity</i>		<i>\$7,560,000</i>

The West Corporation has paid a cash dividend of USD 6 per share each year since its creation; its common stock is currently selling for USD 590 per share. The East Corporation's common stock is currently selling for USD 480 per share. The current year's dividend and three prior years' dividends on the preferred stock are in arrears. The preferred stock has a liquidation value of USD 600 per share.

a. What is the book value per share of the West Corporation common stock and the East Corporation common stock? Is book value the major determinant of market value of the stock?

b. Based solely on the previous information, which investment would you recommend to Waltrip? Why?

**Annual report analysis C** Determine the 2003 return on average common stockholders' equity for The Limited in the Annual report appendix. Explain in writing why this information is important to managers, investors, and creditors.

**Ethics case D** Refer to the ethics case concerning Joe Morrison to answer the following questions:

a. Which alternative would benefit the company and its management over the next several years?

b. Which alternative would benefit society?

c. If you were Morrison, which side of the argument would you take?

**Group project E** In teams of two or three students, examine the annual reports of three companies and calculate each company's return on common shareholders' equity for the most recent two years. At least two years are needed to observe any changes. As a team, decide in which of the three companies you would invest. Appoint a spokesperson for the team to explain to the class which company the team would invest in and why.

**Group project F** In a team of two or three students, locate the annual reports of three companies that have preferred stock in their stockholders' equity section. Determine the features of the preferred stock. Analyze the data in the annual report to determine whether dividends have been paid on the preferred stock each year. Are there dividends in arrears? Write a report to your instructor summarizing your findings. Also be prepared to make a short presentation to the class.

**Group project G** In a group of one or two students, contact state officials and/or consult library resources to inquire about the incorporation laws in your state. Determine your state laws regarding the issuance of stock at an amount below par value, how legal capital is determined, and the requirements and government fees for incorporating a company in your state. Write a report to your instructor summarizing the results of your investigation and be prepared to make a short presentation to your class.

**Using the Internet—A view of the real world**

Visit the following website for Macromedia:

<http://www.macromedia.com>

Pursue choices on the screen until you locate the consolidated statement of stockholders' equity. You will probably go down some "false paths" to get to this financial statement, but you can get there. This experience is all part of learning to use the Internet. Note the changes that have occurred in the Common Stock, Additional Paid-In Capital, and Retained Earnings accounts. Check out the notes to the financial statements for further information. Write a memo to your instructor summarizing your findings.

Visit the following website for Gartner Group:

<http://www.gartner.com>

Pursue choices on the screen until you locate the consolidated statement of stockholders' equity. You will probably go down some "false paths" to get to this financial statement, but you can get there. This experience is all part of learning to use the Internet. Trace the changes that have occurred in the last three years in the Common Stock account. Check out the notes to the financial statements for further information. Write a memo to your instructor summarizing your findings.

#### Answers to self-test

##### True-false

**False.** This is not the primary reason a person may prefer the corporate form of business organization in a situation involving considerable risk. The primary reason is that stockholders can lose only the amount of capital they have invested in a corporation.

**False.** The claims of the creditors rank ahead of the claims of the stockholders, even those stockholders whose stock is preferred as to assets.

**True.** Par value is simply the amount per share that is credited to the Capital Stock account for each share issued and is no indication of the market value or the book value of the stock.

**True.** When capital stock is issued for property or services, the transaction is recorded at the fair market value of (1) the property or services received or (2) the stock issued, whichever is more clearly evident.

##### Multiple-choice

**c.** This feature of corporations is one of the disadvantages of the corporate form of organization.

**b.** Stated value is an arbitrary amount assigned by the board of directors to each share of capital stock without a par value.

**d.** Dividends in arrears are cumulative unpaid dividends. Only cumulative preferred stock has dividends in arrears.

**b.** The amount credited to the Paid-In Capital in Excess of Par Value—Common is computed as follows:

$$10,000 \text{ shares} \times (\text{USD } 50 - \text{USD } 20) = \text{USD } 300,000$$

**a.** The book value of common stock is computed as follows:

<b>Total book value of stockholders' equity</b>	
<b>(\$80,000 + \$200,000 + \$400,000)</b>	<b>\$680,000</b>
<b>Total shares</b>	<b>÷ 1,000</b>
<b>Book value per share</b>	<b>\$ 680</b>

# 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

## Learning objectives

After studying this chapter, you should be able to:

- Identify the different sources of paid-in capital and describe how to present them on a balance sheet.
- Account for a cash dividend, a stock dividend, a stock split, and a retained earnings appropriation.
- Account for the acquisition and reissuance of treasury stock.
- Describe the proper accounting treatment of discontinued operations, extraordinary items, and changes in accounting principle.
- Define prior period adjustments and show their proper presentation in the financial statements.
- Analyze and use the financial results—earnings per share and price-earnings ratio.

## The accountant as a financial analyst

The primary purpose of financial reporting is to provide information to investors and creditors. Investors use financial information in purchasing and selling of stocks, while creditors (such as banks) use financial information in reviewing the credit-worthiness of companies wishing to obtain loans. In making these types of decisions, investors and creditors rely on financial analysts to give them accurate assessments of the value and strength of the company. The role of the financial analysts is to take the financial information reported by a company and translate that into a rating of company performance. It should therefore be no surprise that a successful financial analyst is one that has a deep understanding of financial accounting. Who better to analyze the financial statements than the person who prepared them? Who would have a better understanding of the data and information contained in financial statements than the accountant? Financial statements are becoming ever more complex and difficult to interpret by users. Thus, accountants are becoming increasingly important in assisting others to understand and interpret financial information.

Helping users understand financial information involves such tasks as developing graphs, common-size statements, and performing horizontal and vertical analysis. Analysis could also involve performing data comparisons with relevant financial and nonfinancial data. The Altman Z Model is an example of a tool used by analysts to predict bankruptcy. The model includes such items as retained earnings/total assets and sales/total assets as variables in the calculation. Based upon this test, Cooper Tire & Rubber Company earned a score of 6.07 in a recent year. A score below 2.675 was considered an indication of possible bankruptcy. Therefore, analysts evaluated Cooper as a very healthy company not likely to go bankrupt.



### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

Financial analysts make numerous judgments about the financial condition of companies, as in the example above. These services are essential to the decisions of investors and creditors. Thus, financial analysts with a strong accounting background are well compensated for their efforts.

As owners of a corporation, stockholders provide much of the capital for its activities. On the balance sheet, we show the stockholders' capital investment in the corporation as paid-in capital under stockholders' equity. Also included in stockholders' equity is the capital accumulated through the retention of corporate earnings (retained earnings). Paid-in capital is a relatively permanent portion of stockholders' equity; the retained earnings balance is a relatively temporary portion of corporate capital and is the source of stockholders' dividends.

The preceding chapter discussed the paid-in capital obtained by issuing shares of stock for cash, property, or services. This chapter describes additional sources of paid-in capital and items affecting retained earnings.

#### Paid-in (or contributed) capital

As you have learned in the preceding chapter, **paid-in capital**, or **contributed capital**, refers to all of the contributed capital of a corporation, including the capital carried in the capital stock accounts. The general ledger does not contain an account titled "Paid-In Capital". Instead, paid-in capital is a category, and companies establish a separate account for each source of paid-in capital.

In Exhibit 97, we summarize several sources of stockholders' equity and list general ledger account titles used to record increases and decreases in capital from each of these sources. Chapter 12 discussed some of these general ledger accounts. This chapter discusses other general ledger accounts that record sources of stockholders' equity.

The stockholders' equity section of a balance sheet shows the different sources of the corporation's paid-in capital because these sources are important information. For example, these additional sources may be from stock dividends, treasury stock transactions, or donations.

Sources of stockholders' equity	Illustrative general ledger account titles
I. Capital paid in (or contributed)	
A. For, or assigned to, shares:	
1. Issued to the extent of par or stated value or the amount received for shares without par or stated value.	Common stock
2. To be distributed as a stock dividend.	5% preferred stock
3. In addition to par or stated value:	Stock dividend distributable – common (preferred)
a. In excess or par.	Paid-In capital in Excess of par value – Common (preferred)
b. In excess of stated value.	Paid-In capital in excess of stated value – Common (preferred)
c. Resulting from declaration of stock dividends.	Paid-In capital – Stock Dividends
d. Resulting from reissue of treasury stock at a price above its acquisition price.	Paid -In capital – Common (preferred) Treasury stock transactions
B. Donations (gifts), whether from stockholders or from others.	Paid-in Capital - Donations
II. Capital accumulated by retention of earnings (retained earnings).	Appropriation per loan agreement
A. Appropriated retained earnings.	Retained earnings (Unappropriated)
B. Free and unappropriated retained earnings.	

Exhibit 97: Sources of stockholders' equity

#### Paid-in capital—Stock dividends

When it declares a stock dividend, a corporation distributes additional shares of stock (instead of cash) to its present stockholders. A later section discusses and illustrates how the issuance of a stock dividend results in a credit to a Paid-In Capital—Stock Dividends account.

## Paid-in capital—Treasury stock transactions

Another source of capital is treasury stock transactions. **Treasury stock** is the corporation's own stock, either preferred or common, that it has issued and reacquired. It is legally available for reissuance. By reacquiring shares of its own outstanding capital stock at one price and later reissuing them at a higher price, a corporation can increase its capital by the difference between the two prices. If the reissue price is less than acquisition cost, however, corporate capital decreases. We discuss treasury stock transactions at length later in this chapter.

## Paid-in capital—Donations

Occasionally, a corporation receives a gift of assets, such as a USD 500,000 building. These donated gifts increase stockholders' equity and are called **donated capital**. The entry to record the gift of a USD 500,000 building is a debit to Buildings and a credit to Paid-In Capital—Donations. Accountants would make this entry in the amount of the USD 500,000 fair market value of the gift when received.

## Retained earnings

The **retained earnings** portion of stockholders' equity typically results from accumulated earnings, reduced by net losses and dividends. Like paid-in capital, retained earnings is a source of assets received by a corporation. Paid-in capital is the actual investment by the stockholders; retained earnings is the investment by the stockholders through earnings not yet withdrawn.

The balance in the corporation's Retained Earnings account is the corporation's net income, less net losses, from the date the corporation began to the present, less the sum of dividends paid during this period. Net income increases Retained Earnings, while net losses and dividends decrease Retained Earnings in any given year. Thus, the balance in Retained Earnings represents the corporation's accumulated net income not distributed to stockholders.

When the Retained Earnings account has a debit balance, a **deficit** exists. A company indicates a deficit by listing retained earnings with a negative amount in the stockholders' equity section of the balance sheet. The firm need not change the title of the general ledger account even though it contains a debit balance. The most common credits and debits made to Retained Earnings are for income (or losses) and dividends. Occasionally, accountants make other entries to the Retained Earnings account. We discuss some of these entries later in the chapter.

## Paid-in capital and retained earnings on the balance sheet

The following stockholders' equity section of a balance sheet presents the various sources of capital in proper form:

Stockholders' equity:		
Paid-in capital:		
Preferred stock – 6%, \$100 par value; authorized, issued, and outstanding, 4,000 shares	\$400,000	
Common stock – no-par value, \$5 stated value; authorized, issued, and outstanding, 400,000 shares	2,000,000	\$2,400,000
Paid-in capital -		
From preferred stock issuances*	\$ 40,000	
From donations	10,000	50,000
Total paid-in capital		\$2,450,000
Retained earnings		500,000
Total stockholders' equity		\$2,950,000

\* This label is not the exact account title but is representative of the descriptions used on balance sheets. The exact account title could be used, but shorter descriptions are often shown.

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

\*This label is not the exact account title but is representative of the descriptions used on balance sheets. The exact account title could be used, but shorter descriptions are often shown.

In their highly condensed, published balance sheets, companies often omit the details regarding the sources of the paid-in capital in excess of par or stated value and replace them by a single item, such as:

Paid-in capital in excess of par (or stated) value USD 50,000

**Dividends** are distributions of earnings by a corporation to its stockholders. Usually the corporation pays dividends in cash, but it may distribute additional shares of the corporation's own capital stock as dividends. Occasionally, a company pays dividends in merchandise or other assets. Since dividends are the means whereby the owners of a corporation share in its earnings, accountants charge them against retained earnings.

Before dividends can be paid, the board of directors must declare them so they can be recorded in the corporation's minutes book. Three dividend dates are significant:

- **Date of declaration.** The date of declaration indicates when the board of directors approved a motion declaring that dividends should be paid. The board action creates the liability for dividends payable (or stock dividends distributable for stock dividends).
- **Date of record.** The board of directors establishes the date of record; it determines which stockholders receive dividends. The corporation's records (the stockholders' ledger) determine its stockholders as of the date of record.
- **Date of payment.** The date of payment indicates when the corporation will pay dividends to the stockholders.

To illustrate how these three dates relate to an actual situation, assume the board of directors of the Allen Corporation declared a cash dividend on 2010 May 5, (date of declaration). The cash dividend declared is USD 1.25 per share to stockholders of record on 2010 July 1, (date of record), payable on 2010 July 10, (date of payment). Because financial transactions occur on both the date of declaration (a liability is incurred) and on the date of payment (cash is paid), journal entries record the transactions on both of these dates. No journal entry is required on the date of record.

Exhibit 98 shows the frequencies of dividend payments made by a sample of representative companies for the years 1996-99. Note that cash dividends are far more numerous than stock dividends or dividends in kind (paid in merchandise or other assets).

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#### An accounting perspective:

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#### Uses of technology

After original issuance, investors may trade the stock of a company on secondary markets, such as the New York Stock Exchange. The company makes no entry on its books for these outside trades after issuance. Often, a company uses a spreadsheet or database program to note trades between shareholders. These computer programs can print a report on the date of record. This information allows a company that declares a dividend to be certain the money or stock goes to the stockholders

who own the stock on the date of record rather than to the stockholders who originally purchased the stock.

**Cash dividends** are cash distributions of accumulated earnings by a corporation to its stockholders. To illustrate the entries for cash dividends, consider the following example. On 2010 January 21, a corporation's board of directors declared a 2 per cent quarterly cash dividend on USD 100,000 of outstanding preferred stock. This dividend is one-fourth of the annual dividend on 1,000 shares of USD 100 par value, 8 per cent preferred stock. The dividend will be paid on 2010 March 1, to stockholders of record on 2010 February 5. An entry is not needed on the date of record; however, the entries at the declaration and payment dates are as follows:

2010			
Jan. 21	Retained earnings (-SE)	2,000	
	Dividends payable (+L)	2,000	
	Dividends declared: 2% on \$100,000 of outstanding preferred stock, payable 2010 March 1, to stockholders of record on 2010 February 5.		
Mar. 1	Dividends payable (-L)	2,000	
	Cash (-A)	2,000	
	Paid the dividend declared on 2010 January 21.		

Often a cash dividend is stated as so many dollars per share. For instance, the quarterly dividend could have been stated as USD 2 per share. When they declare a cash dividend, some companies debit a Dividends account instead of Retained Earnings. (Both methods are acceptable.) The Dividends account is then closed to Retained Earnings at the end of the fiscal year.

	2006	2005	2004	2003
<b>Cash dividends paid to common stock shareholders</b>				
Per share amount disclosed in retained earnings statements	213	219	229	239
Per share amount not disclosed in retained earnings statements	157	135	156	164
Total:	370	354	385	403
Cash dividends paid to preferred stock shareholders				
Per share amount disclosed in retained earnings statements	22	22	17	25
Per share amount not disclosed in retained earnings statements	32	38	48	44
Total:	54	60	65	69
**Dividends paid by pooled companies	X	X	X	X
Stock dividends	4	6	4	12
Dividends in kinds	7	10	14	7
Stock purchase rights	1	4	7	9

#### Exhibit 98: Types of dividends

Once a cash dividend is declared and notice of the dividend is given to stockholders, a company generally cannot rescind it unless all stockholders agree to such action.<sup>41</sup> Thus, the credit balance in the Dividends Payable account appears as a current liability on the balance sheet.

<sup>41</sup> Stockholders might agree to rescind (cancel) a dividend already declared if the company is in difficult financial circumstances and needs to retain cash to pay bills or acquire assets to continue operations.

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

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#### An accounting perspective:

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#### Business insight

Fleetwood Enterprises, Inc., is the nation's leading producer of manufactured housing and recreational vehicles. Often investors believe a company that pays dividends is doing well. Therefore, companies try to maintain a record of paying dividends, as Fleetwood noted in a 2001 press release.

*RIVERSIDE, Calif., Sept. 12 /PRNewswire/—The directors of Fleetwood Enterprises, Inc. (NYSE: FLE) have declared the company's regular quarterly cash dividend of 19 cents per share of Common stock, payable 2000 November 8, to shareholders of record 2000 October 6.*

A company that lacks sufficient cash for a cash dividend may declare a stock dividend to satisfy its shareholders. Note that in the long run it may be more beneficial to the company and the shareholders to reinvest the capital in the business rather than paying a cash dividend. If so, the company would be more profitable and the shareholders would be rewarded with a higher stock price in the future.

**Stock dividends** are payable in additional shares of the declaring corporation's capital stock. When declaring stock dividends, companies issue additional shares of the same class of stock as that held by the stockholders.

Corporations usually account for stock dividends by transferring a sum from retained earnings to permanent paid-in capital. The amount transferred for stock dividends depends on the size of the stock dividend. For stock dividends, most states permit corporations to debit Retained Earnings or any paid-in capital accounts other than those representing legal capital. In most circumstances, however, they debit Retained Earnings when a stock dividend is declared.

Stock dividends have no effect on the total amount of stockholders' equity or on net assets. They merely decrease retained earnings and increase paid-in capital by an equal amount. Immediately after the distribution of a stock dividend, each share of similar stock has a lower book value per share. This decrease occurs because more shares are outstanding with no increase in total stockholders' equity.

Stock dividends do not affect the individual stockholder's percentage of ownership in the corporation. For example, a stockholder who owns 1,000 shares in a corporation having 100,000 shares of stock outstanding, owns 1 per cent of the outstanding shares. After a 10 per cent stock dividend, the stockholder still owns 1 per cent of the outstanding shares—1,100 of the 110,000 outstanding shares.

A corporation might declare a stock dividend for several reasons:

- Retained earnings may have become large relative to total stockholders' equity, so the corporation may desire a larger permanent capitalization.
- The market price of the stock may have risen above a desirable trading range. A stock dividend generally reduces the per share market value of the company's stock.

- The board of directors of a corporation may wish to have more stockholders (who might then buy its products) and eventually increase their number by increasing the number of shares outstanding. Some of the stockholders receiving the stock dividend are likely to sell the shares to other persons.
- Stock dividends may silence stockholders' demands for cash dividends from a corporation that does not have sufficient cash to pay cash dividends.

The percentage of shares issued determines whether a stock dividend is a small stock dividend or a large stock dividend. Firms use different accounting treatments for each category.

**Recording small stock dividends** A stock dividend of less than 20 to 25 per cent of the outstanding shares is a small stock dividend and has little effect on the market value (quoted market price) of the shares. Thus, the firm accounts for the dividend at the current market value of the outstanding shares.

Assume a corporation is authorized to issue 20,000 shares of USD 100 par value common stock, of which 8,000 shares are outstanding. Its board of directors declares a 10 per cent stock dividend (800 shares). The quoted market price of the stock is USD 125 per share immediately before the stock dividend is announced. Since the distribution is less than 20 to 25 per cent of the outstanding shares, the dividend is accounted for at market value. The entry for the declaration of the stock dividend on 2010 August 10, is:

Aug. 10	Retained earnings (or Stock Dividends) (800shares x \$125) (-SE)	100,000	
	Stock dividend distributable – Common		80,000
	(800 shares x \$100) (+SE)		
	Paid-In capital – Stock dividends (+SE)		20,000
	To record the declaration of a 10% stock dividend; shares to be distributed on 2010 September 20, to stockholders of record on 2010 August 31.		

This entry records the issuance of the shares:

Sept. 20	Stock dividends distributable –	80,000	
	Common (-SE)		
	Common stock (+SE)	80,000	
	To record the distribution of 800 shares of common stock as authorized in stock dividends declared on 2010 August 10.		

The **stock dividend distributable—common account** is a stockholders' equity (paid-in capital) account credited for the par or stated value of the shares distributable when recording the declaration of a stock dividend. Since a stock dividend distributable is not to be paid with assets, it is not a liability. When a balance sheet is prepared between the date the 10 per cent dividend is declared and the date the shares are issued, the proper statement presentation of the effects of the stock dividend is:

Stockholders' equity:			
Paid-in capital:			
Common stock - \$100 par value; authorized, \$800,000			
20,000 shares; issued and outstanding, 8,000 shares			
	Stock dividend distributable on 2010	80,000	
September 20,	800 shares at par value		
	Total par value of shares issued and to be	\$880,000	
issued			
	Paid-in capital	20,000	
	Total paid-in capital		\$900,000
	Retained earnings		150,000
	Total stockholders' equity		\$1,050,000

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

Suppose, on the other hand, that the common stock in the preceding example is no-par stock and has a stated value of USD 50 per share. The entry to record the declaration of the stock dividend (when the market value is USD 125) is:

Retained earnings (800 shares x \$125) (-SE)	100,000	
Stock dividends distributable – Common (800 shares x \$50) (+SE)		40,000
Paid-in capital – stock dividends (800 shares x \$75) (+SE)	60,000	

To record the declaration of a stock dividend.

The entry to record the issuance of the stock dividend is:

Stock dividend distributable – Common (-SE)	40,000	
Common stock (+SE)		40,000

To record the issuance of the stock dividend.

**Recording large stock dividends** A stock dividend of more than 20 to 25 per cent of the outstanding shares is a large stock dividend. Since one purpose of a large stock dividend is to reduce the market value of the stock so the shares can be traded more easily, firms do not use the current market value of the stock in the entry. They account for such dividends at their par or stated value rather than at their current market value. The laws of the state of incorporation or the board of directors establish the amounts for stocks without par or stated value.

To illustrate the treatment of a stock dividend of more than 20 to 25 per cent, assume X Corporation has been authorized to issue 10,000 shares of USD 10 par value common stock, of which 5,000 shares are outstanding. X Corporation declared a 30 per cent stock dividend (1,500 shares) on 2010 September 20, to be issued on 2010 October 15. The required entries are:

Illustration 13.3 Stock Dividends

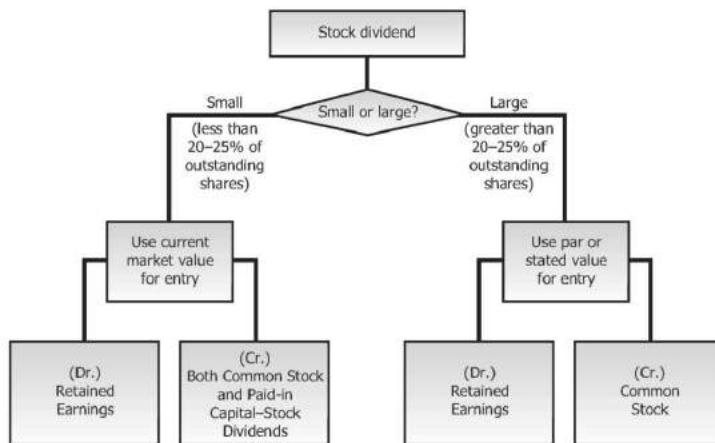


Exhibit 99: Stock dividends

Sept.	20	Retained earnings (or Stock Dividends) (1,500 shares x \$10) (-SE)	15,000	
		Stock dividend distributable – Common (+SE)		15,000
		To declare a 30% stock dividend.		
Oct.	15	Stock dividend distributable – Common (-SE)	15,000	
		Common stock (+SE)		15,000
		To issue the 30% stock dividend.		

Note that although firms account for the small stock dividend at current market value, they account for the 30 per cent stock dividend at par value (1,500 shares X USD 10 = USD 15,000). Because of the differences in

accounting for large and small stock dividends, accountants must determine the relative size of the stock dividend before making any journal entries.

To see the effect of small and large stock dividends on stockholders' equity, look at Exhibit 99.

A **stock split** is a distribution of 100 per cent or more of additional shares of the issuing corporation's stock accompanied by a corresponding reduction in the par value per share. The corporation receives no assets in this transaction. A stock split causes a large reduction in the market price per share of the outstanding stock. A two-for-one split doubles the number of shares outstanding, a three-for-one split triples the number of shares, and so on. The split reduces the par value per share at the same time so that the total dollar amount credited to Common Stock remains the same. For instance, a two-for-one split halves the par value per share.<sup>42</sup> If the corporation issues 100 per cent more stock without a reduction in the par value per share, the transaction is a 100 per cent stock dividend rather than a two-for-one stock split.

The entry to record a stock split depends on the particular circumstances. Usually, firms change only the number of shares outstanding and the par or stated value in the records. (The number of shares authorized may also change.) Thus, they would record a two-for-one stock split in which the par value of the shares decreases from USD 20 to USD 10 as follows:

Common stock - \$20 par value (-SE)	100,000
Common stock - \$10 par value (+SE)	100,000
To record a two-for-one stock split; 5,000 shares of \$20 par value common stock were replaced by 10,000 shares of \$10 par value common stock.	

In Exhibit 100, we summarize the effects of stock dividends and stock splits. Stock dividends and stock splits have no effect on the total amount of stockholders' equity. In addition, stock splits have no effect on the total amount of paid-in capital or retained earnings. They merely increase the number of shares outstanding and decrease the par value per share. Stock dividends increase paid-in capital and decrease retained earnings by equal amounts.

	<b>Total Stockholders' equity</b>	<b>Common Stock</b>	<b>Paid-in Capital - common</b>	<b>Retained Earnings</b>	<b>Number of Shares outstanding</b>	<b>Par value Per share</b>
Stock dividends:						
Small	No effect	Increases	Increases*	Decreases	Increases	No effect
Large	No effect	Increases	No effect	Decreases	Increases	No effect
Stock splits	No effect	No effect	No effect	No effect	Increases	Decreases

Exhibit 100: Summary of effects of stock dividends and stock splits

The preceding chapter discussed how corporate laws differ regarding the legality of a dividend. State law establishes the legal or stated capital of a corporation as that portion of the stockholders' equity that must be maintained intact, unimpaired by dividend declarations or other distributions to stockholders. The legal capital often equals the par or stated value of the shares issued or a minimum price per share issued.

The objective of these state corporate laws is to protect the corporation's creditors, whose claims have priority over those of the corporation's stockholders. To illustrate the significance of the legal capital concept, assume a corporation in severe financial difficulty is about to go out of business. If there were no legal capital restrictions on

<sup>42</sup> If a corporation reduces the par value of its stock without issuing more shares, say, from USD 100 to USD 60 per share, then USD 40 per share must be removed from the appropriate capital stock account and credited to Paid-In Capital Recapitalization. Further discussion of this process, called recapitalization, is beyond the scope of this text.



### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

dividends, the stockholders of that corporation might pay themselves a cash dividend or have the corporation buy back their stock, leaving no funds available for the corporation's creditors.

The board of directors of a corporation possesses sole power to declare dividends. The legality of a dividend generally depends on the amount of retained earnings available for dividends—not on the net income of any one period. Firms can pay dividends in periods in which they incurred losses, provided retained earnings and the cash position justify the dividend. And in some states, companies can declare dividends from current earnings despite an accumulated deficit. The financial advisability of declaring a dividend depends on the cash position of the corporation.

Normally, dividends are reductions of retained earnings since they are distributions of the corporation's net income. However, dividends may be distributions of contributed capital. These dividends are called **liquidating dividends**.

Accountants debit liquidating dividends to a paid-in capital account. Corporations should disclose to stockholders the source of any dividends that are not distributions of net income by indicating which paid-in capital account was debited as a result of the dividend. The legality of paying liquidating dividends depends on the source of the paid-in capital and the laws of the state of incorporation.

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#### An accounting perspective:

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#### Business insight

The Private Securities Litigation Reform Act, passed in 1995, seeks to protect investors against white-collar crime. Auditors are required by this law to become more aggressive in looking for fraud in companies they audit. Risk factors that might encourage management to engage in fraudulent activities include weak internal controls, an aggressive effort to drive up the stock price by reporting higher earnings, and/or executive bonuses or stock options based on earnings. A strong company code of ethics and an effective internal control structure can help deter fraud from occurring.

#### Retained earnings appropriations

The amount of retained earnings that a corporation may pay as cash dividends may be less than total retained earnings for several contractual or voluntary reasons. These contractual or voluntary restrictions or limitations on retained earnings are **retained earnings appropriations**. For example, a loan contract may state that part of a corporation's USD 100,000 of retained earnings is not available for cash dividends until the loan is paid. Or a board of directors may decide to use assets resulting from net income for plant expansion rather than for cash dividends. An example of a voluntary restriction was General Electric's annual report statement that cash dividends were limited "to support enhanced productive capability and to provide adequate financial resources for internal and external growth opportunities".

Companies formally record retained earnings appropriations by transferring amounts from Retained Earnings to accounts such as "Appropriation for Loan Agreement" or "Retained Earnings Appropriated for Plant Expansion".

Even though some refer to retained earnings appropriations as retained earnings reserves, using the term reserves is discouraged.

Other reasons for appropriations of retained earnings include pending litigation, debt retirement, and contingencies in general. Such appropriations do not reduce total retained earnings. They merely disclose to balance sheet readers that a portion of retained earnings is not available for cash dividends. Thus, recording these appropriations guarantees that the corporation limits its outflow of cash dividends while repaying a loan, expanding a plant, or taking on some other costly endeavor. Recording retained earnings appropriations does not involve the setting aside of cash for the indicated purpose; it merely divides retained earnings into two parts—appropriated retained earnings and unappropriated retained earnings. The establishment of a separate fund would require a specific directive from the board of directors. The only entry required to record the appropriation of USD 25,000 of retained earnings to fulfill the provisions in a loan agreement is:

Retained earnings (-SE)	25,000	
Appropriation per loan agreement (+SE)		25,000
To record restriction on retained earnings.		

When the retained earnings appropriation has served its purpose of restricting dividends and the loan has been repaid, the board of directors may decide to return the appropriation intact to Retained Earnings. The entry to do this is:

Appropriation per loan agreement(-SE)	25,000	
Retained earnings (+SE)		25,000
To return balance in appropriation per Loan Agreement account to Retained earnings.		

On the balance sheet, retained earnings appropriations appear in the stockholders' equity section as follows:

Stockholders' equity:		
Paid-in capital:		
Preferred stock – 8%, \$50 par value; 500 shares authorized; issued and outstanding	\$25,000	
Common stock - \$5 par value; 10,000 shares authorized, issued and outstanding	50,000	
Total paid-in capital		\$75,000
Retained earnings:		
Appropriated:		
Per loan agreement	\$25,000	
Unappropriated	20,000	
Total retained earnings		45,000
Total stockholders' equity		\$120,000

Note that a retained earnings appropriation does not reduce either stockholders' equity or total retained earnings but merely earmarks (restricts) a portion of retained earnings for a specific reason.

The formal practice of recording and reporting retained earnings appropriations is decreasing. Footnote explanations such as the following are replacing these appropriations:

Note 7. Retained earnings restrictions. According to the provisions in the loan agreement, retained earnings available for dividends are limited to USD 20,000.

Such footnotes appear after the formal financial statements in "Notes to Financial Statements". The Retained Earnings account on the balance sheet would be referenced as follows: "Retained Earnings (see note 7)...USD 45,000".

Changes in the composition of retained earnings reveal important information about a corporation to financial statement users. A separate formal statement—the statement of retained earnings—discloses such changes.

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

#### Statement of retained earnings

A **statement of retained earnings** is a formal statement showing the items causing changes in unappropriated and appropriated retained earnings during a stated period of time. Changes in unappropriated retained earnings usually consist of the addition of net income (or deduction of net loss) and the deduction of dividends and appropriations. Changes in appropriated retained earnings consist of increases or decreases in appropriations.

Note Ward Corporation's statement of retained earnings in Exhibit 101. The only new appropriation during 2010 was an additional USD 35,000 for plant expansion. Ward added this new USD 35,000 to the USD 25,000 beginning balance in that account and subtracted that amount from unappropriated retained earnings. An alternative to the statement of retained earnings is the statement of stockholders' equity.

**Ward Corporation**  
**Statement of Retained Earnings**  
**For Year Ended 2010 December 31**

Unappropriated retained earnings:		
2010 January 1, balance		\$180,000
Add: Net income		80,000
		\$260,000
Less: Dividends	\$15,000	
Appropriation for plant expansion	35,000	50,000
Unappropriated retained earnings, 2010 December 31		\$210,000
Appropriated retained earnings:		
Appropriation for plant expansion, 2010 January 1, balance	\$25,000	
Add: Increase in 2010	35,000	\$ 60,000
Appropriation for contract obligation, 2010 January 1, balance		20,000
Appropriated retained earnings, 2010 December 31		\$80,000
Total retained earnings, 2010 December 31		\$290,000

Exhibit 101: Statement of retained earnings

#### Statement of stockholders' equity

Most corporations include four financial statements in their annual reports: a balance sheet, an income statement, a statement of stockholders' equity (in place of a statement of retained earnings), and a statement of cash flows (discussed in Chapter 16). A **statement of stockholders' equity** is a summary of the transactions affecting the accounts in the stockholders' equity section of the balance sheet during a stated period. These transactions include activities affecting both paid-in capital and retained earnings accounts. Thus, the statement of stockholders' equity includes the information contained in a statement of retained earnings plus some additional information. The columns in the statement of stockholders' equity reflect the major account titles within the stockholders' equity section: the types of stock issued and outstanding, paid-in capital in excess of par (or stated) value, retained earnings, and treasury stock. Each row indicates the effects of major transactions affecting one or more stockholders' equity accounts.

Look at Exhibit 102, a statement of stockholders' equity. The first row indicates the beginning balances of each account in the stockholders' equity section. This summary shows that Larkin Corporation issued 10,000 shares of common stock, declared a 5 per cent stock dividend on common stock, repurchased 1,200 shares of treasury stock, earned net income of USD 185,000, and paid cash dividends on both its preferred and common stock. After the transactions' effects are indicated within each row, Larkin added or subtracted each column's components to determine the ending balance in each stockholders' equity account.

## Treasury stock

Treasury stock is the corporation's own capital stock that it has issued and then reacquired; this stock has not been canceled and is legally available for reissuance. Because it has been issued, we cannot classify treasury stock as unissued stock.

Recall that when a corporation has additional authorized shares of stock that are to be issued after the date of original issue, in most states the preemptive right requires offering these additional shares first to existing stockholders on a pro rata basis. However, firms may reissue treasury stock without violating the preemptive right provisions of state laws; that is, treasury stock does not have to be offered to current stockholders on a pro rata basis.

<b>Larkin Corporation</b>					
<b>Statement of stockholders' equity</b>					
<b>For the Year ended 2010 December 31</b>					
	<b>\$50 par, value, 6% preferred stock</b>	<b>\$20 par value Common stock</b>	<b>Paid-In capital In excess of par value</b>	<b>Retained Earnings</b>	<b>Treasury Stock</b>
Balance, 2010 January 1	\$250,000	\$300,000	\$200,000	\$500,000	\$(42,000)
Issuance of 10,000 shares of common stock		200,000	100,000		
5% stock dividend on common stock, 1,250 shares		25,000	27,500	(52,500)	
Purchase of 1,200 shares of treasury stock					(48,000)
Net income				185,000	
Cash dividends:					
Preferred stock				(15,000)	
Common stock				(25,000)	
Balance, 2010 December 31	\$250,000	\$525,000	\$327,500	\$592,500	\$(90,000)

### Exhibit 102: Statement of stockholders' equity

A corporation may reacquire its own capital stock as treasury stock to: (1) cancel and retire the stock; (2) reissue the stock later at a higher price; (3) reduce the shares outstanding and thereby increase earnings per share; or (4) issue the stock to employees. If the intent of reacquisition is cancellation and retirement, the treasury shares exist only until they are retired and canceled by a formal reduction of corporate capital.

For dividend or voting purposes, most state laws consider treasury stock as issued but not outstanding, since the shares are no longer in the possession of stockholders. Also, accountants do not consider treasury shares outstanding in calculating earnings per share. However, they generally consider treasury shares outstanding for purposes of determining legal capital, which includes outstanding shares plus treasury shares.

In states that consider treasury stock as part of legal capital, the cost of treasury stock may not exceed the retained earnings at the date the shares are reacquired. This regulation protects creditors by preventing the corporation in financial difficulty from using funds to purchase its own stock instead of paying its debts. Thus, if a corporation is subject to such a law (as is assumed in this text), the retained earnings available for dividends must exceed the cost of the treasury shares on hand.

When firms reacquire treasury stock, they record the stock at cost as a debit in a stockholders' equity account called Treasury Stock.<sup>43</sup> They credit reissuances to the Treasury Stock account at the cost of acquisition. Thus, the Treasury Stock account is debited at cost when shares are acquired and credited at cost when these shares are sold.

<sup>43</sup> Another acceptable method of accounting for treasury stock transactions is the par value method. We leave further discussion of the par value method to intermediate accounting texts.

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

Any excess of the reissue price over cost represents additional paid-in capital and is credited to **Paid-In Capital—Common (Preferred) Treasury Stock Transactions**.

To illustrate, assume that on 2010 February 18, the Hillside Corporation reacquired 100 shares of its outstanding common stock for USD 55 each. (The company's stockholders' equity consisted solely of common stock and retained earnings.) On 2010 April 18, the company reissued 30 shares for USD 58 each. The entries to record these events are:

2010				
Feb.	18	Treasury stock – Common (100 shares x \$55) (-SE)	5,500	
		Cash (-A)		5,500
		Acquired 100 shares of treasury stock at \$55.		
Apr.	18	Cash (30 shares x \$58) (+A)	1,740	
		Treasury stock – Common (30 shares x \$55) (+SE)		1,650
		Paid-In Capital – Common treasury stock transactions (+SE)		90
		Reissued 30 shares of treasury stock at \$58; cost is \$55 per share.		

When the reissue price of subsequent shares is less than the acquisition price, firms debit the difference between cost and reissue price to Paid-In Capital—Common Treasury Stock Transactions. This account, however, never develops a debit balance. By definition, no paid-in capital account can have a debit balance. If Hillside reissued an additional 20 shares at USD 52 per share on 2010 June 12, the entry would be:

June 12	Cash (20 shares x \$52) (+A)	1,040	
	Paid-In Capital – Common treasury stock transactions (-SE)	60	
	Treasury stock – Common (20 shares x \$55) (+SE)		1,100
	Reissued 20 shares of treasury stock at \$52; cost is \$55 per share.		

At this point, the credit balance in the Paid-In Capital—Common Treasury Stock Transactions account would be USD 30. If the remaining 50 shares are reissued on 2010 July 16, for USD 53 per share, the entry would be:

July 16	Cash (50 shares x \$53) (+A)	2,650	
	Paid-In Capital – Common treasury stock transactions (-SE)	30	
	Retained earnings (-SE)	70	
	Treasury stock – Common (50 shares x \$55) (+SE)		2,750
	Reissued 50 shares of treasury stock at \$53; cost is \$55 per share.		

Notice that Hillside has exhausted the Paid-In Capital—Common Treasury Stock Transactions account credit balance. If more than USD 30 is debited to that account, it would develop a debit balance. Thus, the remaining USD 70 of the excess of cost over reissue price is a special distribution to the stockholders involved and is debited to the Retained Earnings account.

Sometimes stockholders donate stock to a corporation. Since donated treasury shares have no cost to the corporation, accountants make only a memo entry when the shares are received.<sup>44</sup> The only formal entry required is to debit Cash and credit the Paid-In Capital—Donations account when the stock is reissued. For example, if donated treasury stock is sold for USD 5,000, the entry would be:

Cash (+A)	5,000	
Paid-In capital – Donations (+SE)		5,000
To record the sale of donated		

<sup>44</sup> The method illustrated here is called the memo method. Other acceptable methods of accounting for donated stock are the cost method and par value method. Intermediate accounting texts discuss these latter two methods.

treasury stock.

When treasury stock is held on a balance sheet date, it customarily appears at cost, as a deduction from the sum of total paid-in capital and retained earnings, as follows:

**Hypothetical Corporation  
Partial balance sheet  
2010 December 31**

Stockholder's equity:		
Paid-In capital:		
Preferred stock -8%, \$100 par value; 2,000 shares authorized, issued, and outstanding	\$200,000	
Common stock-\$10 par value; authorized, 100,000 shares; issued, 80,000 shares of which 1,000 are held in the treasury	\$800,000	
Stock dividend distributable on common stock on 2011 January 15, 7,900 shares	79,000	879,000
Paid-in capital-		
From common stock issuances	\$40,000	
From stock dividends	60,000	
From treasury stock transactions	30,000	
From donations	50,000	180,000
Total paid-in capital		\$1,259,000
Retained earnings:		
Appropriated:		
Per loan agreement	\$250,000	
Unappropriated (restricted to the extent of \$20,000, the cost of treasury shares held)	\$150,000	
Total retained earnings		400,000
Total paid-in capital and retained earnings		\$1,659,000
Less: Treasury stock, common, 1,000 shares at cost		20,000
Total stockholders' equity		\$1,639,000

**Exhibit 103: Stockholders' equity section of the balance sheet**

Stockholders' equity:		
Paid-in capital:		
Common stock-\$10 par value; authorized and issued, 20,000 shares, of which 2,000 shares are in the treasury	\$200,000	
Retained earnings (including \$22,000 restricted by acquisition of treasury stock)	80,000	
Total paid-in capital and retained earnings		\$280,000
Less: Treasury stock at cost, 2,000 shares		22,000
Total stockholders' equity		\$258,000

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**An accounting perspective:**

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**Business insight**

General Mills is a leading producer of ready-to-eat cereals, desserts and baking mixes, snack products, and dinner and side dish mixes. Popular brand names include Hamburger Helper, Betty Crocker, and Yoplait. For 2001 and 2000, General Mills reported common stock in the treasury (treasury stock) of 123,100,000 and 122,900,000 shares, respectively. General Mills deducted the cost of these shares in the stockholders' equity section of the balance sheet.

To summarize much of what we have discussed in Chapters 12 and 13, we present the stockholders' equity section of the balance sheet in Exhibit 103. This partial balance sheet shows: (1) the amount of capital assigned to shares outstanding; (2) the capital contributed for outstanding shares in addition to that assigned to the shares; (3) other forms of paid-in capital; and (4) retained earnings, appropriated and unappropriated.

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

**Anson Company**  
**Income Statement**  
**For the Year Ended 2010 December 31**

Net sales		\$41,000,000
Other revenues		2,250,000
Total revenue		\$43,250,000
Cost of goods sold	\$22,000,000	
Administrative, selling, and general expenses	12,000,000	34,000,000
Income before federal income taxes		\$9,250,000
Deduct: Federal income taxes (40%)		3,700,000
Income from continuing operations		\$5,550,000
Discounted operations:		
Loss from operations of discontinued Cosmetics Division (net of 40% tax effect of \$800,000)	\$(1,200,000)	
Loss on disposal of Cosmetics Division (net of 40% tax effect of \$200,000)	(300,000)	(1,500,000)
Income before extraordinary item and the cumulative effect of a change in accounting principle		\$4,050,000
Extraordinary item:		
Gain on sale of subsidiary over book value	\$40,000	
Less: Tax effect (40%)	16,000	24,000
Income after extraordinary item		\$4,074,000
Net income		\$4,074,000
Earnings per share of common stock:		
Income from continuing operations		\$ 5,550
Discontinued operations		(1.500)
Extraordinary item		0.024
Net income		\$4.074

Exhibit 104: Income statement

#### Net income inclusions and exclusions

Accounting has long faced the problem of what to include in the net income reported for a period. Should net income include only the revenues and expenses related to normal operations? Or should it include the results of discontinued operations and unusual, nonrecurring gains and losses? And further, should the determination of net income for 2010, for example, include an item that can be clearly associated with a prior year, such as additional federal income taxes for 2009? Or should such items, including corrections of errors, be carried directly to retained earnings? How are the effects of making a change in accounting principle to be reported?

*APB Opinion No. 9* (December 1966) sought to provide answers to some of these questions. The Opinion directed that unusual and nonrecurring items having an earnings or loss effect are extraordinary items (reported in the income statement) or prior period adjustments (reported in the statement of retained earnings). Extraordinary items are reported separately after net income from regular continuing activities.

In Exhibit 104 and Exhibit 106, we show the reporting of discontinued operations, extraordinary items, and prior period adjustments. For Exhibit 104 and Exhibit 106, assume that the Anson Company has 1,000,000 shares of common stock outstanding and the company's earnings are taxed at 40 per cent. Also, assume the following:

- Anson sold its Cosmetics Division on 2010 August 1, at a loss of USD 500,000. The net operating loss of that division through 2010 July 31, was USD 2,000,000.
- Anson had a taxable gain in 2010 of USD 40,000 from a sale of a subsidiary at an amount greater than what was on the company's balance sheet (extraordinary item).
- In 2010, Anson discovered that the USD 200,000 cost of land acquired in 2009 had been expensed for both financial accounting and tax purposes. A prior period adjustment was made in 2010.

Next, we explain the effects of these assumptions in greater detail.

A **discontinued operation** occurs when a business sells a segment (usually an unprofitable department or division) to another company or abandons it. When a company discontinues a segment, it shows the relevant information in a special section of the income statement immediately after income from continuing operations and before extraordinary items. Two items of information appear:

- The income or loss (net of tax effect) from the segment's operations for the portion of the current year before it was discontinued.
- The gain or loss (net of tax effect) on disposal of the segment.

To illustrate, Anson's sale of its Cosmetics Division on August 1 led to a before-tax loss of USD 500,000. The after-tax loss was USD 500,000 X 60 per cent = USD 300,000. The operating loss before taxes through July 31 was USD 2,000,000. The after-tax operating loss for that period was USD 2,000,000 X 60 per cent = USD 1,200,000. Note this information on the income statement in Exhibit 104.

Prior to 1973, companies reported a gain or loss as an extraordinary item if it was either unusual in nature or occurred infrequently. As a result, companies were inconsistent in the financial reporting of certain gains and losses. This inconsistency led to the issuance of *APB Opinion No. 30* (September 1973). *Opinion No. 30* redefined **extraordinary items** as those unusual in nature and occurring infrequently. Note that both conditions must be met—unusual nature and infrequent occurrence. Accountants determine whether an item is unusual and infrequent in light of the environment in which the company operates. Examples of extraordinary items include gains or losses that are the direct result of a major catastrophe (a flood or hurricane where few have occurred before), a confiscation of property by a foreign government, or a prohibition under a newly enacted law.

Extraordinary items are included in the determination of periodic net income, but are disclosed separately (net of their tax effects) in the income statement below "Income from continuing operations". As shown in Exhibit 104, Anson reported the extraordinary items after reporting the loss from discontinued operations.

Gains or losses related to ordinary business activities are not extraordinary items regardless of their size. For example, material write-downs of uncollectible receivables, obsolete inventories, and intangible assets are not extraordinary items. However, such items may be separately disclosed as part of income from continuing operations.

	2006	2005	2004	2003
Nature				
Debt extinguishments	4	40	70	48
Other*	8	2	8	7
Total Extraordinary Items	12	42	78	55
Number of Companies				
Presenting extraordinary items	12	42	78	55
Not presenting extraordinary items	588	588	522	545
Total Companies	600	600	600	600

\*For the current year, the nature of the other items included casualty losses and gains from asset disposals.

#### Exhibit 105: Extraordinary items

In Exhibit 105, note that in a sample of 600 companies for the years 2000-2003, most companies do not report extraordinary items.



### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

Changes in accounting principle can materially alter a company's reported net income and financial position. **Changes in accounting principle** are changes in accounting methods pertaining to such items as inventory. Such a change includes a change in inventory valuation method from FIFO to LIFO.

According to *APB Opinion No. 20*, a company should consistently apply the same accounting methods from one period to another. However, a company may make a change if the newly adopted method is preferable and if the change is adequately disclosed in the financial statements. In the period in which a company makes a change in accounting principle, it must disclose on the financial statements the nature of the change, its justification, and its effect on net income. Also, the company must show on the income statement for the year of the change and the cumulative effect of the change on prior years' income (net of tax).

According to *FASB Statement No. 16*, **prior period adjustments** consist almost entirely of corrections of errors in previously published financial statements. Corrections of abnormal, nonrecurring errors that may have been caused by the improper use of an accounting principle or by mathematical mistakes are prior period adjustments. Normal, recurring corrections and adjustments, which follow inevitably from the use of estimates in accounting practice, are not treated as prior period adjustments. Also, mistakes corrected in the same year they occur are not prior period adjustments. To illustrate a prior period adjustment, suppose that Anson purchased land in 2009 at a total cost of USD 200,000 and recorded this amount in an expense account instead of in the Land account. Discovery of the error on 2010 May 1, after publication of the 2009 financial statements, would require a prior period adjustment. The adjustment would be recorded directly in the Retained Earnings account. Assuming the error had resulted in an USD 80,000 underpayment of taxes in 2009, the entry to correct the error would be:

May 1	Land (+A)	200,000	
	Federal income taxes payable (+L)		80,000
	Retained earnings (or prior period adjustments – Land) (+SE)		120,000
	To correct an accounting error expensing land.		

#### An ethical perspective: Ace chemical company

Ace Chemical Company is a small, privately held manufacturer that has been operating at a profit for years. The current balance in the Cash account is USD 8 million, and the balance in Retained Earnings is USD 4 million. The company's plant assets consist of special purpose equipment that can produce only certain chemicals. The company has long-term debt with a principal balance of USD 10 million. Its officers (all of whom are stockholders) are concerned about the future prospects of the company. Many similar firms have been sued by customers and employees claiming that toxic chemicals produced by the company caused their health problems. No such suits have yet been filed against Ace, but the officers fully expect them to be filed within the next two years.

The company's stock is not listed on a stock exchange, nor has it recently been traded. The officers hold 70 per cent of the stock and estimate that their total stockholdings have a current market value of about USD 8 million (although its value would be much lower if all the facts were known). They are worried that if suits are filed and the company loses, there will not even be enough remaining assets to satisfy creditors' claims, and the officers' stock would be worthless. Private legal counsel has informed the officers that the company is likely to lose any suits that are filed.

One of the officers suggested that they could at least receive something for their stock by having the company buy half of the shares held by the officers at a total price of USD 4 million. Another officer asked if such a treasury stock transaction would be legal. The response was that the transaction would be legal because it did not dip into the present legal capital of the company. Retained earnings would be reduced to a zero balance, but would not develop a debit balance as a result of the transaction.

Prior period adjustments do not appear on the income statements but in the current-year financial statements as adjustments to the opening balance of retained earnings on the statement of retained earnings (Exhibit 106).

Most discontinued operations, extraordinary items, changes in accounting principle, and prior period adjustments affect the amount of income taxes a corporation must pay. To report the income tax effect, *FASB Statement No. 96* requires reporting all of these items net of their tax effects, as shown in Exhibit 104 and Exhibit 106.<sup>45</sup> **Net-of-tax effect** means that items appear at the dollar amounts remaining after deducting the income tax effects. Thus, the total effect of a discontinued operation, an extraordinary item, a change in accounting principle, or a prior period adjustment appears in one place in the appropriate financial statement. The reference to "Income from continuing operations" on the income statement represents the results of transactions (including income taxes) that are normal for the business and may be expected to recur. Note that the tax effect of an item may appear separately, as it does for the gain on voluntary early retirement of debt in Exhibit 104. Or the company may mention it parenthetically with only the net amount shown (see loss from discontinued operations and change in accounting principle in Exhibit 104 and correction of error in Exhibit 106).

<b>Anson Company</b>	
<b>Statement of Retained Earnings</b>	
<b>For the Year Ended 2010 December 31</b>	
Retained earnings, 2010 January 1	\$5,000,000
Prior period adjustment:	
Correction of error of expensing land (net of tax effect of \$80,000)	120,000
Retained earnings, 2010 January 1, as adjusted	\$5,120,000
Add: Net income	4,077,600
	\$9,197,600
Less: Dividends	500,000
Retained earnings, 2010 December 31	\$8,687,600

Exhibit 106: Statement of retained earnings

- Income from continuing operations of USD 5,550,000 (Exhibit 104) is more representative of the continuing earning power of the company than is the net income figure of USD 4,077,600.
- Following income, the special items from continuing operations appear at their actual impact on the company—that is, net of their tax effect.
- EPS is reported both before (USD 5.550) and after (USD 4.078) the discontinued operations, extraordinary item, and the cumulative effect of a change in accounting principle (Exhibit 104).

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<sup>45</sup> FASB, *Statement of Financial Accounting Standards No. 96*, "Accounting for Income Taxes" (Stamford, Conn., 1987). Copyright © by the Financial Accounting Standards Board, High Ridge Park, Stamford, Connecticut 06905, U.S.A.

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

- The correction of the USD 200,000 error adds only USD 120,000 to retained earnings (Exhibit 106). This result occurs because the mistake was included in the 2009 tax return and taxes were underpaid by USD 80,000. In the 2010 return, the USD 80,000 of taxes would have to be paid.

#### Analyzing and using the financial results—Earnings per share and price-earnings ratio

A major item of interest to investors and potential investors is how much a company earned during the current year, both in total and for each share of stock outstanding. Firms calculate the earnings per share amount only for the common shares of ownership. They compute **earnings per share (EPS)** as net income available to common stockholders divided by the average number of common shares outstanding during that period. **Income available to common stockholders** is net income less any dividends on preferred stock. They deduct the regular preferred dividend on cumulative preferred stock (but not a dividend in arrears) whether or not declared; however, they deduct only declared dividends on noncumulative preferred stock.

To illustrate, Sun Microsystems, Incorporated, had 3,417,000,000 weighted-average common shares outstanding with income available to common shareholders of USD 922,590,000 during a recent year. Sun would compute EPS as follows:

$$\begin{aligned} \text{EPS} &= \frac{\text{Income available for common stockholders}}{\text{Weighted - average number of common shares outstanding}} \\ &= \frac{\text{USD } 922,590,000}{3,417,000,000} \\ &= \text{USD } 0.27 \text{ per share} \end{aligned}$$

Firms calculate EPS for each major category on the face of the income statement. In other words, they make an EPS calculation for income from continuing operations, discontinued operations, extraordinary items, changes in accounting principle, and net income. Note in Exhibit 104 that Anson reports the EPS amounts at the bottom of its income statement.

The **price-earnings ratio** (current market price per share of common stock divided by EPS) provides an index on whether a stock has future high income potential compared to other stocks. Stocks with future high income potential tend to have a high price-earnings ratio.

In the financial highlights of Kimball International, Incorporated's, recent annual report, the market price at year-end was USD 16.00. Earnings per share were USD .93 (average of class A & B common stock). Kimball would compute its price-earnings ratio that day as follows:

$$\begin{aligned} \text{Price - earnings ratio} &= \frac{\text{Current market price per share of common stock}}{\text{EPS}} \\ &= \frac{\text{USD } 16.00}{\text{USD } 0.93} \\ &= \text{USD } 17.20 \end{aligned}$$

This chapter completes the study of stockholders' equity. In Chapter 14, you learn about stock investments and international accounting.

#### Understanding the learning objectives

- Paid-in capital is presented in the stockholders' equity section of the balance sheet. Each source of paid-in capital is listed separately.
- Sources of paid-in capital are:

- (a) Common stock.
- (b) Preferred stock.
- (c) In excess of par value or stated value (common and preferred).
- (d) Stock dividends.
- (e) Treasury stock transactions.
- (f) Donations.

• Cash dividend of 3 per cent on USD 100,000 of outstanding common stock: declared on July 1 and paid on September 15.

July	1	Retained earnings (-SE)	3,000	
		Dividends payable (+L)		3,000
Sept.	15	Dividends payable (-L)	3,000	
		Cash (-A)		3,000

Ten per cent stock dividend on 10,000 shares of common stock outstanding; par value, USD 100; market value at declaration, USD 125 per share (declared on January 1 and paid on February 1).

Jan.	1	Retained earnings (1,000 shares x \$125) (-SE)	125,000	
		Stock dividends distributable – Common (1,000 shares x \$100) (+SE)		100,000
		Paid-in Capital – Stock dividends (1,000 shares x \$25) (+SE)		25,000
Feb.	1	Stock dividend distributable – Common (-SE)	100,000	
		Common stock (+SE)		100,000

• Thirty per cent stock dividend on 10,000 shares of common stock outstanding: declared on January 1 and payable on February 1; par value, USD 100.

Jan.	1	Retained earnings (3,000 shares x \$100) (-SE)	300,000	
		Stock dividend distributable – Common (+SE)		300,000
Feb.	1	Stock dividend distributable – Common (+SE)	300,000	
		Common stock (-SE)		300,000

• Stock split: 1,000 shares of USD 50 par value common stock replaced by 2,000 shares of USD 25 par value common stock.

Common stock - \$50 par value (-SE)	50,000	
Common stock - \$25 par value (+SE)		50,000

• Retained earnings appropriation: USD 75,000 appropriated for plant expansion.

Retained earnings (-SE)	75,000	
Retained earnings appropriated for plant expansion (+SE)		75,000

• Treasury stock transactions: 100 shares of common stock were reacquired at USD 100 each and reissued for USD 105 each.

Treasury stock – Common (100 shares x \$100)	10,000	
Cash		10,000
Cash (100 shares x \$105)	10,500	
Treasury stock – Common (100 shares x \$100)	10,000	
Paid-in Capital – Common treasury stock transactions (100 shares x \$5)		500

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

- The income or loss (net of tax effect) from the segment's operations for the portion of the current year before it was discontinued is reported on the income statement below "Income from continuing operations".
- The gain or loss (net of tax effect) on disposal of the segment is also reported in that same section of the income statement.
- Extraordinary items are both unusual in nature and infrequent in occurrence. Extraordinary items appear on the income statement (net-of-tax effect) below "Income from continuing operations".
- In the period in which a change in principle is made, the nature of the change, its justification, and its effect on net income must be disclosed in the financial statements. Also, the cumulative effect of the change on prior years' income (net of tax effect) must be shown on the income statement for the year of the change below "Income from continuing operations".
- Prior period adjustments consist of errors in previously published financial statements. Prior period adjustments appear (net-of-tax effect) as a correction to the beginning retained earnings balance on the statement of retained earnings.
- EPS equals the income available to common stockholders divided by the weighted-average number of common shares outstanding. Income available to common stockholders is net income less any dividends on preferred stock. EPS provides information on the return of an investment in common stock.
- The price-earnings ratio equals the current market price per share of common stock divided by EPS. The price-earnings ratio indicates whether a stock has a future high income potential as compared to other stocks.

#### Demonstration problem

**Demonstration problem A** Wylie Corporation has outstanding 10,000 shares of USD 150 par value common stock.

Prepare the entries to record:

- a. The declaration of a cash dividend of USD 1.50 per share.
- b. The declaration of a stock dividend of 10 per cent at a time when the market value per share is USD 185.
- c. The declaration of a stock dividend of 40 per cent at a time when the market value per share is USD 195.

**Demonstration problem B** Following are selected transactions of Brackett Company:

- The company reacquired 200 shares of its own USD 100 par value common stock, previously issued at USD 105 per share, for USD 20,600.
- Fifty of the treasury shares were reissued at USD 110 per share, cash.
- Seventy of the treasury shares were reissued at USD 95 per share, cash.
- Stockholders of the corporation donated 100 shares of their common stock to the company.
- The 100 shares of treasury stock received by donation were reissued for USD 9,000.

Prepare the necessary journal entries to record these transactions.

**Demonstration problem C** Selected account balances of Nexis Corporation at 2010 December 31, are:

Common stock (nom par value; 100,000 shares authorized, issued, and outstanding; stated value of USD 20 per share)	USD 2,000,000
Retained earnings	570,000
Dividends payable (in cash, declared December 15 on preferred stock)	16,000
Preferred stock (8 per cent, par value USD 200; 1,000 shares authorized, issued, and outstanding)	200,000
Paid-In capital from donation of plant site	100,000
Paid-in capital in excess of par value – preferred	8,000

Present in good form the stockholders' equity section of the balance sheet.

## Solution to demonstration problem

### Solution to demonstration problem A

<b>a.</b>	Retained earnings (or dividends) (-SE)	15,000	
	Dividends payable (+L)		15,000
	To record declaration of a cash dividend.		
<b>b.</b>	Retained earnings (or stock dividends) (1,000 shares x \$185) (-SE)	185,000	
	Stock dividend distributable – Common (1,000 shares x \$150) (+L)		150,000
	Paid-in capital – Stock dividends(+SE)		35,000
	To record declaration of a small stock dividend (10%).		
<b>c.</b>	Retained earnings (or stock dividends) (4,000 shares x \$150) (-SE)	600,000	
	Stock dividend distributable – Common (+L)		600,000
	To record declaration of a large stock dividend (40%).		

### Solution to demonstration problem B

<b>1.</b>	Treasury stock (-SE)	20,600	
	Cash (-A)		20,600
	Acquired 200 shares at \$20,600 (\$103 per share).		
<b>2.</b>	Cash (50 shares x \$110) (+A)	5,500	
	Treasury stock – Common (50 shares x \$103) (+SE)		5,150
	Paid-in capital – common treasury stock transactions (+SE)		350
	Reissued 50 shares at \$110 per share; cost is \$5,150.		
<b>3.</b>	Cash (70 shares x \$95) (+A)	6,650	
	Paid-in capital – Common treasury stock transactions		350
	(50 shares x \$7) (-SE)		
	Retained earnings (-SE)	210	
	Treasury stock – common (70 shares x \$103) (+SE)		7,210
	Reissued 70 shares at \$95 per share; cost is \$7,210.		
	<b>4. Stockholders donated 100 shares of common stock to the company. (Only memo entry is made.)</b>		
<b>5.</b>	Cash (+A)	9,000	
	Paid-in capital – Donations (100 shares x \$90) (+SE)		9,000
	Reissued donated shares at \$90 per share.		

### Solution to demonstration problem C

**Nexis Corporation  
Partial balance sheet  
2010 December 31**

Stockholders' equity:	
Paid-in capital:	
Preferred stock – 8%, par value \$200; 1,000 shares authorized, issued, and outstanding	\$200,000
Common stock – no par value, stated value of \$20 per share; 100,000 shares authorized, issued, and outstanding	2,000,000
Paid-in capital from donation of plant site	100,000
Paid-in capital in excess of par value – preferred	8,000
Total paid-in capital	\$2,308,000
Retained earnings	570,000
Total stockholders' equity	\$2,878,000

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

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#### Key terms

**Cash dividends** Cash distributions of accumulated earnings by a corporation to its stockholders.

**Changes in accounting principle** Changes in accounting methods pertaining to such items as inventory.

**Contributed capital** See paid-in capital.

**Date of declaration (of dividends)** The date the board of directors takes action in the form of a motion that dividends be paid.

**Date of payment (of dividends)** The date of actual payment of a dividend, or issuance of additional shares for a stock dividend.

**Date of record (of dividends)** The date of record established by the board that determines the stockholders who will receive dividends.

**Deficit** A debit balance in the Retained Earnings account.

**Discontinued operation** When a segment of a business is sold to another company or is abandoned.

**Dividends** Distribution of earnings by a corporation to its stockholders.

**Dividends (cash)** See cash dividends.

**Dividends (stock)** See stock dividends.

**Donated capital** Results from donation of assets to the corporation, which increases stockholders' equity.

**Earnings per share (EPS)** Earnings to the common stockholders on a per share basis, computed as income available to common stockholders divided by the weighted-average number of common shares outstanding.

**Extraordinary items** Items both unusual in nature and infrequent in occurrence; reported in the income statement net of their tax effects, if any.

**Income available to common stockholders** Net income less any dividends on preferred stock.

**Liquidating dividends** Dividends that are a return of contributed capital, not a distribution chargeable to retained earnings.

**Net-of-tax effect** Used for discontinued operations, extraordinary items, changes in accounting principle, and prior period adjustments, whereby items are shown at the dollar amounts remaining after deducting the effects of such items on income taxes, if any, payable currently.

**Paid-in capital** All of the contributed capital of a corporation, including that carried in capital stock accounts. When the words paid-in capital are included in the account title, the account contains capital contributed in addition to that assigned to the shares issued and recorded in the capital stock accounts.

**Paid-In Capital—Common (Preferred) Treasury Stock Transactions** The account credited when treasury stock is reissued for more than its cost; this account is debited to the extent of its credit balance when such shares are reissued at less than cost.

**Price-earnings ratio** The current market price per share of common stock divided by EPS.

**Prior period adjustments** Consist almost entirely of corrections of errors in previously published financial statements. Prior period adjustments are reported in the statement of retained earnings net of their tax effects, if any.

**Retained earnings** That part of stockholders' equity resulting from accumulated earnings; the account to which the results of corporate activity, including prior period adjustments, are carried and to which dividends and certain items resulting from capital transactions are charged.

**Retained earnings appropriations** Contractual or voluntary restrictions or limitations on retained earnings that reduce the amount of dividends that may be declared.

**Statement of retained earnings** A formal statement showing the items causing changes in unappropriated and appropriated retained earnings during a stated period of time.

**Statement of stockholders' equity** A summary of the transactions affecting the accounts in the stockholders' equity section of the balance sheet during a stated period of time.

**Stock Dividend Distributable—Common account** The stockholders' equity (paid-in capital) account that is credited for the par or stated value of the shares distributable when recording the declaration of a stock dividend.

**Stock dividends** Dividends that are payable in additional shares of the declaring corporation's capital stock.

**Stock split** A distribution of 100 per cent or more of additional shares of the issuing corporation's stock, accompanied by a corresponding reduction in the par value per share. The purpose of a stock split is to cause a large reduction in the market price per share of the outstanding stock.

**Treasury stock** Shares of capital stock issued and reacquired by the issuing corporation; they have not been formally canceled and are available for reissuance.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

The retained earnings balance of a corporation is part of its paid-in capital.

The purchase of treasury stock does not affect stockholders' equity.

Dividends are expenses since they decrease stockholders' equity.

A stock dividend reduces the retained earnings balance and permanently capitalizes the reduced portion of the retained earnings.

A retained earnings appropriation reduces the total stockholders' equity shown on the balance sheet.

Heavy frost damage suffered by a Florida citrus grower's orange trees would probably be reported as an extraordinary item.

#### Multiple-choice

Select the best answer for each of the following questions.

Which of the following is not included in paid-in capital?

- Common Stock.
- Paid-In Capital—Donations.
- Stock Dividend Distributable.
- Appropriation per Loan Agreement.

Bevins Company issued 10,000 shares of USD 20 par value common stock at USD 24 per share. Bevins reacquired 1,000 shares of its own stock at a cost of USD 30 per share. The entry to record the reacquisition is:

- |           |   |        |        |
|-----------|---|--------|--------|
| <b>a.</b> | Premium on Treasury Stock (-SE)                     | 10,000 |        |
|           | Treasury stock (-SE)                                | 20,000 |        |
|           | Cash (-A)   |        | 30,000 |
| <b>b.</b> | Premium on Treasury Stock (-SE)                     | 6,000  |        |
|           | Treasury stock (-SE)                                | 24,000 |        |
|           | Cash (-A)   |        | 30,000 |
| <b>c.</b> | Treasury Stock (-SE)                                | 30,000 |        |
|           | Cash (-A)   |        | 30,000 |
| <b>d.</b> | Treasury stock (-SE)                                | 20,000 |        |
|           | Paid-In Capital – Treasury Stock Transactions (-SE) | 10,000 |        |
|           | Cash (-A)   |        | 30,000 |

If the company reissues 500 shares of the treasury stock in (2) for USD 36 per share, the entry is:

- |           |   |        |        |
|-----------|---|--------|--------|
| <b>a.</b> | Cash (+A)   | 18,000 |        |
|           | Treasury Stock (+SE)                                |        | 15,000 |
|           | Paid-In Capital – Treasury Stock Transactions (+SE) |        | 3,000  |
| <b>b.</b> | Cash (+A)   | 18,000 |        |
|           | Treasury stock (+SE)                                |        | 18,000 |
| <b>c.</b> | Cash (+A)   | 18,000 |        |
|           | Treasury stock (+SE)                                |        | 15,000 |
|           | Retained earnings (+SE)                             |        | 3,000  |



### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

d.	Cash (+A)	18,000	
	Treasury stock (+SE)		10,000
	Retained earnings (+SE)		8,000

Treasury stock should be shown on the balance sheet as a:

- Reduction of the corporation's stockholders' equity.
- Current asset.
- Current liability.
- Investment asset.

An individual stockholder is entitled to receive any dividends declared on stock owned, provided the stock is held on the:

- Date of declaration.
- Date of record.
- Date of payment.
- Last day of a fiscal year.

ABC Corporation declared the regular quarterly dividend of USD 2 per share. ABC had issued 12,000 shares and subsequently reacquired 2,000 shares as treasury stock. What would be the total amount of the dividend?

- USD 24,000.
- USD 28,000.
- USD 20,000.
- USD 4,000.

Which item is not reported as a separate line item below income from continuing operations, net of tax effects, in the income statement?

- Extraordinary items.
- Prior period adjustments.
- Discontinued operations.
- Changes in accounting principle.

Now turn to "Answers to self-test" at the end of the chapter to check your answers.

### Questions

- What are the two main elements of stockholders' equity in a corporation? Explain the difference between them.
- Name several sources of paid-in capital. Would it suffice to maintain one account called Paid-In Capital for all sources of paid-in capital? Why or why not?
- Does accounting for treasury stock resemble accounting for an asset? Is treasury stock an asset? If not, where is it properly shown on a balance sheet?
- What are some possible reasons for a corporation to reacquire its own capital stock as treasury stock?
- What is the purpose underlying the statutes that provide for restriction of retained earnings in the amount of the cost of treasury stock? Are such statutes for the benefit of stockholders, management, or creditors?

- What is the effect of each of the following on the total stockholders' equity of a corporation: (a) declaration of a cash dividend, (b) payment of a cash dividend already declared, (c) declaration of a stock dividend, and (d) issuance of a stock dividend already declared?
- The following dates are associated with a cash dividend of USD 80,000: July 15, July 31, and August 15. Identify each of the three dates, and give the journal entry required on each date, if any.
- How should a declared but unpaid cash dividend be shown on the balance sheet? How should a declared but unissued stock dividend be shown?
- On May 8, the board of directors of Park Corporation declared a dividend, payable on June 5, to stockholders of record on May 17. On May 10, James sold his capital stock in Park Corporation directly to Benton for USD 20,000, endorsing his stock certificate and giving it to Benton. Benton placed the stock certificate in her safe. On May 30, Benton sent the certificate to the transfer agent of Park Corporation for transfer. Who received the dividend? Why?
- What are the possible reasons for a corporation to declare a stock dividend?
- Why is a dividend consisting of the distribution of additional shares of the common stock of the declaring corporation not considered income to the recipient stockholders?
- What is the difference between a small stock dividend and a large stock dividend?
- What are liquidating dividends?
- What is the purpose of a retained earnings appropriation?
- What is a statement of stockholders' equity?
- Describe a discontinued operation.
- What are extraordinary items? Where and how are they reported?
- Give an example of a change in accounting principle. How are the effects of changes in accounting principle reported?
- What are prior period adjustments? Where and how are they reported?
- Why are stockholders and potential investors interested in the amount of a corporation's EPS? What does the EPS amount reveal that total earnings do not.

### Exercises

**Exercise A** The 2009 December 31, trial balance of Yamey Corporation had the following account balances:

Common stock (no-par value; 200,000 shares authorized, issued, and outstanding; stated value of \$20 per share)	\$4,000,000
Notes payable (12% due 2010 May 1)	500,000
Retained earnings, unappropriated	2,500,000
Dividends payable in cash (declared December 15, on preferred stock)	12,000
Appropriation per loan agreement	480,000
Preferred stock (6%, par value \$200; 2,000 shares authorized, issued, and outstanding)	400,000
Paid-In capital in excess of stated value – Common	300,000
Paid-In Capital in Excess of Par Value – Preferred	40,000

Present in proper form the stockholders' equity section of the balance sheet.

**Exercise B** Fogg Company has issued all of its authorized 5,000 shares of USD 400 par value common stock. On 2009 February 1, the board of directors declared a dividend of USD 12 per share payable on 2009 March 15, to stockholders of record on 2009 March 1. Give the necessary journal entries.

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

**Exercise C** The stockholders' equity section of Jay Company's balance sheet on 2009 December 31, shows 100,000 shares of authorized and issued USD 20 stated value common stock, of which 9,000 shares are held in the treasury. On this date, the board of directors declared a cash dividend of USD 2 per share payable on 2010 January 21, to stockholders of record on January 10. Give dated journal entries for these.

**Exercise D** Kevin Company has outstanding 75,000 shares of common stock without par or stated value, which were issued at an average price of USD 80 per share, and retained earnings of USD 3,200,000. The current market price of the common stock is USD 120 per share. Total authorized stock consists of 500,000 shares.

- a. Give the required entry to record the declaration of a 10 per cent stock dividend.
- b. If, alternatively, the company declared a 30 per cent stock dividend, what additional information would you need before making a journal entry to record the dividend?

**Exercise E** Grant Corporation's stockholders' equity consisted of 60,000 authorized shares of USD 30 par value common stock, of which 30,000 shares had been issued at par, and retained earnings of USD 750,000. The company then split its stock, two for one, by changing the par value of the old shares and issuing new USD 15 par shares.

- a. Give the required journal entry to record the stock split.
- b. Suppose instead that the company declared and later issued a 10 per cent stock dividend. Give the required journal entries, assuming that the market value on the date of declaration was USD 40 per share.

**Exercise F** The balance sheet of Willis Company contains the following:

Appropriation per loan agreement USD 900,000

- a. Give the journal entry made to create this account.
- b. Explain the reason for the appropriation's existence and its manner of presentation in the balance sheet.

**Exercise G** Kelly Company had outstanding 50,000 shares of USD 20 stated value common stock, all issued at USD 24 per share, and had retained earnings of USD 800,000. The company reacquired 2,000 shares of its stock for cash at book value from the widow of a deceased stockholder.

- a. Give the entry to record the reacquisition of the stock.
- b. Give the entry to record the subsequent reissuance of this stock at USD 50 per share.
- c. Give the entry required if the stock is instead reissued at USD 30 per share and there were no prior treasury stock transactions.

**Exercise H** Evan Company received 200 shares of its USD 200 stated value common stock on 2009 December 1, as a donation from a stockholder. On 2009 December 15, it reissued the stock for USD 62,400 cash. Give the journal entry or entries necessary for these transactions.

**Exercise I** Vista Company has revenues of USD 80 million, expenses of USD 64 million, a tax-deductible earthquake loss (its first such loss) of USD 4 million, and a tax-deductible loss of USD 6 million resulting from the voluntary early extinguishment (retirement) of debt. The assumed income tax rate is 40 per cent. The company's beginning-of-the-year retained earnings were USD 30 million, and a dividend of USD 2 million was declared.

- a. Prepare an income statement for the year.
- b. Prepare a statement of retained earnings for the year.

**Exercise J** Conner Company had retained earnings of USD 56,000 as of 2009 January 1. In 2009, Conner Company had sales of USD 160,000, cost of goods sold of USD 96,000, and other operating expenses, excluding taxes, of USD 32,000. In 2009, Conner Company discovered that it had, in error, depreciated land over the last

three years resulting in a balance in the accumulated depreciation account of USD 40,000. The assumed tax rate for Conner Company is 40 per cent. Present in proper form a statement of retained earnings for the year ended 2009 December 31.

**Exercise K** The following information relates to Perry Corporation for the year ended 2009 December 31:

Common stock outstanding	75,000 shares
Income from continuing operations	\$1,523,200
Loss on discontinued operations (net of tax)	240,000
Extraordinary gain (net of tax)	144,000

Calculate EPS for the year ended 2009 December 31. Present the information in the same format used in the corporation's income statement.

**Exercise L** Dean Company had an average number of shares of common stock outstanding of 200,000 in 2009 and 215,000 in 2010. Net income for these two years was as follows:

2009	\$2,208,000
2010	2,304,000

- Calculate EPS for the years ended 2009 December 31, and 2010.
- What might the resulting figures tell a stockholder or a potential investor?

### Problems

**Problem A** The bookkeeper of Hart Company has prepared the following incorrect statement of stockholders' equity for the year ended 2009 December 31:

Stockholders' equity:		
Paid-In Capital:		
Preferred stock – 6%, cumulative (8,000 shares)	\$1,003,200	
Common stock – 50,000 shares	2,856,000	
Total paid-in capital		\$3,859,200
Retained earnings		1,636,800
Total stockholders' equity		\$5,496,000

The authorized stock consists of 12,000 shares of preferred stock with a USD 120 par value and 75,000 shares of common stock, USD 48 par value. The preferred stock was issued on two occasions: (1) 5,000 shares at par, and (2) 3,000 shares at USD 134.40 per share. The 50,000 shares of common stock were issued at USD 62.40 per share. Five thousand shares of treasury common stock were reacquired for USD 264,000. The bookkeeper deducted the cost of the treasury stock from the Common Stock account.

Prepare the correct stockholders' equity section of the balance sheet at 2009 December 31.

**Problem B** The only stockholders' equity items of Jody Company at 2009 June 30, are:

Stockholders' equity:		
Paid-in capital:		
Common stock - \$200 par value, 10,000 shares authorized, 6,000 shares issued and outstanding	\$1,200,000	
Paid-in capital in excess of par value	480,000	
Total paid-in capital		\$1,680,000
Retained earnings		480,000
Total stockholders' equity		\$2,160,000

On 2009 August 4, a 4 per cent cash dividend was declared, payable on September 3. On November 16, a 10 per cent stock dividend was declared. The shares were issued on December 1. The market value of the common stock was USD 360 per share on November 16 and USD 354 per share on December 1.

Prepare journal entries for these dividend transactions.

**Problem C** Following are selected transactions of White Corporation:

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

2002

Dec. 31 The board of directors authorized the appropriation of USD 50,000 of retained earnings to provide for the future acquisition of a new plant site and the construction of a new building. (On the last day of the next six years, the same action was taken. You need not make entries for these six years.)

2007

Jan. 2 Purchased a new plant site for cash, USD 100,000.

Mar. 29 Entered into a contract for construction of a new building, payment to be made within 30 days following completion.

2009

Feb. 10 Following final inspection and approval of the new building, Dyer Construction Company was paid in full, USD 500,000.

Mar. 10 The board of directors authorized release of the retained earnings appropriated for the plant site and building.

Apr. 2 A 5 per cent stock dividend on the 100,000 shares of USD 50 par value common stock outstanding was declared. The market price on this date was USD 55 per share.

Prepare journal entries for all of these transactions.

**Problem D** Following are selected data of Kane Corporation at 2009 December 31:

Net income for the year	\$512,000
Dividends declared on preferred stock	72,000
Retained earnings appropriated during the year for future plant expansion	240,000
Dividends declared on common stock	64,000
Retained earnings, January 1, unappropriated	720,000
Directors ordered that the balance in the "Appropriation per loan agreement", related to a loan repaid on 2009 March 31, be returned to unappropriated retained earnings	480,000

Prepare a statement of retained earnings for the year ended 2009 December 31.

**Problem E** The stockholders' equity of Sayers Company at 2009 January 1, is as follows:

Common stock – no-par value, stated value of \$20; 100,000 shares authorized, 60,000 shares issued	\$1,200,000
Paid-in capital in excess of stated value	200,000
Appropriation per loan agreement	75,200
Unappropriated retained earnings	424,000
Treasury stock (3,000 shares at cost)	(72,000)

During 2009, the following transactions occurred in the order listed:

- Issued 10,000 shares of stock for USD 368,000.
- Declared a 4 per cent stock dividend when the market price was USD 48 per share.
- Sold 1,000 shares of treasury stock for USD 43,200.
- Issued stock certificates for the stock dividend declared in transaction 2.
- Bought 2,000 shares of treasury stock for USD 67,200.
- Increased the appropriation by USD 43,200 per loan agreement.

Prepare journal entries as necessary for these transactions.

**Problem F** The stockholders' equity of Briar Company on 2008 December 31, consisted of 1,000 authorized, issued, and outstanding shares of USD 72 cumulative preferred stock, stated value USD 240 per share, which were originally issued at USD 1,192 per share; 100,000 shares authorized, issued, and outstanding of no-par, USD 160

stated value common stock, which were originally issued at USD 160; and retained earnings of USD 1,120,000. Following are selected transactions and other data relating to 2009. No previous treasury stock transactions had occurred.

- The company reacquired 2,000 shares of its common stock at USD 336.
- One thousand of the treasury shares were reissued at USD 288.
- Stockholders donated 1,000 shares of common stock to the company. These shares were immediately reissued at USD 256 to provide working capital.
- The first quarter's dividend of USD 18 per share was declared and paid on the preferred stock. No other dividends were declared or paid during 2009.

The company suffered a net loss of USD 224,000 for the year 2009.

- a. Prepare journal entries for the preceding numbered transactions.
- b. Prepare the stockholders' equity section of the 2009 December 31, balance sheet.

**Problem G** The following stockholders' equity section is from Bell Company's 2008 October 31, balance sheet:

Stockholders' equity:		
Paid-in capital:		
Preferred stock - \$60 par value, 6%; 1,000 shares authorized; 350 shares issued and outstanding	\$ 21,000	
Common stock - \$6 par value; 100,000 shares authorized; 40,000 shares issued and outstanding	240,000	
Paid-in capital from donation of plant site	15,000	
Total paid-in capital		\$276,000
Retained earnings:		
Appropriated:		
Appropriation for contingencies	\$ 12,000	
Unappropriated	33,300	
Total retained earnings		45,300
Total stockholders' equity		\$321,300

During the ensuing fiscal year, Bell Company entered into the following transactions:

- The appropriation of USD 12,000 of retained earnings had been authorized in October 2008 because of the likelihood of an unfavorable court decision in a pending lawsuit. The suit was brought by a customer seeking damages for the company's alleged breach of a contract to supply the customer with certain products at stated prices in 2007. The suit was concluded on 2009 March 6, with a court order directing the company to pay USD 10,500 in damages. These damages were not deductible in determining the income tax liability. The board ordered the damages paid and the appropriation closed. The loss does not qualify as an extraordinary item.
- The company acquired 1,000 shares of its own common stock at USD 9 in May 2009. On June 30, it reissued 500 of these shares at USD 7.20.
- Dividends declared and paid during the year were 6 per cent on preferred stock and 18 cents per share on common stock. Both dividends were declared on September 1 and paid on 2009 September 30.

For the fiscal year, the company had net income after income taxes of USD 11,400, excluding the loss of the lawsuit.

- a. Prepare journal entries for the preceding numbered transactions.
- b. Prepare a statement of retained earnings for the year ended 2009 October 31.
- c. Prepare the stockholders' equity section of the 2009 October 31, balance sheet.

**Problem H** Selected data for Brinks Company for 2009 are given below:

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

Common stock - \$20 par value	\$2,000,000
Sales, net	1,740,000
Selling and administrative expenses	320,000
Cash dividends declared and paid	120,000
Cost of goods sold	800,000
Depreciation expense	120,000
Interest revenue	20,000
Loss on write-down of obsolete inventory	40,000
Retained earnings (as of 2008/12/31)	2,000,000
Operating less on Candy Division up to point of sale in 2009	40,000
Loss on disposal of Candy Division	200,000
Earthquake loss	96,000
Cumulative negative effect on prior years' income of changing from straight-line to an accelerated method of computing depreciation.	64,000

Assume the applicable federal income tax rate is 40 per cent. All of the items of expense, revenue, and loss are included in the computation of taxable income. The earthquake loss resulted from the first earthquake experienced at the company's location. In addition, the company discovered that in 2008 it had erroneously charged to expense the USD 160,000 cost of a tract of land purchased that year and had made the same error on its tax return for 2008.

- Prepare an income statement for the year ended 2009 December 31.
- Prepare a statement of retained earnings for the year ended 2009 December 31.

#### Alternate problems

**Alternate problem A** The trial balance of Dex Corporation as of 2009 December 31, contains the following selected balances:

Notes payable (17%, due 2011 May 1)	\$4,000,000
Allowance for uncollectible accounts	60,000
Common stock (without par value, \$20 stated value; 300,000 shares authorized, issued, and outstanding)	6,000,000
Retained earnings, unappropriated	500,000
Dividends payable (in cash, declared December 15 on preferred stock)	14,000
Appropriation for pending litigation	600,000
Preferred stock (6%, \$200 par value; 3,000 shares authorized, issued, and outstanding)	600,000
Paid-In Capital – Donations	400,000
Paid-In Capital in Excess of Par Value – Preferred	10,000

Present the stockholders' equity section of the balance sheet as of 2009 December 31.

**Alternate problem B** The stockholders' equity section of Carson Company's 2008 December 31, balance sheet follows:

Stockholders' equity:		
Paid-In Capital:		
Common stock - \$120 par value; authorized, 2,000 shares; issued and outstanding, 1,000 shares	\$120,000	
Paid-in capital in excess of par value	6,000	
Total paid-in capital		\$126,000
Retained earnings		48,000
Total stockholders' equity		\$174,000

On 2009 July 15, the board of directors declared a cash dividend of USD 12 per share, which was paid on 2009 August 1. On 2009 December 1, the board declared a stock dividend of 10 per cent, and the shares were issued on 2009 December 15. Market value of the stock was USD 144 on December 1 and USD 168 on December 15.

Prepare journal entries for these dividend transactions.

**Alternate problem C** The ledger of Falcone Company includes the following account balances on 2009 September 30:

Appropriation for contingencies	\$210,000
Appropriation for plant expansion	392,000
Retained earnings, unappropriated	700,000

During October 2009, the company took action to:

- Increase the appropriation for contingencies by USD 60,000.
- Decrease the appropriation for plant expansion by USD 160,000.
- Establish an appropriation per loan agreement, with an annual increase of USD 48,000.
- Declare a cash dividend of USD 140,000.

Prepare the journal entries to record these transactions of Falcone Company.

**Alternate problem D** Following are selected transactions of Taylor Corporation:

2004

Dec. 31 By action of the board of directors, USD 450,000 of retained earnings was appropriated to provide for future expansion of the company's main building. (On the last day of each of the next four years, the same action was taken. You need not make entries for these years.)

2009

Jan. 3 Obtained, at a cost of USD 4,500, a building permit to construct a new wing on the main plant building.

July 30 Paid USD 1,800,000 to Starke Construction Company for completion of the new wing.

Aug. 4 The board of directors authorized the release of the sum appropriated for expansion of the plant building.

4 The board of directors declared a 10 per cent common stock dividend on the 25,000 shares of USD 500 par value common stock outstanding. The market price on this date was USD 660 per share.

Prepare journal entries to record all of these transactions.

**Alternate problem E** The following information relates to Dahl Corporation for the year 2009:

Net income for the year	\$ 1,680,000
Dividends declared on common stock	235,000
Dividends declared on preferred stock	134,000
Retained earnings, January 1, unappropriated	5,040,000
Appropriation for retirement of bonds	672,000
Balance in "Appropriation for possible loss of a lawsuit", no longer needed on December 31 because of a favorable court decision, is (by directors' order) returned to unappropriated retained earnings	840,000

Prepare a statement of retained earnings for the year ended 2009 December 31.

**Alternate problem F** The stockholders' equity of Acorn Company as of 2008 December 31, consisted of 20,000 shares of authorized, issued, and outstanding USD 50 par value common stock, paid-in capital in excess of par of USD 240,000, and retained earnings of USD 400,000. Following are selected transactions for 2009:

May 1 Acquired 3,000 shares of its own common stock at USD 100 per share.

June 1 Reissued 500 shares at USD 120.

30 Reissued 700 shares at USD 90.

Oct. 1 Declared a cash dividend of USD 5 per share.

31 Paid the cash dividend declared on October 1.

Net income for the year was USD 80,000. No other transactions affecting retained earnings occurred during the year.

- a. Prepare general journal entries for these transactions.
- b. Prepare the stockholders' equity section of the 2009 December 31, balance sheet.



### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

**Alternate problem G** The stockholders' equity section of Sager Company's 2008 December 31, balance sheet follows:

Stockholders' equity:	
Paid-In Capital:	
Preferred stock - \$60 par value, 5%; authorized, 5,000 shares; issued and outstanding, 2,500 shares	\$150,000
Common stock – without par or stated value; authorized, 50,000 shares; issued, 25,000 shares of which 500 are held in treasury	225,000
Paid-in capital in excess of par – preferred	3,000
Total paid-in capital	\$378,000
Retained earnings:	
Appropriated:	
For plant expansion	\$15,000
Unappropriated (restricted as to dividends to the extent of \$6,000, the cost of the treasury stock held)	126,000
Total retained earnings	141,000
Total paid-in capital and retained earnings	\$519,000
Less: Treasury stock, common, at cost (500 shares)	6,000
Total stockholders' equity	\$513,000

Following are selected transactions that occurred in 2009:

Jan. 13 Cash was received for 550 shares of previously unissued common stock at USD 13.20.

Feb. 4 A plot of land was accepted as payment in full for 500 shares of common stock, and the stock was issued.

Closing market price of the common stock on this date was USD 12 per share.

Mar. 24 All of the treasury stock was reissued at USD 14.40 per share.

June 23 The regular semiannual dividend on the preferred stock was declared.

30 The preferred dividend was paid.

July 3 A 10 per cent stock dividend was declared on the common stock. Market price on this date was USD 16.80.

18 The stock dividend shares were issued.

Oct. 4 The company reacquired 105 shares of its common stock at USD 14.40.

Dec. 18 The regular semiannual dividend on the preferred stock and a USD 0.24 per share dividend on the common stock were declared.

31 Both dividends were paid.

31 An additional appropriation of retained earnings of USD 3,000 for plant expansion was authorized.

a. Prepare journal entries to record the 2009 transactions.

b. Prepare a statement of retained earnings for the year 2009, assuming net income for the year was USD 25,800.

c. Prepare the stockholders' equity section of the 2009 December 31, balance sheet.

**Alternate problem H** Selected data of Ace Company for the year ended 2009 December 31, are:

Sales, net	\$1,000,000
Interest expense	90,000
Cash dividends on common stock	150,000
Selling and administrative expenses	245,000
Cash dividends on preferred stock	70,000
Rent revenue	400,000
Cost of goods sold	650,000
Flood loss (has never occurred before)	200,000
Interest revenue	90,000

Other revenue	150,000
Depreciation and maintenance on rental equipment	270,000
Stock dividend on common stock	300,000
Operating income on Plastics Division up to point of sale in 2009	50,000
Gain on disposal of Plastics Division	25,000
Litigation loss (has never occurred before)	400,000
Cumulative positive effect on prior years' income of changing to a different depreciation method	80,000

Assume the applicable federal income tax rate is 40 per cent. All of the preceding items of expense, revenue, and loss are included in the computation of taxable income. The litigation loss resulted from a court award of damages for patent infringement on a product that the company produced and sold in 2005 and 2006, but was discontinued in 2006. In addition, the company discovered that in 2005 it had erroneously charged to expense the USD 250,000 cost of a tract of land purchased that year and had made the same error on its tax return for 2008. Retained earnings as of 2009 January 1, were USD 5,600,000. Assume there were 10,000 shares of common stock and 5,000 shares of preferred stock outstanding for the entire year.

Prepare an income statement and a statement of retained earnings for 2009.

### Beyond the numbers—Critical thinking

**Business decision case A** The stockholders' equity section of the Bates Corporation's balance sheet for 2009 June 30, follows:

Stockholders' equity:		
Paid-in Capital:		
Common stock - \$20 par value; authorized	\$1,600,000	
200,000 shares; issued and outstanding		
80,000 shares		
Paid-in capital in excess of par value	960,000	
Total paid-in capital		\$2,560,000
Retained earnings		1,520,000
Total stockholders' equity		\$4,080,000

On 2009 July 1, the corporation's directors declared a 10 per cent stock dividend distributable on August 2 to stockholders of record on July 16. On 2009 November 1, the directors voted a USD 2.40 per share annual cash dividend payable on December 2 to stockholders of record on November 16. For four years prior to 2009, the corporation had paid an annual cash dividend of USD 2.52.

As of 2009 July 1, Bob Jones owned 8,000 shares of Bates Corporation's common stock, which he had purchased four years earlier. The market value of his stock was USD 48 per share on 2009 July 1, and USD 43.64 per share on 2009 July 16.

a. What amount of cash dividends will Jones receive in 2009? How does this amount differ from the amount of cash dividends Jones received in the previous four years?

b. Jones has asked you, his CPA, to explain why the price of the stock dropped from USD 48 to USD 43.64 on 2009 July 16. Write a memo to Jones explaining your answer.

c. Do you think Jones is better off as a result of the stock dividend and the USD 2.40 cash dividend than he would have been if he had just received the USD 2.52 cash dividend? Write a memo to Jones explaining your answer.

**Business decision case B** The following journal entries are for Keel Corporation:

1.

Retained earnings	12,000	
Reserve for uncollectible accounts		12,000
To record the adjusting entry for uncollectible accounts.		

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

<b>2.</b>	Retained earnings	48,000	
	Reserve for depreciation		48,000
	To record depreciation expense.		
<b>3.</b>	Retained earnings	120,000	
	Appropriation for plant expansion		120,000
	To record retained earnings appropriation.		
<b>4.</b>	Retained earnings	8,000	
	Stock dividend distributable – Common		8,000
	To record 10% stock dividend declaration (100 shares to be distributed - \$80 par value, \$120 market value).		
<b>5.</b>	Stock dividend distributable – Common	8,000	
	Common stock		8,000
	To record distribution of stock dividend.		
<b>6.</b>	Treasury Stock	32,000	
	Cash		32,000
	To record acquisition of 200 shares of \$80 par value common stock at \$160 per share.		
<b>7.</b>	Cash	17,600	
	Treasury Stock		17,600
	To record sale of 100 treasury shares at \$176 per share.		
<b>8.</b>	Cash	6,800	
	Treasury stock		6,800
	To record sale of 50 treasury shares at \$136 per share.		
<b>9.</b>	Common stock	16,000	
	Dividends payable		16,000
	To record declaration of cash dividend.		
<b>10.</b>	Dividends payable	16,000	
	Cash		16,000
	To record payment of cash dividend.		

The management of Keel Corporation has asked you, a CPA, to analyze these journal entries and decide whether each is correct. The explanations are all correct. Wherever a journal entry is incorrect, prepare the journal entry that should have been made.

**Annual report analysis C** The following questions are based on the Coca-Cola Company's 2006 annual report. To view the report, go to the Coca-Cola web site at [www.cocacola.com](http://www.cocacola.com). After you activate the web site, click on The Coca-Cola Company. Go to investors and a menu will drop down that has financials as an option with Financial Statements (select this) to its right. Click on Balance Sheet and then open it to find the total cost of treasury shares. Then go to Selected Financial Data and open it to find the number of common shares outstanding.

a. Based on the information in the balance sheet and the note, determine the number of common shares outstanding; and the total cost of treasury stock shares on hand at the end of 2006.

b. In writing, discuss what reasons Coca-Cola might have to acquire treasury stock.

c. Find Coca-Cola's basic EPS for 2006 listed in its Income Statement. If the common stock's market price at 2006 December 31, was USD 30, what was the price-earnings ratio?

**Ethics case—Writing experience D** Based on the ethics case, answer the following questions concerning Ace Chemical Company in writing:

a. Is this transaction fair to the creditors?

b. Why would the officers not merely declare a USD 4 million cash dividend? Is the proposed treasury stock transaction fair to the other stockholders?

c. If you were one of the officers, would you feel comfortable in going ahead with this proposed treasury stock transaction?

**Group project E** In teams of two to three students, go to the library to find articles evaluating accounting software packages. Use a periodicals index such as the *Accounting and Tax Index* or the *Business Periodicals Index* to locate these articles. Compare the cost and features of three accounting software packages. As a team, prepare a memorandum to the manager of a small retail business. Compare and contrast the three accounting software packages so the manager might decide which package to purchase. In the memorandum, cite the sources used in gathering the data and properly reference any direct quotes or paraphrasing. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project F** With a small group of students, go to the library and locate *Statement of Financial Accounting Standards No. 4, "Reporting Gains and Losses from Extinguishing of Debt"*, published by the Financial Accounting Standards Board. Write a report to your instructor giving the highlights of the standard. Why are these gains and losses treated as extraordinary items? Why did the Board act on this topic? Why did one member of the Board dissent?

**Group project G** With one or two other students, locate the annual reports of three companies and study their statements of stockholders' equity. Determine why the number of common shares outstanding changed (if at all) during the current year. For instance, the number of outstanding shares may have increased due to new issuances, exercise of stock options, conversion of preferred stock, exercise of warrants, stock dividends, and other causes. The number of shares outstanding may have decreased because of repurchases of stock (treasury stock transactions). Write a report to your instructor presenting your findings. Also be prepared to make a short presentation to your class.

#### Using the Internet—A view of the real world

Visit the following website for the General Electric Company:

<http://www.ge.com>

Pursue choices on the screen until you locate the consolidated statement of changes in stockholders' equity. You will probably go down some "false paths" to get to this financial statement, but you can get there. This experience is all part of learning to use the Internet. Trace the changes that have occurred in the last three years in the dividends and other transactions with stockholders. Check out the notes to the financial statements for further information. Write a memo to your instructor summarizing your findings.

Visit the following website for 3M:

<http://www.3m.com>

Pursue choices on the screen until you locate the Financial Section. You will probably go down some "false paths" to get to this information, but you can get there. This experience is all part of learning to use the Internet. Trace the changes that have occurred in the stockholders' equity section for the most recent two years. Identify the causes of the changes. Check out the notes to the financial statements for further information. Write a memo to your instructor summarizing your findings.

### 13. Corporations: Paid-in capital, retained earnings, dividends, and treasury stock

#### Answers to self-test

#### True-false

**False.** The paid-in capital of a corporation only includes capital contributed by stockholders or others. Thus, it does not include retained earnings.

**False.** The purchase of treasury stock reduces total stockholders' equity.

**False.** Dividends are distributions of earnings in the past and are not expenses.

**True.** A stock dividend permanently capitalizes a portion of retained earnings by decreasing retained earnings and increasing paid-in capital by an equal amount.

**False.** The purpose of a retained earnings appropriation is to disclose that a portion of retained earnings is not available for cash dividends. Thus, such an appropriation does not reduce total stockholders' equity.

**False.** Such damage occurs too frequently to be considered nonrecurring.

#### Multiple-choice

**d.** Appropriation per Loan Agreement is part of retained earnings.

**c.** When treasury stock is reacquired, the stock is recorded at cost in a debit-balance stockholders' equity account, Treasury Stock.

**a.** The excess of the reissue price over the cost of treasury stock is recorded in the Paid-In Capital—Treasury Stock Transactions account.

**a.** Treasury stock is customarily shown as a deduction from total stockholders' equity.

**b.** The date of record determines who is to receive the dividends.

**c.** The total amount of dividends is computed as follows:

Total Outstanding shares at declaration:

(12,000 – 2,000) shares	10,000
Dividend per share	X USD 2
Total dividend amount	USD 20,000

**b.** Prior period adjustments are shown as adjustments to the opening balance of retained earnings on the statement of retained earnings.

# 14. Stock investments

## Learning objectives

After studying this chapter, you should be able to:

- Report stock investments and distinguish between the cost and equity methods of accounting for stock investments.
- Prepare journal entries to account for short-term stock investments and for long-term stock
- Prepare journal entries to account for long-term stock investments of 20 per cent to 50 per cent.
- Describe the nature of parent and subsidiary corporations.
- Prepare consolidated financial statements through the use of a consolidated statement work sheet.
- Describe the uses and limitations of consolidated financial statements.
- Analyze and use the financial results—dividend yield on common stock and payout ratio on common stock.

## The role of accountants in business acquisitions

The number and size of corporate mergers and acquisitions has accelerated at an amazing pace over the last decade. The combination of these sometimes mega-giant corporations, involves complex strategic alliance decisions. The potential rewards of mergers and acquisitions can be enormous—increased market share, broadened product lines, stability for the overall company, strengthened financial position, captured key executive or technical talent, and cost savings. In 1999, Exxon and Mobil merged in an USD 82 billion deal. The companies originally estimated that the merger would save the companies USD 2.8 billion, but by the end of 2002 that number had risen to nearly USD 7 billion.

Not all mergers and acquisitions turn out this well. In fact, many mergers and acquisitions weaken companies (for example, the acquisition of Skype by eBay). Beyond the need to record accounting transactions after the combination, accountants are now being asked to play an increasing role in business valuation before the combination.

When considering the acquisition of a company, the first question is "Do we really want to go into business with this company?" Target companies may misrepresent their financial position or conceal suspicious behavior in an attempt to maximize their purchase price. Accountants are used by acquirers to scope out the full details of a target's financials, operations, and human assets. Accountants are intimately familiar with accounting practices and recording procedures and therefore are best trained to find financial statement misrepresentations. Discoveries by accountants have canceled many giant mergers and acquisitions.

The second question to consider is "What is the target worth?" The acquiring company generally requires the target company to make available its financial statements. Accounting professionals are asked to interpret the financial statements and other financial data to determine the value of the target. Accounting professionals also understand how accounting numbers translate into firm value and which aspects of firm value are not captured by accounting numbers.

## 14. Stock investments

Business acquisitions are commonplace in every industry. The role of accounting professionals in business valuation is essential to the success of the company and represents one of the fastest growing areas in accounting.

Often a large company attempts to take over a smaller company by acquiring a controlling interest (more than 50 per cent of the outstanding shares) in that target company. Some of these takeover attempts are friendly (not resisted by the target company), and some are unfriendly (resisted by the target company). If the attempt is successful, the two companies become one business entity for accounting purposes, and consolidated financial statements are prepared. The company that takes over another company is the parent company; the company acquired is the subsidiary company. This chapter discusses accounting for parent and subsidiary companies.

When a corporation purchases the stock of another corporation, the method of accounting for the stock investment depends on the corporation's motivation for making the investment and the relative size of the investment. A corporation's motivation for purchasing the stock of another company may be as: (1) a short-term investment of excess cash; (2) a long-term investment in a substantial percentage of another company's stock to ensure a supply of a required raw material (for example, when large oil companies invest heavily in, or purchase outright, wildcat oil drilling companies); or (3) a long-term investment for expansion (when a company purchases another profitable company rather than starting a new business operation). On the balance sheet, the first type of investment is a current asset, and the last two types are long-term (noncurrent) investments. As explained in the chapter, the purchaser's level of ownership of the investee company determines whether the investment is accounted for by the cost method or the equity method.

### Cost and equity methods

Investors in common stock can use two methods to account for their investments the cost method or the equity method. Under both methods, they initially record the investment at cost (price paid at acquisition). Under the **cost method**, the investor company does not adjust the investment account balance subsequently for its share of the investee's reported income, losses, and dividends. Instead, the investor company receives dividends and credits them to a Dividends Revenue account. Under the **equity method**, the investor company adjusts the investment account for its share of the investee's reported income, losses, and dividends.

The Accounting Principles Board (the predecessor of the Financial Accounting Standards Board) has identified the circumstances under which each method must be used. This chapter illustrates each of those circumstances. The general rules for determining the appropriate method of accounting follow:

<b>Types of Common Stock Investment</b>	<b>Method of accounting required By accounting principles board in most cases</b>
All short-term investments	Cost
Long-term investments of:	
Less than 20%:	
If no significant influence	Cost
If significant influence	Equity
20% - 50%	Equity
More than 50%	Cost or equity

## Accounting for short-term stock investments and for long-term stock investments of less than 20 per cent

Accountants use the **cost method** to account for all short-term stock investments. When a company owns less than 50 per cent of the outstanding stock of another company as a long-term investment, the percentage of ownership determines whether to use the cost or equity method. A purchasing company that owns less than 20 per cent of the outstanding stock of the investee company, and does not exercise significant influence over it, uses the cost method. A purchasing company that owns from 20 per cent to 50 per cent of the outstanding stock of the investee company or owns less than 20 per cent, but still exercises significant influence over it, uses the **equity method**. Thus, firms use the cost method for all short-term stock investments and almost all long-term stock investments of less than 20 per cent. For investments of more than 50 per cent, they use either the cost or equity method because the application of consolidation procedures yields the same result.

### Cost method for short-term investments and for long-term investments of less than 20 per cent

When a company purchases stock (equity securities) as an investment, accountants must classify the stock according to management's intent. If management bought the security for the principal purpose of selling it in the near term, the security would be a **trading security**. If the stock will be held for a longer term, it is called an **available-for-sale security**. Trading securities are always current assets. Available-for-sale securities may be either current assets or noncurrent assets, depending on how long management intends to hold them. Each classification is accounted for differently. This topic will be discussed later in this chapter.

Securities can be transferred between classifications; however, there are specific rules that must be met for these transfers to be allowed. These rules will be addressed in intermediate accounting. Under the cost method, investors record stock investments at cost, which is usually the cash paid for the stock. They purchase most stocks from other investors (not the issuing company) through brokers who execute trades in an organized market, such as the New York Stock Exchange. Thus, cost usually consists of the price paid for the shares, plus a broker's commission.

For example, assume that Brewer Corporation purchased as a near-term investment 1,000 shares of Cowen Company's USD 10 par value common stock at USD 14.22 per share, plus a USD 180 broker's commission. Brokers quote most stock prices in dollars and cents. Brewer's entry to record its investment is:

Trading securities [(1,000 shares x \$14.22) + \$180 commission] (-SE)	14,400
Cash (-A)	14,400
Purchased 1,000 share of Cowen common stock as a near-term investment at 14.22 plus commission.	

**Accounting for cash dividends received** Investments in stock provide dividends revenue. As a general rule, investors debit cash dividends to Cash and credit Dividends Revenue. The only exception to this general rule is when a dividend declared in one accounting period is payable in the next. This exception allows a company to record the revenue in the proper accounting period. Assume that Cowen declared a USD 1 per share cash dividend on 2010 December 1, to stockholders of record as of December 20, payable on 2011 January 15. Brewer should make the following entry in 2010:

2010		
Dec. 1	Dividends receivable (+A)	1,000
	Dividends revenue (+SE)	1,000
	To record \$1 per share cash dividend on Cowen common stock, payable 2010 January 15.	



## 14. Stock investments

When collecting the dividend on 2011 January 15, Brewer debits Cash and credits Dividends Receivable:

2011			
Jan. 15	Cash (+A)	1,000	
	Dividends receivable (-A)		1,000
	To record the receipt of a cash dividend on Cowen common stock.		

**Stock dividends and stock splits** As discussed in Chapter 13, a company might declare a stock dividend rather than a cash dividend. An investor does not recognize revenue on receipt of the additional shares from a stock dividend. The investor merely records the number of additional shares received and reduces the cost per share for each share held. For example, if Cowen distributed a 10 per cent stock dividend in February 2011, Brewer, which held 1,000 shares at a cost of USD 14,400 (or USD 14.40 per share), would receive another 100 shares and would then hold 1,100 shares at a cost per share of USD 13.09 (computed as USD 14,400/1,100 shares). Similarly, when a corporation declares a stock split, the investor would note the shares received and the reduction in the cost per share.

*FASB Statement No. 115* (1993) governs the subsequent valuation of marketable equity securities accounted for under the fair market value method.<sup>46</sup> Marketable refers to the fact that the stocks are readily saleable; equity securities are common and preferred stocks. The Statement also addresses the subsequent valuation of debt securities. *FASB Statement No. 159* (2007) amends *FASB Statement No. 115* and gives a fair value alternative that allows companies to elect to measure certain items at fair value at a specified date. The subsequent valuation of debt securities will be addressed in intermediate accounting classes.

Company	No. of shares	Cost per Share	Market Price per share 2010/12/31	Total cost	Total market 2007/12/31	Increase/ (decrease) in market value
A	200	\$35	\$40	\$ 7,000	\$ 8,000	\$ 1,000
B	400	10	15	4,000	6,000	2,000
C	100	90	50	9,000	5,000	(4,000)
				\$20,000	\$19,000	\$ (1,000)

Exhibit 107: Stock portfolio of Hanson company

The *FASB Statement* requires that at year-end, companies adjust the carrying value of each of their two portfolios (trading securities and available-for-sale securities) to their fair market value. Fair market value is considered to be the market price of the securities or what a buyer or seller would pay to exchange the securities. An unrealized holding gain or loss will usually result in each portfolio.

**Trading securities** To illustrate the application of the fair market value to trading securities, assume that Hanson Company has the securities shown in Exhibit 107 in its trading securities portfolio. Applying the fair market value method reveals that the total fair market value of the trading securities portfolio is USD 1,000 less than its cost. The journal entry required at the end of 2010 is:

2010

46 FASB, *Statement of Financial Accounting Standards No. 115*, "Accounting for Certain Marketable Securities" (Stamford, Conn., 1993). Copyright © by the Financial Accounting Standards Board, Stamford, Connecticut 06856, U.S.A. Quoted (or excerpted) with permission. Copies of the complete document are available from the FASB.

47. FASB, *Statement of Financial Accounting Standards No. 159*, "The Fair Value Option for Financial Assets and Financial Liabilities" (Norwalk, Conn., 2007). Copyright © by the Financial Accounting Standards Board, Norwalk, Connecticut 06856, U.S.A.

Dec.	31	Unrealized loss on trading securities (-SE)	1,000	
		Trading securities (-A)		1,000
		To record unrealized loss from market decline of trading securities.		

Note that the debit is to the Unrealized Loss on Trading Securities account. This loss is unrealized because the securities have not been sold. However, **the loss is reported in the income statement as a deduction in arriving at net income.** The credit in the preceding entry is to the Trading Securities account so as to adjust its balance to its fair market value. (An unrealized holding gain would be an addition to net income.)

If Hanson sold investment C on 2011 January 1, the company would receive USD 5,000 (assuming no change in market values from the previous day). The loss on the sale results from market changes in 2010 rather than in 2011; the fair market value procedure placed that loss in the proper year. The entry for the sale is:

2011			
Jan.	1	Cash (+A)	5,000
		Trading securities- Company	5,000
		C Stock (-A)	
		To record sale of Company C Stock.	

No adjustment needs to be made to the unrealized loss account previously debited because the unrealized loss recorded in 2010 has flowed through the income statement and been closed to retained earnings through the closing process.

**Available-for-sale securities** Assume a marketable equity security that management does not intend to sell in the near term has a cost of USD 32,000 and a current market value on 2010 December 31, of USD 31,000. The treatment of the loss depends on whether it results from a temporary decline in market value of the stock or a permanent decline in the value. Assume first that the loss is related to a "temporary" decline in the market value of the stock. The required entry is:

2010			
Dec.	31	Unrealized loss on available-for-sale securities (-SE)	1,000
		Available-for-sale securities (-A)	1,000
		To record unrealized loss from market decline of available-for-sale securities.	

These accounts would appear on the balance sheet as follows:

<b>Hanson Company</b>	
<b>Partial Balance Sheet</b>	
<b>2010 December 31</b>	
Investments (or Current Assets)*:	
Available-for-sale securities	\$31,000
Stockholders' equity:	
Capital stock	\$xxx,xxx
Additional paid-in capital	X,xxx
Total paid-in capital	\$xxx,xxx
Less: Unrealized loss on available-for-sale securities	1,000
	\$xxx,xxx
Retained earnings	Xx,xxx
Total stockholders' equity	\$xxx,xxx

\*Depending on the length of time management intends to hold the securities.

Note that the unrealized loss for available-for-sale securities appears in the balance sheet as a separate negative component of stockholders' equity rather than in the income statement (as it does for trading securities). An unrealized gain would be shown as a separate positive component of stockholders' equity. An unrealized loss or gain on available-for-sale securities is not included in the determination of net income because it is **not** expected to be realized in the near future. These securities will probably not be sold soon.

## 14. Stock investments

The sale of an available-for-sale security results in a realized gain or loss and is reported on the income statement for the period. Any unrealized gain or loss on the balance sheet must be recognized at that time. Assume the stock discussed above is sold on 2011 January 1, for USD 31,000 (assuming no change in market value from the previous day) after the company had held the stock for three years. The entries to record this sale are:

2011			
Jan. 1	Realized loss on available-for-sale securities (-SE)	1,000	
	Unrealized loss on available-for-sale securities (+SE)		1,000
	Cash	31,000	
	Available-for-sale securities		31,000

The account debited in the first entry shows that the unrealized loss has been realized with the sale of the security; the amount is reported in the income statement. The second entry writes off the security and records the cash received and is similar to the entry for the sale of trading securities.

A loss on an individual available-for-sale security that is considered to be "permanent" is recorded as a realized loss and deducted in determining net income. The entry to record a permanent loss of USD 1,400 reads:

Realized loss on available-for-sale securities	1,400	
(-SE)		
Available-for-sale securities (-A)		1,400
To record loss in value of available-for-sale securities.		

No part of the USD 1,400 loss is subject to reversal if the market price of the stock recovers. The stock's reduced value is now its "cost". When this stock is later sold, the sale will be treated in the same manner as trading securities. The loss or gain has already been recognized on the income statement. Therefore, the entry would simply record the cash received and write off the security sold for its fair market value. If the market value of the security has fluctuated since the last time the account had been adjusted (end of the year), then an additional gain or loss may have to be recorded to account for this fluctuation.

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### An accounting perspective:

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### Business insight

On Pearl Harbor Day, 1941 December 7, the stock market fell from 116.60 to 112.52. The average fell to 92.92 by April 1942. By the end of WWII, the average had risen to 119.40. The average has risen tremendously since that time, although some time in fits and starts. For instance, in 2007 the Dow-Jones Industrial Average broke through the 14,000 barrier. The Dow was back below 7,000 in the spring of 2009 and then rose to over 10,000 by the end of that year. Over the last 60 years, investors have averaged about a 10 per cent to 12 per cent return annually by investing in the stock market. No one knows what will happen in the future, but many people invest in stocks to try to stay ahead of inflation. You can visit the DJIA site on the Internet at <http://www.dowjones.com> to learn more about the stock market.

### The equity method for long-term investments of between 20 per cent and 50 per cent

When a company (the **investor**) purchases between 20 per cent and 50 per cent of the outstanding stock of another company (the investee) as a long-term investment, the purchasing company is said to have significant

influence over the investee company. In certain cases, a company may have significant influence even when its investment is less than 20 per cent. In either situation, the investor must account for the investment under the equity method.

When using the **equity method** in accounting for stock investments, the investor company must recognize its share of the investee company's income, regardless of whether or not it receives dividends. The logic behind this treatment is that the investor company may exercise influence over the declaration of dividends and thereby manipulate its own income by influencing the investee's decision to declare (or not declare) dividends.

Thus, when the investee reports income or losses, the investor company must recognize its share of the investee's income or losses. For example, assume that Tone Company (the investor) owns 30 per cent of Dutch Company (the investee) and Dutch reports USD 50,000 net income in the current year. Under the equity method, Tone makes the following entry as of the end of 2010:

Investment in Dutch Company (+A)	15,000
Income from Dutch Company ( $\$50,000 \times 0.30$ ) (+SE)	15,000

To record 30% of Dutch Company's Net Income.

The USD 15,000 income from Dutch would be reported on Tone's 2010 income statement. The investment account is also increased by USD 15,000.

If the investee incurs a loss, the investor company debits a loss account and credits the investment account for the investor's share of the loss. For example, assume Dutch incurs a loss of USD 10,000 in 2011. Since it still owns 30 per cent of Dutch, Tone records its share of the loss as follows:

Loss from Dutch Company ( $\$10,000 \times 0.30$ ) (-SE)	3,000
Investment in Dutch Company (-A)	3,000

To recognize 30% of Dutch Company's loss.

Tone would report the USD 3,000 loss on its 2011 income statement. The USD 3,000 credit reduces Tone's equity in the investee. Furthermore, because dividends are a distribution of income to the owners of the corporation, if Dutch declares and pays USD 20,000 in dividends, this entry would also be required for Tone:

Cash (+A)	6,000
Investment in Dutch Company ( $\$20,000 \times 0.30$ ) (-A)	6,000

To record receipt of 30% of dividends paid by Dutch Company.

Under the equity method just illustrated, the Investment in the Dutch Company account always reflects Tone's 30 per cent interest in the net assets of Dutch.

### Reporting for stock investments of more than 50 per cent

In recent years, many companies have expanded by purchasing a major portion, or all, of another company's outstanding voting stock. The purpose of such acquisitions ranges from ensuring a source of raw materials (such as oil), to desiring to enter into a new industry, or seeking income on the investment. Both corporations remain separate legal entities, regardless of the investment purpose. In this section, you learn how to account for business combinations.

As stated in the introduction to this chapter, a corporation that owns more than 50 per cent of the outstanding voting common stock of another corporation is the **parent company**. The corporation acquired and controlled by the parent company is the **subsidiary company**.

## 14. Stock investments

A parent company and its subsidiaries maintain their own accounting records and prepare their own financial statements. However, since a central management controls the parent and its subsidiaries and they are related to each other, the parent company usually must prepare one set of financial statements. These statements, called **consolidated statements**, consolidate the parent's financial statement amounts with its subsidiaries' and show the parent and its subsidiaries as a single enterprise.

According to *FASB Statement No. 94*, consolidated statements must be prepared (1) when one company owns more than 50 per cent of the outstanding voting common stock of another company, and (2) unless control is likely to be temporary or if it does not rest with the majority owner (e.g. the company is in legal reorganization or bankruptcy).<sup>47</sup> Thus, almost all subsidiaries must be included in the consolidated financial statements under *FASB Statement No. 94*. Previously, the consolidated statements did not include subsidiaries in markedly dissimilar businesses than those of the parents.

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### An accounting perspective:

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#### Business insight

Procter & Gamble markets more than 300 brands. Examples include Tide, Ariel, Pantene Pro-V, Pringles, and Folgers. The company's 2000 annual report includes the following information about presentation of subsidiaries and equity investments:

*The consolidated financial statements include The Procter & Gamble Company and its controlled subsidiaries (the Company). Investments in companies over which the Company exerts significant influence, but does not control the financial and operating decisions, are accounted for by the equity method.*

Financial transactions involving a parent and one of its subsidiaries or between two of its subsidiaries are **intercompany transactions**. In preparing consolidated financial statements, parent companies eliminate the effects of intercompany transactions by making **elimination entries**. Elimination entries allow the presentation of all account balances as if the parent and its subsidiaries were a single economic enterprise. Elimination entries appear only on a consolidated statement work sheet, not in the accounting records of the parent or subsidiaries. After elimination entries are prepared, the parent totals the amounts remaining for each account of the work sheet and prepares the consolidated financial statements.

To illustrate the need for elimination entries, assume Y Company formed the Z Company, receiving all of Z Company's USD 100,000 par value common stock for USD 100,000 cash. If the stock of an existing company had been acquired, it would have been purchased from that company's stockholders. The parent records the following entry on its books:

Investment in Z Company (+A)	100,000
Cash(-A)	100,000

To record an investment in Z Company.  
Purchased 100% of Z Company stock.

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<sup>47</sup> FASB, *Statement of Financial Accounting Standards No. 94*, "Consolidation of All Majority-Owned Subsidiaries" (Stamford, Conn., 1987), p. 5. Copyright © by the Financial Accounting Standards Board, High Ridge Park, Stamford, Connecticut 06905, U.S.A.

Z Company, the subsidiary, records the following entry on its books:

Cash (+A)	100,000	
Common stock (+SE)		100,000
To record issuance of all the common stock to Y Company.		

An elimination entry can offset the parent company's subsidiary investment account against the stockholders' equity accounts of the subsidiary. On the consolidated statements work sheet, the required elimination is:

Common stock (Z company) (- SE)	100,000	
Investment in Z Company (-A)		100,000

This elimination is required because the parent company's investment in the stock of the subsidiary actually represents an equity interest in the net assets of the subsidiary. Unless the investment is eliminated, the same resources appear twice on the consolidated balance sheet—first as the investment account of the parent and second as the assets of the subsidiary. By eliminating Z Company's common stock, the parent avoids double counting stockholders' equity. Viewing the two companies as if they were one, the Z Company common stock is really not outstanding; it is held within the consolidated group.

Consolidated financial statements present financial data as though the companies were a single entity. Since no entity can owe an amount to itself or be due an amount from itself, Z Company must eliminate intercompany receivables and payables (amounts owed to and due from companies within the consolidated group) during the preparation of consolidated financial statements. For example, assume the parent company purchased USD 5,000 of bonds issued by its subsidiary company. Because no debt is owed to or due from any entity outside the consolidated enterprise, Y Company would eliminate those balances by an entry like the following that offsets the Investment in Bonds against the Bonds Payable:

Bonds payable (subsidiary company) (-L)	5,000	
Investment in bonds (parent company) (-A)		5,000
To eliminate intercompany bonds and bond investment.		

<b>P Company and Subsidiary S Company Work Sheet for Consolidated balance sheet 2010 January 1 (date of acquisition)</b>					
<b>Assets</b>	<b>P Company</b>	<b>S Company</b>	<b>Eliminations</b>		<b>Consolidated Amounts</b>
			<b>Debit</b>	<b>Credit</b>	
Cash	26,000	12,000			38,000
Notes receivable	5,000			(2) 5,000	
Accounts receivable, net	24,000	15,000			39,000
Merchandise inventory	35,000	30,000			65,000
Investment in S Company	106,000			(1) 106,000	
Equipment, net	41,000	15,000			56,000
Building, net	65,000	35,000			100,000
Land	20,000	10,000			30,000
	322,000	117,000			328,000
<b>Liabilities and stockholders' equity</b>					
Accounts payable	18,000	6,000			24,000
Notes payable		5,000	(2) 5,000		
Common stock	250,000	100,000	(1) 100,000		
Paid-in capital excess of par value - common		4,000	(1) 4,000		
Retained earnings	54,000	2,000	(1) 2,000		
	322,000	117,000	111,000	111,000	328,000

Exhibit 108: Consolidated balance sheet work sheet (stock acquired at book value)

## 14. Stock investments

When preparing consolidated statements, the parent would similarly eliminate other intercompany balances.

### Consolidated balance sheet at time of acquisition

A parent company may acquire a subsidiary at its book value or at a cost above or below book value. Also, the parent may acquire 100 per cent of the outstanding voting common stock of the subsidiary or some lesser percentage exceeding 50 per cent.

To consolidate its assets and liabilities with those of its subsidiaries, a parent company prepares a consolidated statement work sheet similar to the one in Exhibit 108. A **consolidated statement work sheet** is an informal record on which elimination entries are made for the purpose of showing account balances as if the parent and its subsidiaries were a single economic enterprise. The first two columns of the work sheet show assets, liabilities, and stockholders' equity of the parent and subsidiary as they appear on each corporation's balance sheet. The pair of columns labeled Eliminations allows intercompany items to be offset and consequently eliminated from the consolidated statement. The final column shows the amounts that will appear on the consolidated balance sheet.

The work sheet in Exhibit 108 consolidates the accounts of P Company and its subsidiary, S Company, on 2010 January 1. P Company acquired S Company on 2010 January 1, by purchasing all of its outstanding voting common stock for USD 106,000 cash, which was the book value of the stock. Book value is equal to stockholders' equity, or net assets (assets minus liabilities). Thus, common stock (USD 100,000), paid-in capital in excess of par value—common (USD 4,000), and retained earnings (USD 2,000) equal USD 106,000. When P Company acquired the S Company stock, P Company made the following entry in its books:

Investment in S company	106,000	
Cash		106,000

To record investment in S Company.

The Investment in S Company account appears as an asset on P Company's balance sheet. By buying the subsidiary's stock, the parent acquired a 100 per cent equity, or ownership, interest in the subsidiary's net assets. Thus, if both the investment account and the subsidiary's assets appear on the consolidated balance sheet, the same resources would be counted twice. The Common Stock and Retained Earnings accounts of the subsidiary also represent an equity interest in the subsidiary's assets. Therefore, P's investment in S Company must be offset against S Company's stockholders' equity accounts so that the subsidiary's assets and the ownership interest in these assets appear only once on the consolidated balance sheet. P Company accomplishes this elimination by entry 1 under Eliminations on the work sheet. The entry debits S Company's Common Stock for USD 100,000, Paid-In Capital in Excess of Par Value—Common for USD 4,000, and Retained Earnings for USD 2,000 and credits Investment in S Company for USD 106,000. In journal entry form, the elimination entry made only on the consolidated work sheet is:

Common stock (-SE)	100,000	
Paid-in capital in excess of par value – Common (-SE)	4,000	
Retained earnings (-SE)	2,000	
Investment in S Company (-A)		106,000

To eliminate investment account and subsidiary stockholder's equity.

Entry 2 eliminates the effect of an intercompany debt. On the date it acquired S Company, P Company loaned S Company USD 5,000. The loan is a USD 5,000 note receivable on P's books and a USD 5,000 note payable on S's books. If the elimination entry is not made on the work sheet, the consolidated balance sheet would show USD 5,000 owed to the consolidated enterprise by itself. From the viewpoint of the consolidated equity, neither an asset

nor a liability exists. Therefore, entry 2 on the work sheet eliminates both the asset and liability. The entry debits Notes Payable and credits Notes Receivable for USD 5,000. In general journal form, entry 2 is:

Notes payable (-L)	5,000	
Notes receivable (-A)		5,000
To eliminate intercompany payable and receivable.		

Note that P Company makes elimination entries only on the consolidated statement work sheet; no elimination entries appear in the accounting records of either P Company or S Company. P Company uses the final work sheet column to prepare the consolidated balance sheet.

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### An accounting perspective:

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#### Uses of technology

Computer applications have greatly simplified the preparation of consolidated work sheets. Spreadsheet programs in particular expedite the process of constructing consolidated financial statements.

In the previous example, P Company acquired 100 per cent of S Company at a cost equal to book value. In some cases, firms acquire subsidiaries at a cost greater than or less than book value. For example, assume P Company purchased 100 per cent of S Company's outstanding voting common stock for USD 125,000 (instead of USD 106,000). The book value of this stock is USD 106,000. Cost exceeds book value by USD 19,000. P Company's management may have paid more than book value because (1) the subsidiary's earnings prospects justify paying a price greater than book value or (2) the total fair market value of the subsidiary's assets exceeds their total book value.

Where cost exceeds book value because of expected above-average earnings, the investor labels the excess goodwill on the consolidated balance sheet. **Goodwill** is an intangible value attached to a business primarily due to above-average earnings prospects (as discussed in Chapter 11). On the other hand, if the excess is attributable to the belief that assets of the subsidiary are undervalued, then the investor increases the asset values on the consolidated balance sheet to the extent of the excess. In Exhibit 109, USD 4,000 is due to the undervaluation of land owned by the company, and the remaining USD 15,000 of the excess of cost over book value is due to expected above-average earnings. As a result, P Company adds USD 4,000 of the USD 19,000 excess to Land, and identifies the other USD 15,000 as Goodwill on the work sheet (Exhibit 109) and on the balance sheet (Exhibit 110).

P Company establishes Goodwill as part of the first elimination entry. Elimination entry 1 in Exhibit 109 involves debits to the subsidiary's Common Stock for USD 100,000, Paid-In Capital in Excess of Par Value—Common for USD 4,000, Retained Earnings for USD 2,000, Land for USD 4,000, and Goodwill for USD 15,000, and a credit to Investment in S Company for USD 125,000. In journal form, entry 1 is:

Common stock (-SE)	100,000	
Paid-in capital in excess of par value – common (-SE)	4,000	
Retained earnings (-SE)	2,000	
Land (+A)	4,000	
Goodwill (+A)	15,000	
Investment in S Company (-A)		125,000
To eliminate investment and subsidiary		



## 14. Stock investments

stockholder's equity and to establish increased value of land and goodwill.

Entry 2 is the same as elimination entry 2 in Exhibit 108. Entry 2 eliminates the intercompany loan by debiting Notes Payable and crediting Notes Receivable for USD 5,000.

After these elimination entries are made, the company consolidates and extends the remaining amounts to the Consolidated Amounts column. It uses the amounts in this column to prepare the consolidated balance sheet in Exhibit 110. Notice that the firm carries the USD 15,000 debit to Goodwill to the Consolidated Amounts column and lists it as an asset in the consolidated balance sheet.

As noted earlier, a company may purchase all or part of another company at more than book value and create goodwill on the consolidated balance sheet. *FASB Statement No. 142* (2001) requires goodwill to be recorded at acquisition cost and to remain at this amount until there is evidence of impairment. We leave a discussion of this topic to a more advanced text.

Under some circumstances, a parent company may pay less than book value of the subsidiary's net assets. In such cases, it is highly unlikely that a bargain purchase has been made. The most logical explanation is that some of the subsidiary's assets are overvalued. Firms use the excess of book value over cost to reduce proportionately the value of the noncurrent assets acquired (except long-term investments in marketable securities). If noncurrent assets are reduced to zero, the remaining dollar amount is a deferred credit entitled, Excess of Fair Value Over Cost of Assets Acquired.

### **P Company and Subsidiary S Company Work Sheet for consolidation balance sheet 2010 January 1 (date of acquisition)**

<b>Assets</b>	<b>P Company</b>	<b>S Company</b>	<b>Eliminations Debit</b>	<b>Credits</b>	<b>Consolidated Amounts</b>
Cash	7,000	12,000			19,000
Notes receivable	5,000			(2) 5,000	
Accounts receivable, net	24,000	15,000			39,000
Merchandise inventory	35,000	30,000			65,000
Investment in S Company	125,000			(1) 125,000	
Equipment, net	41,000	15,000			56,000
Building, net	65,000	35,000			100,000
Land	20,000	10,000	(1) 4,000		34,000
Goodwill			(1) 15,000		15,000
	322,000	117,000			328,000
<b>Liabilities and stockholders' equity</b>					
Accounts payable	18,000	6,000			24,000
Notes payable		5,000	(2) 5,000		
Common stock	250,000	100,000	(1) 100,000		250,000
Paid-in capital excess of par value – common		4,000	(1) 4,000		-0-
Retained earnings	54,000	2,000	(1) 2,000		54,000
	322,000	117,000	130,000	130,000	328,000

### **Exhibit 109: Consolidated balance sheet work sheet (stock acquired at more than book value)**

Sometimes a parent company acquires less than 100 per cent of the outstanding voting common stock of a subsidiary. For example, assume P Company acquired 80 per cent of S Company's outstanding voting common stock. P Company is the majority stockholder, but another group of stockholders owns the remaining 20 per cent of the stock. Stockholders who own less than 50 per cent of a subsidiary's outstanding voting common stock are minority stockholders, and their claim or interest in the subsidiary is the **minority interest**. Minority

stockholders have an interest in the subsidiary's net assets and share the subsidiary's income or loss with the parent company.

Look at Exhibit 111, which shows the elimination entries required when P Company purchases 80 per cent of S Company's stock for USD 90,000. The book value of the stock acquired by P Company is USD 84,800 (80 per cent of USD 106,000). Assuming no assets are undervalued, P Company attributes the excess of cost (USD 90,000) over book value (USD 84,800) of USD 5,200 to S Company's above-average earnings prospects (goodwill).

Elimination entry 1 eliminates S Company's stockholders' equity by debiting Common Stock for USD 100,000, Paid-In Capital in Excess of Par Value—Common for USD 4,000, and Retained Earnings for USD 2,000. To establish minority interest, it credits a Minority Interest account for USD 21,200 (20 per cent of USD 106,000). P Company eliminates the investment account by crediting Investment in S Company for USD 90,000. The USD 5,200 debited to Goodwill makes the debits equal the credits. In journal form, the elimination entry 1 is:

**P Company and Subsidiary S Company  
Consolidation balance sheet  
2010 January 1**

Assets		
Current assets:		
Cash	\$19,000	
Accounts receivable, net	39,000	
Merchandise inventory	65,000	
Total current assets		\$123,000
Property, plant, and equipment:		
Equipment, net	\$56,000	
Building, net	100,000	
Land	34,000	
Total property, plant, and equipment		190,000
Goodwill		15,000
Total assets		\$328,000
Liabilities and stockholders' equity		
Current liabilities:		
Account payable		\$24,000
Stockholders' equity:		
Common stock	\$250,000	
Retained earnings	54,000	
Total stockholders' equity		304,000
Total liabilities and stockholders equity		\$328,000

**Exhibit 110: Consolidated balance sheet**

Common stock (-SE)	100,000	
Paid-in capital in excess of par value – Common (-SE)	4,000	
Retained earnings (-SE)	2,000	
Goodwill (+A)	5,200	
Investment in S Company (-A)		90,000
Minority interest (+L)		21,200
To eliminate investment and subsidiary stockholder's equity and to establish minority interest and goodwill.		

Elimination entry 2 is the same as shown in Exhibit 108. The entry eliminates intercompany debt by debiting Notes Payable and crediting Notes Receivable for USD 5,000.

On the consolidated balance sheet (Exhibit 112), minority interest appears between the liabilities and stockholders' equity sections.

## 14. Stock investments

### Accounting for income, losses, and dividends of a subsidiary

When a subsidiary is operating profitably, its net assets and retained earnings increase. The subsidiary pays dividends to both the parent company and minority stockholders. The subsidiary records all transactions in its accounting records in a normal manner.

As noted earlier, two different methods used by an investor to account for investments in common stock are the cost and equity methods. A parent company may use either the cost or equity method of accounting for its investment in a consolidated subsidiary. This choice is allowed because the investment account is eliminated during the consolidation process; therefore, the results are identical after consolidation. To illustrate the consolidation process at a date after acquisition, we assume the parent company uses the equity method.

<b>P Company and Subsidiary S Company</b>					
<b>Work Sheet for consolidated balance sheet</b>					
<b>2010 January 1 (date of acquisition)</b>					
<b>Assets</b>	<b>P Company</b>	<b>S Company</b>	<b>Eliminations Debit</b>	<b>Credit</b>	<b>Consolidated Amounts</b>
Cash	42,000	12,000			54,000
Notes receivable	5,000			(2) 5,000	
Accounts receivable, net	24,000	15,000			39,000
Merchandise inventory	35,000	30,000			65,000
Investment in S Company	90,000			(1) 90,000	
Equipment, net	41,000	15,000			56,000
Building, net	65,000	35,000			100,000
Land	20,000	10,000			30,000
Goodwill			(1) 5,200		5,200
	322,000	117,000			349,200
<b>Liabilities and stockholders' equity</b>					
Accounts payable	18,000	6,000			24,000
Notes payable		5,000	(2) 5,000		
Common stock	250,000	100,000	(1) 100,000		
Paid-in capital excess Of par value- common		4,000	(1) 4,000		-0-
Retained earnings	54,000	2,000	(1) 2,000		54,000
Minority interest				(1) 21,200	21,200
	322,000	117,000	116,200	116,200	349,200

Exhibit 111: Consolidated balance sheet work sheet (80 per cent of stock acquired at more than book value)

### Consolidated financial statements at a date after acquisition

Under the equity method, the investment account on the parent company's books increases and decreases as the parent records its share of the income, losses, and dividends reported by the subsidiary. Thus, the balance in the investment account differs after acquisition from its balance on the date of acquisition. Consequently, the amounts eliminated on the consolidated statements work sheet differ from year to year. As an illustration, assume the following facts:

- P Company acquired 100 per cent of the outstanding voting common stock of S Company on 2010 January 1. P Company paid USD 121,000 for stockholders' equity totaling USD 106,000. The excess of cost over book value is attributable to (a) an undervaluation of land amounting to USD 4,000 and (b) the remainder to S Company's above-average earnings prospects.
- During 2010, S Company earned USD 20,000 from operations.
- On 2010 December 31, S Company paid a cash dividend of USD 8,000.

- S Company owes P Company USD 5,000 on a note at December 31.
- Including its share (100 per cent) of S Company's income, P Company earned USD 31,000 during 2010.
- P. Company paid a cash dividend of USD 10,000 during December 2010.
- P Company uses the equity method of accounting for its investment in S Company.

**P Company and Subsidiary S Company  
Consolidation Balance Sheet  
2010 January 1**

Assets			
Current assets:			
Cash		\$ 54,000	
Accounts receivable, net		39,000	
Merchandise inventory		65,000	
Total current assets			\$158,000
Property, plant, and equipment:			
Equipment, net		\$ 56,000	
Building, net		100,000	
Land		30,000	
Total property, plant, and equipment			186,000
Goodwill			5,200
Total assets			\$349,200
Liabilities and stockholders' equity			
Current liabilities:			
Account payable			24,000
Minority interest			21,200
Stockholders' equity:			
Common stock		\$250,000	
Retained earnings		54,000	
Total stockholders' equity			304,000
Total liabilities and stockholders equity			\$349,200

**Exhibit 112: Consolidated balance sheet**

The financial statements for the two companies as of 2010 December 31, are in the first two columns of Exhibit 113.

The work sheet shown in Exhibit 113 allows us to prepare a consolidated income statement, statement of retained earnings, and balance sheet. Notice that in Exhibit 113, P Company has a balance of USD 20,000 in its Income of S Company account and a balance of USD 133,000 in its Investment in S Company account. These balances are the result of the following journal entries made by P Company in 2010:

2010			
Jan.	1	Investment in S Company (+A)	121,000
		Cash (-A)	121,000
		To record 100% investment in subsidiary.	
Dec.	31	Investment in S Company (+A)	20,000
		Income in S Company (+SE)	20,000
		To record income of subsidiary.	
	31	Cash (+A)	8,000
		Investment in S Company (-A)	8,000
		To record dividends received from subsidiary.	

The explanations for the elimination entries on the work sheet in Exhibit 113 are as follows:

**Entry 1:** During the year, S Company earned USD 20,000. P Company increased its investment account balance by USD 20,000. Entry 1 on the work sheet eliminates the subsidiary's income from the Investment in S Company account and the Income of S Company account (USD 20,000). This entry reverses the entry made on the books of P Company to recognize the parent's share of the subsidiary's income (the first December 31 journal entry).

**P Company and Subsidiary S Company**

14. Stock investments

**Work Sheet for Consolidated Balance Sheet  
2010 December 31**

	<b>P</b>	<b>S</b>	<b>Elimination</b>		<b>Consolidated</b>
<b>Income Statement</b>	<b>Company</b>	<b>Company</b>	<b>Debit</b>	<b>Credit</b>	<b>Amounts</b>
Revenue from sales	397,000	303,000			700,000
Income of S Company	20,000		(1) 20,000		
Cost of goods sold	(250,000)	(180,000)			(430,000)
Expenses (excluding depreciation and taxes)	(100,000)	(80,000)			(180,000)
Depreciation expense	(7,400)	(5,000)			(12,400)
Federal income tax expense	(28,600)	(18,000)			(46,000)
Net income, carried forward	31,000	20,000			31,000*
<b>Statement of Retained Earnings</b>					
Retained earnings – January 1:					
P Company	54,000				54,000
S Company		6,000	(3) 6,000		
Net income brought forward	31,000	20,000			31,000*
	85,000	26,000			85,000*
Dividends:					
P Company	(10,000)				(10,000)
S Company		(8,000)		(2) 8,000	
Retained earnings – Dec. 31 carried forward	75,000	18,000			75,000*
<b>Balance sheet assets</b>					
Cash	38,000	16,000			54,000
Notes receivable	5,000			(4) 5,000	
Accounts receivable, net	25,000	18,000			43,000
Merchandise inventory	40,000	36,000			76,000
Investment in S Company	133,000		(2) 8,000	(3) 121,000	
				(1) 20,000	
Equipment, net	35,900	12,000			48,900
Building, net	61,700	33,000			94,700
Land	20,000	10,000	(3) 4,000		34,000
Goodwill			(3) 11,000		11,000
	359,600	125,000			361,600*
<b>Liabilities and stockholders' equity</b>					
Accounts payable	19,600	2,000			21,600

## 14. Stock investments

Notes payable	15,000	5,000	(4) 5,000		15,000
Common stock	250,000	100,000	(3) 100,000		250,000
Retained earnings	75,000	18,000			75,000*
	359,000	125,000	154,000	154,000	361,600*

\*Totals are determined vertically, not horizontally

Exhibit 113: Consolidated work sheet one year after acquisition

**Entry 2:** When S Company paid its cash dividend, P Company debited Cash and credited the investment account for USD 8,000 (the second December 31 journal entry). Entry 2 restores the investment account to its balance before the dividends from S Company were deducted. That is, P Company debits its investment account and credits S Company's dividends account for USD 8,000. On a consolidated basis, a company cannot pay a dividend to itself.

**Entry 3:** Entry 3 eliminates the original investment account balance (USD 121,000) and the subsidiary's stockholders' equity accounts as of the date of acquisition (retained earnings of USD 6,000 and common stock of USD 100,000). The entry also establishes goodwill of USD 11,000 and increases land by USD 4,000 to account for the excess of acquisition cost over book value.

**Entry 4:** Entry 4 eliminates the intercompany debt of USD 5,000.

After the first three entries have been made, the investment account contains a zero balance from the viewpoint of the consolidated entity.

After making the eliminations, P Company combines the corresponding amounts and places them in the Consolidated Amounts column. Notice that certain totals in the first two columns do not add across to the total in the Consolidated Amounts column. For instance, consolidated net income is USD 31,000, not USD 31,000 plus USD 20,000. The firm carries the net income row in the Income Statement section forward to the net income row in the Statement of Retained Earnings section. Likewise, it carries the ending retained earnings row in the Statement of Retained Earnings section forward to the retained earnings row in the Balance Sheet section. P Company uses the final work sheet column to prepare the consolidated income statement (Exhibit 114), the consolidated statement of retained earnings (Exhibit 115), and the consolidated balance sheet (Exhibit 116).

### Uses and limitations of consolidated statements

Consolidated financial statements are of primary importance to stockholders, managers, and directors of the parent company. The parent company benefits from the income and other financial strengths of the subsidiary. Likewise, the parent company suffers from a subsidiary's losses and other financial weaknesses.

Consolidated financial statements are of limited use to the creditors and minority stockholders of the subsidiary. The subsidiary's creditors have a claim against the subsidiary alone; they cannot look to the parent company for payment. Minority stockholders in the subsidiary do not benefit or suffer from the parent company's operations. These minority stockholders benefit from the subsidiary's income and financial strengths; they suffer from the subsidiary's losses and financial weaknesses. Thus, the subsidiary's creditors and minority stockholders are more interested in the subsidiary's individual financial statements than in the consolidated statements. Because of these factors, annual reports always include the financial statements of the consolidated entity, and sometimes include the financial statements of certain subsidiary companies alone, but never include the parent company's financial statements alone.

## Analyzing and using the financial results—Dividend yield on common stock and payout ratios

Investors often search for stock that fulfills their needs. To locate this stock, potential stockholders may use the dividend yield on common stock ratio or the payout ratio on common stock. To demonstrate these ratios, consider the 2000 annual report of Tyco International.

### P Company and Subsidiary S Company Consolidated Income Statement For the year ended 2010 December 31

Revenue from sales		\$700,000
Cost of goods sold		430,000
Gross margin		\$270,000
Expenses (excluding depreciation and taxes)	\$180,000	
Depreciation expense	12,400	
Federal income tax expense	46,600	239,000
Net sales		\$31,000

Exhibit 114: Consolidated income statement

### P Company and Subsidiary S Company Consolidated statement of Retained Earnings For the Year Ended 2010 December 31

Retained earnings, 2010 January 1	\$54,000
Net income	31,000
Subtotal	\$85,000
Dividends	10,000
Retained earnings, 2010 December 31	\$75,000

Exhibit 115: Consolidated statement of retained earnings

### P Company and Subsidiary S Company Consolidation Balance Sheet 2010 December 31

<b>Assets</b>		
Current assets:		
Cash	\$54,000	
Accounts receivable, net	43,000	
Merchandise inventory	76,000	
Total current assets		\$173,000
Property, plant, and equipment:		
Equipment, net	\$48,900	
Building, net	94,700	
Land	34,000	
Total property, plant, and equipment		177,600
Goodwill		11,000
Total assets		\$361,600
<b>Liabilities and stockholders' equity</b>		
Current liabilities:		
Account payable	\$21,600	
Notes payable	15,000	
Total liabilities		\$36,600
Stockholders' equity:		
Common stock	\$250,000	
Retained earnings	75,000	
Total stockholders' equity		325,000
Total liabilities and stockholders equity		\$361,600

Exhibit 116: Consolidated balance sheet (one year after acquisition)

	<b>2000</b>	<b>1999</b>
Dividend per share of common stock	\$ 0.05	\$ 0.05
Current market price per share	53.81	50.25
Earnings per share	2.68	0.62

Investors use the **dividend yield on common stock ratio** as a tool to compare stocks. Some investors favor stocks with a high dividend yield ratio and a high payout ratio. Other investors would rather have the corporation



## 14. Stock investments

retain more of the funds and use them to attempt to increase future earnings and the market price of the stock. The formula for the dividend yield on common stock ratio is:

$$\text{Dividend yield on common stock ratio} = \frac{\text{Dividend per share of common stock}}{\text{Current market price per share}}$$

For Tyco, the dividend yield on common stock ratios are:

2003: USD 0.05/USD 53.81 = .09 per cent

2002: USD 0.05/USD 50.25 = .10 per cent

To determine the relevance of this ratio, an investor compares these numbers to ratios calculated on other stocks.

Investors calculate the **payout ratio on common stock** as follows:

$$\text{Payout ratio on common stock} = \frac{\text{Dividend per share of common stock}}{\text{Earnings per share (EPS)}}$$

This ratio indicates whether a company pays out a large percentage of earnings as dividends or reinvests most of its earnings. When computing the payout ratio, remember that negative earnings per share result in an invalid calculation. Tyco's payout ratios are:

2003: USD 0.05/USD 2.68 = 1.87 per cent

2002: USD 0.05/USD 0.62 = 8.06 per cent

Now that you have studied consolidated financial statements, you should realize the importance of presenting a complete picture of the business operations of a company. In Chapter 15 you learn about long-term financing, its advantages and disadvantages, and how bonds differ from stocks.

### Understanding the learning objectives

- Under the cost method, the investor company records its investment at the price paid at acquisition and does not adjust the investment account balance subsequently. The cost method is used for all short-term investments, long-term investments of less than 20 per cent where the purchasing company does not exercise significant influence over the investee company, and may be used for long-term investments of more than 50 per cent.
- Under the equity method, the investment is also initially recorded at acquisition price but is then adjusted periodically for the investor company's share of the investee's reported income, losses, and dividends. The equity method is used for all long-term investments of between 20 per cent and 50 per cent and may be used for investments of more than 50 per cent. This method is also used for investments of less than 20 per cent if the purchasing company exercises significant influence over the investee company.
- Under the cost method, the initial investment is debited to either Trading Securities or Available-for-Sale Securities, depending on whether the investment is a near-term or longer-term investment.
- At the end of each accounting period, the company must adjust the carrying value of each investment. The fair market value method is applied independently to each of these portfolios.
- Under the cost method, dividends received are credited to Dividend Revenue.
- Under the equity method, the initial investment is debited to an Investment in (Company Name) account. Income, losses, and dividends result in increases or decreases to the investment account.
- The equity method must be used for long-term investments of 20 per cent to 50 per cent and for long-term investments of less than 20 per cent where significant influence is present.

- The initial investment is debited to an Investment in (Company Name) account. The purchasing company's share of the investee's income is debited to the investment account, and the purchaser's share of the investee's losses and dividends is credited to the investment account as they are reported by the investee.

- A corporation that owns more than 50 per cent of the outstanding voting common stock of another corporation is called the parent company.

- The corporation acquired and controlled by the parent company is known as the subsidiary company.

- A parent company and its subsidiaries maintain their own accounting records and prepare their own financial statements, but the parent company must also prepare consolidated financial statements. The consolidated financial statements consolidate the financial results of the parent and subsidiaries as a single enterprise.

- Consolidated financial statements must be prepared (1) when one company owns more than 50 per cent of the outstanding voting stock of another company and (2) unless control is likely to be temporary or if it does not rest with the majority owner.

- In preparing consolidated financial statements, the effects of intercompany transactions must be eliminated by making elimination entries. Elimination entries are made only on a consolidated statement work sheet, not in the accounting records of either company.

- One elimination entry offsets the parent company's subsidiary investment account against the stockholders' equity accounts of the subsidiary. Intercompany receivables and payables also must be eliminated.

- A consolidated financial statements work sheet is an informal record in which elimination entries are made for the purpose of showing account balances as if the parent and its subsidiaries were a single economic enterprise.

- A consolidated balance sheet work sheet is prepared at the time of acquisition. The first two columns of the work sheet show assets, liabilities, and stockholders' equity of the parent and subsidiary as they appear on each corporation's individual balance sheet. The next pair of columns shows the eliminations. The final column shows the amounts that appear on the consolidated balance sheet.

- A consolidated work sheet is prepared at various dates after acquisition. The first two columns show the income statements, statements of retained earnings, and balance sheets of the parent and subsidiary. The next pair of columns shows the eliminations. The final column shows the amounts that appear in the consolidated financial statements.

- Consolidated financial statements are of primary importance to stockholders, managers, and directors of the parent company. On the other hand, consolidated financial statements are of limited use to the creditors and minority stockholders of the subsidiary.

- $\text{Dividend yield on common stock ratio} = \frac{\text{Dividend per share of common stock}}{\text{Current market price per share}}$

- This ratio helps investors to compare stocks.

- $\text{Payout ratio on common stock} = \frac{\text{Dividend per share of common stock}}{\text{Earnings per share (EPS)}}$

- This ratio indicates whether a company pays out a large percentage of earnings as dividends or reinvests most of its earnings.

## 14. Stock investments

### Demonstration problem

**Demonstration problem A** Following are selected transactions and other data for Kelly Company for 2010:

Mar. 21 Purchased 600 shares of Sly Company common stock at USD 48.75 per share, plus a USD 450 broker's commission. Also purchased 100 shares of Rob Company common stock at USD 225 per share, plus a USD 376 broker's commission. Both investments are expected to be temporary.

June 2 Received cash dividends of USD 1.50 per share on the Sly common shares and USD 3 per share on the Rob common shares.

Aug. 12 Received shares representing a 100 per cent stock dividend on the Rob shares.

30 Sold 100 shares of Rob common stock at USD 120 per share, less a USD 360 broker's commission.

Sept. 15 Received shares representing a 10 per cent stock dividend on the Sly common stock. Market price today was USD 52.50 per share.

Dec. 31 Per share market values for the two investments in common stock are Sly, USD 45.75, and Rob, USD 106.50. Both investments are considered temporary.

Prepare journal entries to record these transactions and the necessary adjustments for a December 31 closing.

**Demonstration problem B** Lanford Company acquired all of the outstanding voting common stock of Casey Company on 2010 January 2, for USD 300,000 cash. After the close of business on the date of acquisition, the balance sheets for the two companies were as follows:

	<b>Landford Company</b>	<b>Casey Company</b>
Assets		
Cash	\$75,000	\$30,000
Accounts receivable, net	90,000	37,700
Notes receivable	15,000	7,750
Merchandise inventory	112,500	45,000
Investment in Casey Company	300,000	
Investment in bonds		30,000
Plant and equipment, net	303,000	195,000
Total assets	\$895,500	\$345,000
Liabilities and stockholders' equity		
Accounts payable	\$ 75,000	\$ 45,000
Notes payable	22,500	15,000
Bonds payable	225,000	
Common stock - \$.50 par value	300,000	150,000
Paid-in capital excess of par value – common		60,000
Retained earnings	273,000	75,000
Total liabilities and stockholders' equity	\$895,500	\$345,000

On 2010 January 2, Casey Company borrowed USD 15,000 from Lanford Company by giving a note. On that same day, Casey Company purchased USD 30,000 of Lanford Company's bonds. The excess of cost over book value is attributable to Casey Company's above-average earnings prospects.

Prepare a work sheet for a consolidated balance sheet on the date of acquisition.

### Solution to demonstration problem A

2010			
Mar. 21	Trading securities (+A)	52,576	
	Cash (-A)		52,576
	To record purchase of 600 shares of Sly common stock for \$29,700 and 100 of Rob common stock for \$22,876		
June 2	Cash (+A)	1,200	
	Dividend revenue (+SE)		1,200
	To record cash dividends: \$900 Sly and \$300 Rob.		
Aug. 12	Received 100 shares of Rob common stock as a 100% stock dividend. The new cost per share is \$22,876/200 shares =		

	\$114.38		
30	Cash (+A)	11,640	
	Trading securities (-A)		11,438
	Gain on sale of trading securities (+SE)		202
	To record the sale of trading securities:		
	Proceeds = \$12,000 - \$360; cost = \$114.38 x 100 shares.		
Sept. 15	Received 60 shares of Sly common stock as a 10% stock dividend. New cost per share is \$29,700/660 shares = \$45.		
Dec. 31	Unrealized loss on trading securities (-SE)	293	
	Trading securities (-A)		293
	To write trading securities down to market value.		

	Cost	Market	Inc. (Dec.) in marketable value
Sly common stock	\$29,700	\$30,195*	\$495
Rob common stock	11,438	10,650†	(788)
Total	\$41,138	\$40,845	\$(293)

\* \$45.75 x 660 shares = \$30,195.

† \$106.50 x 100 shares = \$10,650.

### Solution to demonstration problem B

#### Landford Company and Subsidiary Casey Company Work Sheet for Consolidation Balance Sheet 2010 January 2 (date of acquisition)

	P	S	Eliminations		Consolidated
Assets	Company	Company	Debit	Credit	Amounts
Cash	75,000	30,000			105,000
Accounts receivable, net	90,000	37,500			127,500
Notes receivable	15,000	7,500		(2) 15,000	7,500
Merchandise inventory	112,500	45,000			157,500
Investment in Casey Company	300,000			(1) 300,000	-0-
Investment in bonds		30,000		(3) 30,000	-0-
Plant and equipment, net	303,000	195,000			498,000
Goodwill			(1) 15,000		15,000
	895,500	345,000			910,500
Liabilities and stockholders' equity					
Accounts payable	75,000	45,000			120,000
Notes payable	22,500	15,000	(2) 15,000		22,500
Bonds payable	225,000		(3) 30,000		195,000
Common stock	300,000	150,000	(1) 150,000		300,000
Paid-in capital excess of par value – Common		60,000	(1) 60,000		-0-
Retained earnings	273,000	75,000	(1) 75,000		273,000
	895,500	345,000	345,000	345,000	910,500

### Key terms

**Available-for-sale securities** Securities purchased that will be held for longer than the near term.

**Consolidated statements** The financial statements that result from consolidating the parent's financial statement amounts with those of its subsidiaries (after certain eliminations have been made). The

## 14. Stock investments

consolidated statements reflect the financial position and results of operations of a single economic enterprise.

**Consolidated statement work sheet** An informal record on which elimination entries are made to show account balances as if the parent and its subsidiaries were a single economic enterprise.

**Cost method** A method of accounting for stock investments in which the investor company does not adjust the investment account balance for its share of the investee's reported income, losses, and dividends. Dividends received are credited to Dividends Revenue.

**Dividend yield on common stock ratio** Equal to dividend per share of common stock divided by the current market price per share. Investors use this ratio to compare stocks.

**Elimination entries** Entries made on a consolidated statement work sheet to remove certain intercompany items and transactions. Elimination entries allow the presentation of all account balances as if the parent and its subsidiaries were a single economic enterprise.

**Equity method** A method of accounting for stock investments where the investment account is adjusted periodically for the investor company's share of the investee's income, losses, and dividends as they are reported by the investee.

**Goodwill** An intangible value attached to a business primarily due to above-average earnings prospects.

**Intercompany transactions** Financial transactions involving a parent and one of its subsidiaries or between two of the subsidiaries.

**Investee** A company that has 20 per cent to 50 per cent of its stock purchased by another company (the investor) as a long-term investment.

**Investor** A company that purchases 20 per cent to 50 per cent of another company (the investee) as a long-term investment.

**Marketable equity securities** Readily saleable common and preferred stocks of other companies.

**Minority interest** The claim or interest of the stockholders who own less than 50 per cent of a subsidiary's outstanding voting common stock. The minority stockholders have an interest in the subsidiary's net assets and share the subsidiary's earnings with the parent company.

**Parent company** A corporation that owns more than 50 per cent of the outstanding voting common stock of another corporation.

**Payout ratio on common stock** Calculated by dividing dividend per share of common stock by earnings per share (EPS). The ratio indicates whether a company pays out a large percentage of earnings as dividends or reinvests most of its earnings.

**Subsidiary company** A corporation acquired and controlled by a parent corporation; control is established by ownership of more than 50 per cent of the subsidiary's outstanding voting common stock.

**Trading securities** Securities bought principally for sale in the near term.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

Under the cost method, the investment account is adjusted when dividends are received.

The cost method should be used when a corporation makes a long-term investment of less than 20 per cent, and there is no significant control.

In a stock split, the investor does not recognize revenue, but reduces the cost per share of stock.

Trading securities and available-for-sale securities should be grouped separately in applying the fair market value rules.

When making elimination entries, the entries are made only on the consolidated statements work sheet and not on the accounting records of the parent and subsidiary.

#### Multiple-choice

Select the best answer for each of the following questions.

In which of the following cases is the investor company limited to use of the equity method in accounting for its stock investments?

- a. Short-term investments.
- b. Long-term investments of less than 20 per cent.
- c. Long-term investments of 20 per cent—50 per cent.
- d. Long-term investments of more than 50 per cent.

Under the equity method, which of the following is true?

- a. Dividends received reduce the investment account.
- b. Dividends received increase the investment account.
- c. The investor's share of net income decreases the investment account.
- d. The investor's share of net loss increases the investment account.

When the fair market value rules are followed, which of the following is true when the market value of the stocks in the Trading Securities account falls below their cost?

- a. The Unrealized Losses on Trading Securities account is credited.
- b. The Recovery of Market Value of Trading Securities account is credited.
- c. The Allowance for Market Decline of Current Marketable Equity Securities is debited.
- d. The Unrealized Loss on Trading Securities is debited.

Under the equity method, the investment account always reflects only the:

- a. Dividends paid by the investee corporation.
- b. Investor's interest in the net assets of the investee.
- c. Investor's share of net income.
- d. Historical cost of the investment.

The excess of cost over the book value of an investment that is due to expected above-average earnings is labeled on the consolidated balance sheet as:

- a. Goodwill.
- b. Common stock.
- c. Retained earnings.
- d. Loss on investment.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- For what reasons do corporations purchase the stock of other corporations?
- Explain how marketable securities should be classified in the balance sheet.
- Describe the valuation bases used for marketable equity securities.
- Under what circumstances is the equity method used to account for stock investments?
- Explain briefly the accounting for stock dividends and stock splits from the investor's point of view.
- Of what significance is par value to the investing corporation?
- What is the purpose of preparing consolidated financial statements?
- Under what circumstances must consolidated financial statements be prepared?

## 14. Stock investments

- Why is it necessary to make elimination entries on the consolidated statement work sheet? Are these elimination entries also posted to the accounts of the parent and subsidiary? Why or why not?
- Why might a corporation pay an amount in excess of the book value for a subsidiary's stock? Why might it pay an amount less than the book value of the subsidiary's stock?
- The item Minority interest often appears as one amount in the consolidated balance sheet. What does this item represent?
- How do a subsidiary's earnings, losses, and dividends affect the investment account of the parent when the equity method of accounting is used?
- Why are consolidated financial statements of limited usefulness to the creditors and minority stockholders of a subsidiary?

### Exercises

**Exercise A** On 2010 July 1, Tam Company purchased 200 shares of Del Company capital stock as a temporary investment (trading securities) at USD 676.80 per share plus a commission of USD 720. On July 15, a 10 per cent stock dividend was received. Tam received a cash dividend of USD 3.60 per share on 2010 August 12. On November 1, Tam sold all of the shares for USD 835.20 per share, less a commission of USD 720. Prepare entries to record all of these transactions in Tam Company's accounts.

**Exercise B** Key Company purchased 200 shares of Franklin Company stock at a total cost of USD 7,560 on 2010 July 1. At the end of the accounting year (2010 December 31), the market value for these shares was USD 6,840. By 2011 December 31, the market value had risen to USD 7,920. This stock is the only marketable equity security that Key Company owns. The company classifies the securities as trading securities. Give the entries necessary at the date of purchase and at 2010 December 31, and 2011.

**Exercise C** Corbit Company has marketable equity securities that have a fair market value at year-end that is USD 13,440 below their cost. Give the required entry if:

- a. The securities are current assets classified as trading securities.
- b. The securities are noncurrent assets classified as available-for-sale securities, and the loss is considered to be temporary.
- c. The securities are noncurrent assets classified as available-for-sale securities, and the loss is considered to be permanent.

State where each of the accounts debited in (a), (b), and (c) would be reported in the financial statements.

**Exercise D** Ruiz Company owns 75 per cent of Sim Company's outstanding common stock and uses the equity method of accounting. Sim Company reported net income of USD 702,000 for 2010. On 2010 December 31, Sim Company paid a cash dividend of USD 189,000. In 2011, Sim Company incurred a net loss of USD 125,000. Prepare entries to reflect these events on Ruiz Company's books.

**Exercise E** On 2010 February 1, Larkin Company acquired 100 per cent of the outstanding voting common stock of TRD Company for USD 8,400,000 cash. The stockholders' equity of the TRD Company consisted of common stock, USD 6,720,000, and retained earnings, USD 1,680,000. Prepare (a) the entry to record the investment in TRD Company and (b) the elimination entry on the work sheet used to prepare a consolidated balance sheet as of the date of acquisition.

**Exercise F** Given the facts in the previous exercise, how much would be recorded as goodwill in each of the following instances? The same amount was paid, but the parent company acquired a—

- a. 90 per cent interest.
- b. 70 per cent interest.
- c. 55 per cent interest.

**Exercise G** Heidi Corporation acquired, for cash, 80 per cent of the outstanding voting common stock of Sumpter Company. After the close of business on the date of acquisition, Sumpter Company's stockholders' equity consisted of common stock, USD 5,880,000, and retained earnings, USD 2,184,000. The cost of the investment exceeded the book value by USD 302,400 and was attributable to above-average earnings prospects. Prepare (a) the entry to record the investment in Sumpter Company and (b) the elimination entry on the work sheet used to prepare consolidated financial statements as of the date of acquisition.

**Exercise H** On 2009 January 1, Company J acquired 85 per cent of the outstanding voting common stock of Company K. On that date, Company K's stockholders' equity consisted of:

Stockholders' equity:	
Paid-in capital:	
Common stock, \$90 par; 30,000 shares authorized, issued, and outstanding	\$2,700,000
Retained earnings	675,000
Total stockholders' equity	\$3,375,000

Compute the difference between cost and book value in each of the following cases:

- a. Company J pays USD 2,868,750 cash for its interest in Company K.
- b. Company J pays USD 3,375,000 cash for its interest in Company K.
- c. Company J pays USD 2,610,000 cash for its interest in Company K.

**Exercise I** The 2010 January 1, stockholders' equity section of Saye Company's balance sheet follows:

Stockholders' equity:	
Paid-in capital:	
Common stock, \$144 par; authorized, 200,000 shares; issued, and outstanding, 150,000 shares	\$21,600,000
Paid-in capital in excess of par value	3,600,000
Total paid-in capital	\$25,200,000
Retained earnings	2,160,000
Total stockholders' equity	\$27,360,000

Ninety per cent of Saye Company's outstanding voting common stock was acquired by Tim Company on 2011 January 1, for USD 24,048,000. Compute (a) the book value of the investment, (b) the difference between cost and book value, and (c) the minority interest.

**Exercise J** Company S purchased 90 per cent of Company T's outstanding voting common stock on 2010 January 2. The investment is accounted for under the equity method. Company S paid USD 2,790,000 for its proportionate equity of USD 2,430,000. The difference was due to undervalued land owned by Company T. Company T earned USD 324,000 during 2010 and paid cash dividends of USD 108,000.

- a. Compute the balance in the investment account on 2010 December 31.
- b. Compute the amount of the minority interest on (1) 2010 January 2, and (2) 2010 December 31.

### Problems

**Problem A** Paris Company acquired on 2010 July 15, 400 shares of Rome Company USD 720 par value capital stock at USD 698.40 per share plus a broker's commission of USD 1,728. On 2010 August 1, Paris Company received a cash dividend of USD 8.64 per share. On 2010 November 3, it sold 200 of these shares at USD 756 per



## 14. Stock investments

share less a broker's commission of USD 1,152. On 2010 December 1, Rome Company issued shares comprising a 100 per cent stock dividend declared on its capital stock on November 18.

On 2010 December 31, the end of Paris Company's calendar-year accounting period, the market quotation for Rome Company's common stock was USD 331.20 per share. The decline was considered to be temporary.

a. Prepare journal entries to record all of these data assuming the securities are considered temporary investments classified as trading securities. Where should the accounts in the last entry appear in the financial statements?

b. Assume Rome Company has become a major customer so the shares are held for long-term affiliation purposes. Indicate how the investment should be shown in the balance sheet.

**Problem B** On 2010 October 17, Strong Company purchased the following common stocks (all trading securities) at the indicated per share prices that included commissions:

600 shares of X Company common stock @	\$129,600
\$216	
1,000 shares of Y Company common stock @	144,000
\$144	
1,600 shares of Z Company common stock @	115,200
\$72	
	\$388,800

On 2010 December 31, the market prices per share of the above common stocks were X, USD 223.20; Y, USD 136.80; and Z, USD 54.

Summarized, the cash dividends per share received in 2011 were X, USD 14.40; Y, USD 7.20; and Z, USD 5.40.

On 2011 December 31, the per share market prices were X, USD 252.80; Y, USD 115.20; and Z, USD 72.

All of these changes in market prices are considered temporary.

Prepare journal entries for all of these transactions, including calendar year-end adjusting entries, assuming the shares of common stock acquired are considered trading securities.

If the securities acquired are considered available-for-sale securities, how would the entries differ?

For both parts a and b, give the descriptions (titles) and the dollar amounts of the items that would appear in the income statements for 2010 and 2011.

**Problem C** On 2010 January 1, Long Company acquired 80 per cent of the outstanding voting common stock of Fall Company for USD 4,032,000 cash. Long Company uses the equity method. During 2010, Fall reported USD 672,000 of net income and paid USD 288,000 in dividends. The stockholders' equity section of the 2009 December 31, balance sheet for Fall follows:

Stockholders' equity:	
Paid-in capital:	
Common stock - \$42 par	\$4,200,000
Retained earnings	840,000
Total stockholders' equity	\$5,040,000

a. Prepare the general journal entries to record the investment and the effect of Fall's income and dividends on Long Company's accounts.

b. Prepare the elimination entry that would be made on the work sheet for a consolidated balance sheet as of the date of acquisition.

**Problem D** Pearson Company acquired 75 per cent of the outstanding voting common stock of Frost Company for USD 1,444,800 cash on 2010 January 1. The investment is accounted for under the equity method. During 2010, 2011, and 2012, Frost Company reported the following:

	<b>Net income (loss)</b>	<b>Dividends Paid</b>
2010	\$357,840	\$290,640
2011	(45,360)	-0-
2012	108,360	72,240

a. Prepare general journal entries to record the investment and the effect of the subsidiary's income, losses, and dividends on Pearson Company's accounts.

b. Compute the balance in the investment account on 2012 December 31.

**Problem E** Cord Company acquired 100 per cent of the outstanding voting common stock of Thorpe Company on 2010 January 2, for USD 2,700,000. At the end of business on the date of acquisition, the balance sheets for the two companies were as follows:

	<b>Cord Company</b>	<b>Thorpe Company</b>
<b>Assets</b>		
Cash	\$ 315,000	\$ 180,000
Accounts receivable, net	234,000	144,000
Notes receivable	360,000	90,000
Merchandise inventory	495,000	234,000
Investment in Thorpe Company	2,700,000	
Equipment, net	648,000	450,000
Building, net	1,890,000	990,000
Land	765,000	405,000
Total assets	\$7,407,000	\$2,493,000
<b>Liabilities and stockholders' equity</b>		
Accounts payable	\$ 117,000	\$ 135,000
Notes payable	90,000	108,000
Common stock - \$45 par value	5,400,000	1,800,000
Retained earnings	1,800,000	450,000
Total liabilities and stockholders' equity	\$7,407,000	\$2,493,000

The excess of cost over book value is attributable to the above-average earnings prospects of Thorpe Company. On the date of acquisition, Thorpe Company borrowed USD 72,000 from Cord Company by giving a note.

a. Prepare a work sheet for a consolidated balance sheet as of the date of acquisition.

b. Prepare a consolidated balance sheet for 2010 January 2.

**Problem F** Refer to the previous problem, Cord Company uses the equity method. Assume the following are from the adjusted trial balances of Cord Company and Thorpe Company on 2010 December 31:

	<b>Cord Company</b>	<b>Thorpe Company</b>
<b>Debit balance accounts</b>		
Cash	\$ 351,000	\$ 315,000
Accounts receivable, net	378,000	180,000
Notes receivable	315,000	45,000
Merchandise inventory, December 31	495,000	287,100
Investment in Thorpe Company	2,790,000	
Equipment, net	615,000	427,500
Building, net	1,814,400	950,400
Land	765,000	405,000
Cost of goods sold	1,800,000	630,000
Expense (excluding depreciation and taxes)	720,000	270,900
Depreciation expense	108,000	62,100
Income tax expense	585,000	189,000
Dividends	540,000	108,000
Total of the accounts with debit balances	\$11,277,000	\$3,870,000
<b>Credit balance accounts</b>		
Accounts payable	\$ 135,000	\$ 180,000
Notes payable	144,000	90,000
Common stock - \$45 par value	5,400,000	1,800,000
Retained earnings – January 1	1,800,000	450,000
Revenue from sales	3,600,000	1,350,000
Income from Thorpe Company	198,000	

## 14. Stock investments

Total of the accounts with credit balances      \$11,277,000      \$3,870,000

There is no intercompany debt at the end of the year.

Prepare a work sheet for consolidated financial statements on 2010 December 31.

**Problem G** Using the work sheet from Problem F, prepare the following items:

- a. Consolidated income statement for the year ended 2010 December 31.
- b. Consolidated statement of retained earnings for the year ended 2010 December 31.
- c. Consolidated balance sheet for 2010 December 31.

### Alternate problems

**Alternate problems A** On 2010 September 1, Ramsey Company purchased the following relatively long-term investments classified as available-for-sale securities:

- Two thousand shares of Lacey Company capital stock at USD 439.20 plus broker's commission of USD 5,760.
- One thousand shares of Membrow Company capital stock at USD 705.60 plus broker's commission of USD 5,040.

Cash dividends of USD 18.00 per share on the Lacey capital stock and USD 14.40 per share on the Membrow capital stock were received on December 7 and December 10, respectively.

On 2010 December 31, per share market values are Lacey, USD 460.80; and Membrow, USD 655.20.

- a. Prepare journal entries to record these transactions.
- b. Prepare the necessary adjusting entry(ies) at 2010 December 31, to adjust the carrying values assuming that market price changes are believed to be temporary. Where would the accounts appear in the financial statements?

**Alternate problem B** Kress, Inc., purchased on 2010 July 2, 240 shares of Baker Company USD 180 par value common stock as a temporary investment at USD 288 per share, plus a broker's commission of USD 432.

On 2010 July 15, a cash dividend of USD 7.20 per share was received. On 2010 September 1, Baker Company split its USD 180 par value common shares two for one.

On 2010 November 2, Kress sold 200 shares of Baker common stock at USD 180, less a broker's commission of USD 288.

- a. Prepare journal entries to record all of the above transactions.
- b. How would you recommend that the remaining shares be classified in the 2010 December 31, balance sheet if still held at that date?
- c. Assume the remaining shares were considered current assets classified as trading securities at the end of 2010, at which time their market value was USD 128 per share. Prepare any necessary adjusting entries for the end of 2010.

**Alternate problem C** Prime Company acquired 90 per cent of the outstanding voting common stock of Orr Company 2010 January 1, for USD 7,560,000 cash. Prime Company uses the equity method. During 2010 Orr reported USD 1,512,000 of net income and paid USD 504,000 in cash dividends. The stockholders' equity section of the 2009 December 31, balance sheet for Orr follows:

Stockholders' equity:  
Paid-in capital:  
Common stock, \$21.00    \$6,720,000  
par  
Retained earnings      1,680,000  
Total stockholders'    \$8,400,000

equity

a. Prepare general journal entries to record the investment and the effect of Orr's earnings and dividends on Prime Company's accounts.

b. Prepare the elimination entry that would be made on the work sheet for a consolidated balance sheet as of the date of acquisition.

**Alternate problem D** Codd Company acquired 70 per cent of the outstanding voting common stock of Snow Company for USD 8,568,000 on 2010 January 1. The investment is accounted for under the equity method. During the years 2010-2012, Snow Company reported the following:

	<b>Net Income Dividends</b>	
	<b>(loss)</b>	<b>Paid</b>
2007	\$1,454,880	\$871,920
2008	372,960	223,440
2009	(23,520)	55,860

a. Prepare general journal entries to record the investment and the effect of the subsidiary's income, losses, and dividends on Codd Company's accounts.

b. Compute the investment account balance on 2011 December 31.

**Alternate problem E** Maple Company acquired all of the outstanding voting common stock of Dodd Company on 2010 January 2, for USD 4,320,000. On the date of acquisition, the balance sheets for the two companies were as follows:

	<b>Maple Company</b>	<b>Dodd Company</b>
<b>Assets</b>		
Cash	\$ 900,000	\$270,000
Accounts receivable, net	432,000	360,000
Notes receivable	180,000	108,000
Merchandise inventory	1,368,000	864,000
Investment in Dodd Company	4,320,000	
Equipment, net	1,224,000	738,000
Building, net	3,330,000	1,656,000
Land	1,404,000	450,000
Total assets	\$13,158,000	\$4,446,000
<b>Liabilities and stockholders' equity</b>		
Accounts payable	\$792,000	\$360,000
Notes payable	216,000	252,000
Common stock - \$120 par value	9,540,000	3,564,000
Retained earnings	2,610,000	270,000
Total liabilities and stockholders' equity	\$12,158,000	\$4,446,000

The management of Maple Company thinks that the Dodd Company's land is undervalued by USD 162,000. The remainder of the excess of cost over book value is due to superior earnings potential.

On the date of acquisition, Dodd Company borrowed USD 180,000 from Maple Company by giving a note.

a. Prepare a work sheet for a consolidated balance sheet as of the date of acquisition.

b. Prepare a consolidated balance sheet for 2010 January 2.

**Alternate problem F** Refer back to the previous problem. Maple Company uses the equity method. Assume the following amounts are taken from the adjusted trial balances of Maple Company and Dodd Company on 2010 December 31:

	<b>Maple Company</b>	<b>Dodd Company</b>
<b>Debit balance accounts</b>		
Cash	\$ 864,000	\$ 364,295
Accounts receivable, net	553,536	414,000
Notes receivable	342,000	90,000
Merchandise inventory, December 31	1,530,000	1,008,000

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Investment in Dodd Company	4,519,356	
Equipment, net	1,147,500	691,860
Building, net	3,136,500	1,573,200
Land	1,404,000	450,000
Cost of goods sold	8,064,000	2,160,000
Expense (excluding depreciation and taxes)	2,160,000	810,000
Depreciation expense	243,000	128,940
Income tax expense	569,664	123,504
Dividends	477,000	178,200
Total of the accounts with debit balances	\$25,037,556	\$7,992,000
<b>Credit balance accounts</b>		
Accounts payable	\$ 720,000	\$ 378,000
Notes payable	270,000	180,000
Common stock - \$90 par value	9,540,000	3,564,000
Retained earnings	2,610,000	270,000
Revenue from sales	11,520,000	3,600,000
Income from Dodd Company	377,556	
Total of the accounts with credit balances	\$25,037,556	\$7,992,000

There is no intercompany debt at the end of the year.

Prepare a work sheet for consolidated financial statements on 2010 December 31.

**Alternate problem G** Using the work sheet from the previous problem, prepare the following items:

- Consolidated income statement for the year ended 2010 December 31.
- Consolidated statement of retained earnings for the year ended 2010 December 31.
- Consolidated balance sheet for 2010 December 31.

### Beyond the numbers—Critical thinking

**Business decision case A** You are the CPA engaged to audit the records of Quigley Company. You find that your client has a portfolio of marketable equity securities that has a total market value of USD 300,000 less than the total cost of the portfolio. You ask the vice president for finance if the client expects to sell these securities in the coming year. He answers that he does not know. The securities will be sold if additional cash is needed to finance operations. When you ask for a cash forecast, you are told that a forecast has been prepared that covers the next year. It indicates no need to sell the marketable securities.

Write a brief statement in which you explain how you would classify the client's portfolio of marketable securities in the balance sheet. Does it really make any difference whether the securities are classified as trading securities or available-for-sale securities? Explain.

**Business decision case B** On 2010 January 2, Brown Company acquired 60 per cent of the voting common stock of Cobb Company for USD 720,000 cash. The excess of cost over book value was due to above-average earnings prospects. Brown has hired you to help it prepare consolidated financial statements and has already collected the following information for both companies as of 2010 January 2:

	<b>Brown Company</b>	<b>Cobb Company</b>
<b>Assets</b>		
Cash	\$ 72,000	\$ 54,000
Accounts receivable, net	108,000	126,000
Merchandise inventory	288,000	216,000
Investment in Cobb Company	720,000	
Plant and equipment, net	936,000	738,000
Total assets	\$2,124,000	\$1,134,000
<b>Liabilities and stockholders' equity</b>		
Accounts payable	\$ 144,000	\$ 54,000
Common stock	1,440,000	720,000
Retained earnings	540,000	360,000
Total liabilities and stockholders' equity	\$2,124,000	\$1,134,000

- a. Brown believes that consolidated financial statements can be prepared simply by adding together the amounts in the two individual columns. Is this correct? If not, why not?
- b. Prepare a consolidated balance sheet for the date of acquisition without preparing a consolidated statement work sheet.

**Business decision case C** International Flavors & Fragrances, Inc., is the leading creator and manufacturer of flavors and fragrances used by others to impart or improve flavor or fragrance in a wide variety of consumer products.

Use the following excerpt from International Flavors & Fragrances Inc.'s 2000 annual report to calculate the dividend yield on common stock and the payout ratios. Then comment on the results.

	2000	1999	1998
Earnings per share	\$1.22	\$1.53	\$1.90
Dividends per share (\$)	1.29	1.52	1.48
Stock price per common share (\$)	20.31	37.63	44.19

**Group project D** In teams of two or three students, select three companies you believe may be profitable short-term investments. Determine the current market prices for those companies' stocks from today's newspaper and the market prices six months ago. Calculate the gain or loss that your team would have recorded if it had purchased 500 shares of each company's stock six months ago and sold all of the shares today. Write a short memo to your instructor describing why you selected those companies and why you believe the market prices of their stocks increased or decreased. Also, be prepared to describe your analysis to the class.

**Group project E** With one or two other students, go to the library and locate *Statement of Financial Standards No. 94*, "Consolidation of All Majority-Owned Subsidiaries", published by the Financial Accounting Standard Board. In a report to your instructor answer questions such as: What does the standard require? Why did the FASB act on this topic? Why are "nonhomogeneous" subsidiaries included in the consolidated group? Why did one of the Board members dissent from the statement? Describe some of the important background on this topic as given in the statement.

**Group project F** In a small group of students, locate the annual reports of three companies with investments in other companies. Compare the accounting and reporting for the investments by the three companies. For instance, by reading the notes to the financial statements, try to determine whether they account for the investments using the cost or equity methods. Is there goodwill on the balance sheets? What else can you determine about the investments? Write a report to your instructor summarizing your findings.

#### Using the Internet—A view of the real world

Visit the following website for General Electric Company:

<http://www.ge.com>

Pursue choices on the screen until you locate the consolidated statement of financial position. You will probably go down some "false paths" to get to this financial statement, but you can get there. This experience is all part of learning to use the Internet. Check to see if there is a minority interest listed on the consolidated statement of financial position. Check out the notes to the financial statements for further information. Browse around the site for any other interesting information concerning the company. Write a memo to your instructor summarizing your findings.

#### Answers to self-test

##### True-false

## 14. Stock investments

**False.** Under the cost method of accounting for stock investments, the Dividend Revenue account, rather than the investment account, is adjusted.

**True.** For long-term investments of less than 20 per cent, the cost method should be used.

**True.** Revenue is not recognized when there is a stock split. The new number of shares is recorded, and the cost per share is reduced.

**True.** Trading securities should be considered separately from available-for-sale securities in applying the fair market value method.

**True.** Eliminating entries are not made on the accounting records of the parent and subsidiary. Only the work sheet is affected by elimination entries made during consolidation.

### **Multiple-choice**

**c.** The Accounting Principles Board has said that investors must use the equity method when accounting for long-term investments of 20 per cent to 50 per cent.

**a.** Under the equity method, dividends received reduce the investment account; the other choices are not true.

**d.** If the market value of securities falls below their cost, an unrealized loss account is debited.

**b.** Under the equity method, the investment account always reflects the investor's interest in the net assets of the investee.

**a.** If cost is greater than the book value of an investment because of expected above-average earnings, the excess cost should be labeled goodwill.

# 15. Long-term financing: Bonds

## Learning objectives

After studying this chapter, you should be able to:

- Describe the features of bonds and tell how bonds differ from shares of stock.
- List the advantages and disadvantages of financing with long-term debt and prepare examples showing how to employ financial leverage.
- Prepare journal entries for bonds issued at face value.
- Explain how interest rates affect bond prices and what causes a bond to sell at a premium or a discount.
- Apply the concept of present value to compute the price of a bond.
- Prepare journal entries for bonds issued at a discount or a premium.
- Prepare journal entries for bond redemptions and bond conversions.
- Describe the ratings used for bonds.
- Analyze and use the financial results—times interest earned ratio.
- Explain future value and present value concepts and make required calculations (Appendix).

## The accountant's role in financial institutions

Companies that require funds to maintain existing operations and expand new operations frequently do not have the necessary cash available within the company. Therefore, these companies are required to obtain long-term financing from banks and other financial institutions. The operations of financial institutions are unique from those of the typical manufacturing or service company. As a result, the accounting measurement and disclosure practices followed by financial institutions can be quite different from those followed in other industries. In addition to the more traditional careers in accounting (auditing, professional services, financial reporting, cost accounting, and taxation), accounting majors with interests in finance may pursue a career in financial institutions.

Accountants in this industry commonly deal with issues related to marketable securities, derivatives, hedging, sale of receivables, foreign currency exchanges, and loan loss provisions and impairments. In addition, accountants in this area are being called upon to play an increasing role in the strategic operations of the financial institution. Not only are accountants needed to account for the institution's transactions, but they are being asked to recommend new opportunities for growth and to advise on financial risk as well. Some of these new areas include issues related to asset/liability management, interest rate risk, present value measurements, capital structure, and key ratio analysis.

Accountants also play a key role in one of the most important decisions of a financial institution—the decision of whether to lend money to a prospective borrower. The decision to lend money hinges on the ability of the prospective borrower to pay interest and repay debt. Since accountants have been trained in financial statement



## 15. Long-term financing: Bonds

preparation and interpretation, accountants are some of the most sought after professionals for understanding the financial position and risk of a prospective borrower.

In previous chapters, you learned that corporations obtain cash for recurring business operations from stock issuances, profitable operations, and short-term borrowing (current liabilities). However, when situations arise that require large amounts of cash, such as the purchase of a building, corporations also raise cash from long-term borrowing, that is, by issuing bonds. The issuing of bonds results in a Bonds Payable account.

### Bonds payable

A **bond** is a long-term debt, or liability, owed by its issuer. Physical evidence of the debt lies in a negotiable bond certificate. In contrast to long-term notes, which usually mature in 10 years or less, bond maturities often run for 20 years or more.

Generally, a bond issue consists of a large number of USD 1,000 bonds rather than one large bond. For example, a company seeking to borrow USD 100,000 would issue one hundred USD 1,000 bonds rather than one USD 100,000 bond. This practice enables investors with less cash to invest to purchase some of the bonds.

Bonds derive their value primarily from two promises made by the borrower to the lender or bondholder. The borrower promises to pay (1) the **face value** or principal amount of the bond on a specific maturity date in the future and (2) periodic interest at a specified rate on face value at stated dates, usually semiannually, until the maturity date.

Large companies often have numerous long-term notes and bond issues outstanding at any one time. The various issues generally have different stated interest rates and mature at different points in the future. Companies present this information in the footnotes to their financial statements. Exhibit 117 shows a portion of the long-term borrowings footnote from Dow Chemical Company's 2000 annual report. Promissory notes, debenture bonds, and foreign bonds are shown, with their amounts, maturity dates, and interest rates.

	<b>Promissory notes and debentures at 2000 December 31</b>	
	<b>Millions</b>	
	<b>2000</b>	<b>1999</b>
6.95%, final maturity 2002	\$ 346	\$ ---
7.81%, final maturity 2002	---	
7.13%, final maturity 2003		
7.00%, final maturity 2005	300	---
7.70%, final maturity 2006	2,473	2,448
Subtotal	\$3,267	\$3,135

	<b>Foreign bonds at 2000 December 31</b>	
	<b>Millions</b>	
	<b>2000</b>	<b>1999</b>
4.63%, final maturity 2000, Swiss Fran	\$--	\$ 95
6.38%, final maturity 2001, Japanese Yen	218	244
5.00%, final maturity 2003, Euro	139	151
Subtotal	\$357	\$490

Exhibit 117: Dow chemical company's long-term notes and bonds (in millions)

### Comparison with stock

A bond differs from a share of stock in several ways:

- A bond is a debt or liability of the issuer, while a share of stock is a unit of ownership.
- A bond has a maturity date when it must be paid. A share of stock does not mature; stock remains outstanding indefinitely unless the company decides to retire it.

- Most bonds require stated periodic interest payments by the company. In contrast, dividends to stockholders are payable only when declared; even preferred dividends need not be paid in a particular period if the board of directors so decides.
- Bond interest is deductible by the issuer in computing both net income and taxable income, while dividends are not deductible in either computation.

## Selling (issuing) bonds

A company seeking to borrow millions of dollars generally is not able to borrow from a single lender. By selling (issuing) bonds to the public, the company secures the necessary funds.

Usually companies sell their bond issues through an investment company or a banker called an **underwriter**. The underwriter performs many tasks for the bond issuer, such as advertising, selling, and delivering the bonds to the purchasers. Often the underwriter guarantees the issuer a fixed price for the bonds, expecting to earn a profit by selling the bonds for more than the fixed price.

When a company sells bonds to the public, many purchasers buy the bonds. Rather than deal with each purchaser individually, the issuing company appoints a trustee to represent the bondholders. The **trustee** usually is a bank or trust company. The main duty of the trustee is to see that the borrower fulfills the provisions of the bond indenture. A **bond indenture** is the contract or loan agreement under which the bonds are issued. The indenture deals with matters such as the interest rate, maturity date and maturity amount, possible restrictions on dividends, repayment plans, and other provisions relating to the debt. An issuing company that does not adhere to the bond indenture provisions is in default. Then, the trustee takes action to force the issuer to comply with the indenture.

Bonds may differ in some respects; they may be secured or unsecured bonds, registered or unregistered (bearer) bonds, and term or serial bonds. We discuss these differences next.

Certain bond features are matters of legal necessity, such as how a company pays interest and transfers ownership. Such features usually do not affect the issue price of the bonds. Other features, such as convertibility into common stock, are sweeteners designed to make the bonds more attractive to potential purchasers. These sweeteners may increase the issue price of a bond.

**Secured bonds** A **secured bond** is a bond for which a company has pledged specific property to ensure its payment. Mortgage bonds are the most common secured bonds. A **mortgage** is a legal claim (lien) on specific property that gives the bondholder the right to possess the pledged property if the company fails to make required payments.

**Unsecured bonds** An **unsecured bond** is a **debenture bond**, or simply a debenture. A debenture is an unsecured bond backed only by the general creditworthiness of the issuer, not by a lien on any specific property. A financially sound company can issue debentures more easily than a company experiencing financial difficulty.

**Registered bonds** A **registered bond** is a bond with the owner's name on the bond certificate and in the register of bond owners kept by the bond issuer or its agent, the registrar. Bonds may be registered as to principal (or face value of the bond) or as to both principal and interest. Most bonds in our economy are registered as to principal only. For a bond registered as to both principal and interest, the issuer pays the bond interest by check. To transfer ownership of registered bonds, the owner endorses the bond and registers it in the new owner's name. Therefore, owners can easily replace lost or stolen registered bonds.

## 15. Long-term financing: Bonds

**Unregistered (bearer) bonds** An **unregistered (bearer) bond** is the property of its holder or bearer because the owner's name does not appear on the bond certificate or in a separate record. Physical delivery of the bond transfers ownership.

**Coupon bonds** A **coupon bond** is a bond not registered as to interest. Coupon bonds carry detachable coupons for the interest they pay. At the end of each interest period, the owner clips the coupon for the period and presents it to a stated party, usually a bank, for collection.

**Term bonds and serial bonds** A **term bond** matures on the same date as all other bonds in a given bond issue. **Serial bonds** in a given bond issue have maturities spread over several dates. For instance, one-fourth of the bonds may mature on 2011 December 31, another one-fourth on 2012 December 31, and so on.

**Callable bonds** A **callable bond** contains a provision that gives the issuer the right to call (buy back) the bond before its maturity date. The provision is similar to the call provision of some preferred stocks. A company is likely to exercise this call right when its outstanding bonds bear interest at a much higher rate than the company would have to pay if it issued new but similar bonds. The exercise of the call provision normally requires the company to pay the bondholder a call premium of about USD 30 to USD 70 per USD 1,000 bond. A call premium is the price paid in excess of face value that the issuer of bonds must pay to redeem (call) bonds before their maturity date.

**Convertible bonds** A **convertible bond** is a bond that may be exchanged for shares of stock of the issuing corporation at the bondholder's option. A convertible bond has a stipulated conversion rate of some number of shares for each USD 1,000 bond. Although any type of bond may be convertible, issuers add this feature to make risky debenture bonds more attractive to investors.

**Bonds with stock warrants** A **stock warrant** allows the bondholder to purchase shares of common stock at a fixed price for a stated period. Warrants issued with long-term debt may be nondetachable or detachable. A bond with nondetachable warrants is virtually the same as a convertible bond; the holder must surrender the bond to acquire the common stock. Detachable warrants allow bondholders to keep their bonds and still purchase shares of stock through exercise of the warrants.

**Junk bonds** **Junk bonds** are high-interest rate, high-risk bonds. Many junk bonds issued in the 1980s financed corporate restructurings. These restructurings took the form of management buyouts (called leveraged buyouts or LBOs), hostile takeovers of companies by outside parties, or friendly takeovers of companies by outside parties. In the early 1990s, junk bonds lost favor because many issuers defaulted on their interest payments. Some issuers declared bankruptcy or sought relief from the bondholders by negotiating new debt terms.

Several advantages come from raising cash by issuing bonds rather than stock. First, the current stockholders do not have to dilute or surrender their control of the company when funds are obtained by borrowing rather than issuing more shares of stock. Second, it may be less expensive to issue debt rather than additional stock because the interest payments made to bondholders are tax deductible while dividends are not. Finally, probably the most important reason to issue bonds is that the use of debt may increase the earnings of stockholders through favorable financial leverage.

**Favorable financial leverage** A company has **favorable financial leverage** when it uses borrowed funds to increase earnings per share (EPS) of common stock. An increase in EPS usually results from earning a higher rate of return than the rate of interest paid for the borrowed money. For example, suppose a company borrowed money at 10 per cent and earned a 15 per cent rate of return. The 5 per cent difference increases earnings.

Exhibit 118 provides a more comprehensive example of favorable financial leverage. The two companies in the illustration are identical in every respect except in the way they are financed. Company A issued only capital stock, while Company B issued equal amounts of 10 per cent bonds and capital stock. Both companies have USD 20,000,000 of assets, and both earned USD 4,000,000 of income from operations. If we divide income from operations by assets (USD 4,000,000/USD 20,000,000), we see that both companies earned 20 per cent on assets employed. Yet B's stockholders fared far better than A's. The ratio of net income to stockholders' equity is 18 per cent for B, while it is only 12 per cent for A.

Assume that both companies issued their stock at the beginning of 2010 at USD 10 per share. B's USD 1.80 EPS are 50 per cent greater than A's USD 1.20 EPS. This EPS difference probably would cause B's shares to sell at a substantially higher market price than A's shares. B's larger EPS would also allow a larger dividend on B's shares.

Company B in Exhibit 118 is employing financial leverage, or **trading on the equity**. The company is using its stockholders' equity as a basis for securing funds on which it pays a fixed return. Company B expects to earn more from the use of such funds than their fixed after-tax cost. As a result, Company B increases its rate of return on stockholders' equity and EPS.<sup>48</sup>

**Companies A and B Condensed Statements  
Balance Sheets  
2010 December 31**

	<b>Company A</b>	<b>Company B</b>
Total assets	\$20,000,000	\$20,000,000
Bonds payable, 10%		\$10,000,000
Stockholders' equity (capital stock)	\$20,000,000	10,000,000
Total equities	\$20,000,000	\$20,000,000
Income statements		
For the year ended 2010 December 31		
Income from operations	\$4,000,000	\$4,000,000
Interest expense		1,000,000
Income before federal income taxes	\$4,000,000	\$3,000,000
Deduct: Federal income taxes (40%)	1,600,000	1,200,000
Net income	\$2,400,000	\$1,800,000
Number of common shares outstanding	2,000,000	1,000,000
Earnings per share (EPS) (Net income/Number of common shares outstanding)	\$1.20	\$1.80
Rate of return on assets employed (Income from Operations/Total assets; both companies \$4,000,000/\$20,000,000)	20%	20%
Rate of return on stockholders' equity (Net income/Stockholders' equity):		
Company A (\$2,400,000/\$20,000,000)	12%	
Company B (\$1,800,000/\$10,000,000)		18%

**Exhibit 118: Favorable financial leverage**

Several disadvantages accompany the use of debt financing. First, the borrower has a fixed interest payment that must be met each period to avoid default. Second, use of debt also reduces a company's ability to withstand a major loss. For example, assume that instead of having net income, both Company A and Company B in Exhibit 118 sustain a net loss in 2010 of USD 11,000,000. At the end of 2010, Company A will still have USD 9,000,000 of stockholders' equity and can continue operations with a chance of recovery. Company B, on the other hand, would have negative stockholders' equity of USD 1,000,000 and the bondholders could force the company to liquidate if B could not make interest payments as they came due. The result of sustaining the loss by the two companies is as follows:

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<sup>48</sup> Issuing bonds is only one method of using leverage. Other methods of using financial leverage include issuing preferred stock or long-term notes.

15. Long-term financing: Bonds

**Companies A and B  
Partial Balance Sheets  
2010 December 31**

	<b>Company A Company B</b>	
Stockholders' equity:		
Paid-in capital:		
Common stock	\$20,000,000	\$10,000,000
Retained earnings	(11,000,000)	(11,000,000)
Total stockholders' equity	\$ 9,000,000	\$ (1,000,000)

A third disadvantage of debt financing is that it also causes a company to experience unfavorable financial leverage when income from operations falls below a certain level. **Unfavorable financial leverage** results when the cost of borrowed funds exceeds the revenue they generate; it is the reverse of favorable financial leverage. In the previous example, if income from operations fell to USD 1,000,000, the rates of return on stockholders' equity would be 3 per cent for A and zero for B, as shown in this schedule:

**Companies A and B  
Income Statements  
For the year ended 2010 December 31**

	<b>Company A Company B</b>	
Income from operations	\$1,000,000	\$1,000,000
Interest expense		1,000,000
Income before federal income taxes	\$1,000,000	\$ -0-
Deduct: Federal income taxes (40%)	400,000	-0-
Net income	600,000	\$ -0-
Rate of return on stockholders' equity:		
Company A (\$600,000/\$20,000,000)	3%	
Company B (\$0/\$10,000,000)		0%

The fourth disadvantage of issuing debt is that loan agreements often require maintaining a certain amount of working capital (Current assets - Current liabilities) and place limitations on dividends and additional borrowings.

When a company issues bonds, it incurs a long-term liability on which periodic interest payments must be made, usually twice a year. If interest dates fall on other than balance sheet dates, the company must accrue interest in the proper periods. The following examples illustrate the accounting for bonds issued at face value on an interest date and issued at face value between interest dates.

**Bonds issued at face value on an interest date** Valley Company's accounting year ends on December 31. On 2010 December 31, Valley issued 10-year, 12 per cent bonds with a USD 100,000 face value, for USD 100,000. The bonds are dated 2010 December 31, call for semiannual interest payments on June 30 and December 31, and mature on 2020 December 31. Valley made the required interest and principal payments when due. The entries for the 10 years are as follows:

On 2010 December 31, the date of issuance, the entry is:

2010			
Dec. 31	Cash (+A)	100,000	
	Bonds payable (+L)		100,000
	To record bonds issued at face value.		

On each June 30 and December 31 for 10 years, beginning 2010 June 30 (ending 2020 June 30), the entry would be:

Each year			
June 30			
And Dec.31	Bond Interest Expense (\$100,000 x 0.12 x 6,000 1/2) (-SE)		
	Cash (-A)		6,000
	To record periodic interest payment.		

On 2020 December 31, the maturity date, the entry would be:

2020			
Dec. 31	Bond interest expense (-SE)	6,000	
	Bonds payable (-L)	100,000	
	Cash (-A)		106,000
	To record final interest and bond redemption payment.		

Note that Valley does not need adjusting entries because the interest payment date falls on the last day of the accounting period. The income statement for each of the 10 years 2010-2018 would show Bond Interest Expense of USD 12,000 (USD 6,000 X 2); the balance sheet at the end of each of the years 2010-2018 would report bonds payable of USD 100,000 in long-term liabilities. At the end of 2019, Valley would reclassify the bonds as a current liability because they will be paid within the next year.

The real world is more complicated. For example, assume the Valley bonds were dated 2010 October 31, issued on that same date, and pay interest each April 30 and October 31. Valley must make an adjusting entry on December 31 to accrue interest for November and December. That entry would be:

2010			
Dec. 31	Bond interest expense ( $\$100,000 \times 0.12 \times 2/12$ ) (-SE)	2,000	
	Bond interest payable (+L)		2,000
	To accrue two month's interest expense.		

The 2011 April 30, entry would be:

2011			
Apr. 30	Bond interest expense ( $\$100,000 \times 0.12 \times 4/12$ ) (-SE)	4,000	
	Bond interest payable (-L)	2,000	
	Cash (-A)		6,000
	To record semiannual interest payment.		

The 2011 October 31, entry would be:

2011			
Oct. 31	Bond interest expense (-SE)	6,000	
	Cash (-A)		6,000
	To record semiannual interest payment.		

Each year Valley would make similar entries for the semiannual payments and the year-end accrued interest. The firm would report the USD 2,000 Bond Interest Payable as a current liability on the December 31 balance sheet for each year.

**Bonds issued at face value between interest dates** Companies do not always issue bonds on the date they start to bear interest. Regardless of when the bonds are physically issued, interest starts to accrue from the most recent interest date. Firms report bonds to be selling at a stated price "plus accrued interest". The issuer must pay holders of the bonds a full six months' interest at each interest date. Thus, investors purchasing bonds after the bonds begin to accrue interest must pay the seller for the unearned interest accrued since the preceding interest date. The bondholders are reimbursed for this accrued interest when they receive their first six months' interest check.

Using the facts for the Valley bonds dated 2010 December 31, suppose Valley issued its bonds on 2011 May 31, instead of on 2010 December 31. The entry required is:

2011			
May 31	Cash (+A)	105,000	
	Bonds payable (+L)		100,000
	Bond interest payable ( $\$100,000 \times 0.12 \times 5/12$ ) (+L)		5,000
	To record bonds issued at face value plus accrued interest.		

## 15. Long-term financing: Bonds

This entry records the USD 5,000 received for the accrued interest as a debit to Cash and a credit to Bond Interest Payable.

The entry required on 2011 June 30, when the full six months' interest is paid, is:

2011			
June 30	Bond Interest Expense ( $\$100,000 \times 0.12 \times (1/12)$ ) (-SE)	1,000	
	Bond interest payable (-L)	5,000	
	Cash (-A)		6,000
	To record bond interest payment.		

This entry records USD 1,000 interest expense on the USD 100,000 of bonds that were outstanding for one month. Valley collected USD 5,000 from the bondholders on May 31 as accrued interest and is now returning it to them.

### Bond prices and interest rates

The price of a bond issue often differs from its face value. The amount a bond sells for above face value is a **premium**. The amount a bond sells for below face value is a **discount**. A difference between face value and issue price exists whenever the market rate of interest for similar bonds differs from the contract rate of interest on the bonds. The **effective interest rate** (also called the yield) is the minimum rate of interest that investors accept on bonds of a particular risk category. The higher the risk category, the higher the minimum rate of interest that investors accept. The **contract rate of interest** is also called the stated, coupon, or nominal rate. Firms state this rate in the bond indenture, print it on the face of each bond, and use it to determine the amount of cash paid each interest period. The market rate fluctuates from day to day, responding to factors such as the interest rate the Federal Reserve Board charges banks to borrow from it; government actions to finance the national debt; and the supply of, and demand for, money.

Market and contract rates of interest are likely to differ. Issuers must set the contract rate before the bonds are actually sold to allow time for such activities as printing the bonds. Assume, for instance, that the contract rate for a bond issue is set at 12 per cent. If the market rate is equal to the contract rate, the bonds will sell at their face value. However, by the time the bonds are sold, the market rate could be higher or lower than the contract rate. As shown in Exhibit 119, if the market rate is lower than the contract rate, the bonds will sell for more than their face value. Thus, if the market rate is 10 per cent and the contract rate is 12 per cent, the bonds will sell at a premium as the result of investors bidding up their price. However, if the market rate is higher than the contract rate, the bonds will sell for less than their face value. Thus, if the market rate is 14 per cent and the contract rate is 12 per cent, the bonds will sell at a discount. Investors are not interested in bonds bearing a contract rate less than the market rate unless the price is reduced. Selling bonds at a premium or a discount allows the purchasers of the bonds to earn the market rate of interest on their investment.

Computing long-term bond prices involves finding **present values** using compound interest. The appendix to this chapter explains the concepts of future value and present value. If you do not understand the present value concept, read the appendix before continuing with this section.

Buyers and sellers negotiate a price that yields the going rate of interest for bonds of a particular risk class. The price investors pay for a given bond issue is equal to the present value of the bonds. To compute present value, we discount the promised cash flows from the bonds—principal and interest—using the market, or effective, rate. We use the market rate because the bonds must yield at least this rate or investors are attracted to alternative investments. The life of the bonds is stated in interest (compounding) periods. The interest rate is the effective rate

per interest period, which is found by dividing the annual rate by the number of times interest is paid per year. For example, if the annual rate is 12 per cent, the semiannual rate would be 6 per cent.

Issuers usually quote bond prices as percentages of face value—100 means 100 per cent of face value, 97 means 97 per cent of face value, and 103 means 103 per cent of face value. For example, one hundred USD 1,000 face value bonds issued at 103 have a price of USD 103,000. Regardless of the issue price, at maturity the issuer of the bonds must pay the investor(s) the face value of the bonds.

**Illustration 15.3** Bond Premiums and Discounts

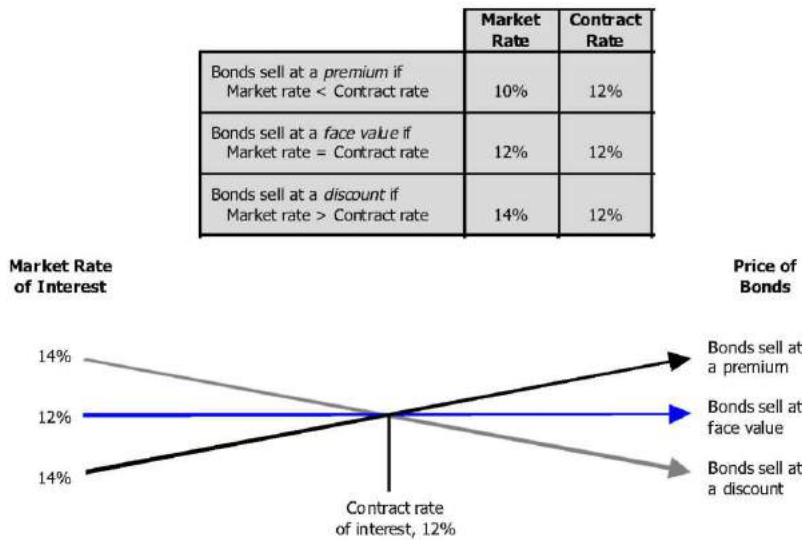


Exhibit 119: Bond premiums and discounts

**Bonds issued at face value** The following example illustrates the specific steps in computing the price of bonds. Assume Carr Company issues 12 per cent bonds with a USD 100,000 face value to yield 12 per cent. Dated and issued on 2010 June 30, the bonds call for semiannual interest payments on June 30 and December 31 and mature on 2013 June 30.<sup>49</sup> The bonds would sell at face value because they offer 12 per cent and investors seek 12 per cent. Potential purchasers have no reason to offer a premium or demand a discount. One way to prove the bonds would be sold at face value is by showing that their present value is USD 100,000:

	Cash Flow	X Present value Factor	= Present value
Principal of \$100,000 due in six interest periods multiplied by present value factor for 6% from Table A.3 of the Appendix (end of text)	\$100,000	X 0.70496	=\$70,496
Interest of \$6,000 due at the end of six interest periods multiplied by present value factor for 6% from Table A.4 of the Appendix (end of text)	6,000	X 4.91732	=29,504
Total price (present value)			\$100,000

According to this schedule, investors who seek an effective rate of 6 per cent per six-month period should pay USD 100,000 for these bonds. Notice that the same number of interest periods and semiannual interest rates occur in discounting both the principal and interest payments to their present values. The entry to record the sale of these bonds on 2010 June 30, debits Cash and credits Bonds Payable for USD 100,000.

<sup>49</sup> Bonds do not normally mature in such a short time; we use a three-year life for illustrative purposes only.



An accounting perspective:

Business insight

Some persons estimate that Social Security will be broke by the year 2025 unless changes are made. Therefore, you may want to set aside funds during your working career to provide for retirement.

Over the last 60 years, the inflation rate has averaged about 3 per cent per year, treasury bills have averaged a little under 4 per cent per year, corporate bonds have averaged about a little over 5 per cent per year, and stocks have averaged a little over 10 per cent per year. Using the tables at the end of the text we can determine how much you would have at age 65 if you invested USD 2,000 each year for 45 years in treasury bills, corporate bonds, or stocks, beginning at age 20.

To do this calculation for treasury bills, for instance, we would first use Table A.2 to determine the future value of an annuity of USD 2,000 for 30 periods at 4 per cent ( $USD\ 2,000 \times 56.08494 = USD\ 112,170$ ). (We would have used 45 periods, but the table only went up to 30 periods.) Then we would use Table A.1 to find the value of this lump sum of USD 112,170 for another 15 years at 4 per cent ( $USD\ 112,170 \times 1.80094 = USD\ 202,011$ ). Then we cannot forget that we have another 15 years of USD 2,000 annuity to consider. Thus, we go back to Table A.2 and calculate the future value of an annuity of USD 2,000 for 15 periods at 4 per cent ( $USD\ 2,000 \times 20.02359 = USD\ 40,047$ ). Then we add the USD 202,011 and the USD 40,047 to get the total future value of USD 242,058. (You would have invested  $USD\ 2,000 \times 45\ years = USD\ 90,000$ .) Would you be pleased? Not when you see what you could have had at age 65 if you invested in stocks.

If you had invested in corporate bonds at 5 per cent, you would have USD 319,401. However, if you had invested in stocks at 10 per cent, you would have USD 1,437,810 at age 65. Can you use the tables in the back of the text to verify these amounts?

**Bonds issued at a discount** Assume the USD 100,000, 12 per cent Carr bonds are sold to yield a current market rate of 14% annual interest, or 7 per cent per semiannual period. Carr computes the present value (selling price) of the bonds as follows:

	Cash flow	X Present value factor	=Present value
Principal of \$100,000 due in six interest periods multiplied by present value factor for 7% from Table A.3 of the Appendix (end of text)	\$100,000	X0.66634	=\$66,634
Interest of \$6,000 due at the end of six interest periods multiplied by present value factor for 7% from Table A.4 of the Appendix (end of text)	6,000	X4.76654	=28,559
Total price (present value)			\$95,233

Note that in computing the present value of the bonds, Carr uses the actual USD 6,000 cash interest payment that will be made each period. The amount of cash the company pays as interest does not depend on the market interest rate. However, the market rate per semiannual period—7 per cent—does change, and Carr uses this new rate to find interest factors in the tables.

The journal entry to record issuance of the bonds is:

2010			
June 30	Cash (+A)	95,233	
	Discount on bonds payable (-L; Contra-account)	4,767	
	Bonds payable (+L)		100,000
	To record bonds issued at a discount.		

In recording the bond issue, Carr credits Bonds Payable for the face value of the debt. The company debits the difference between face value and price received to Discount on Bonds Payable, a contra account to Bonds Payable. Carr reports the bonds payable and discount on bonds payable in the balance sheet as follows:

Long-term liabilities:			
Bonds payable, 12%, due 2009 June 30	\$100,000		
Less: Discount on bonds payable	4,767	\$95,233	

The USD 95,233 is the carrying value, or net liability, of the bonds. Carrying value is the face value of the bonds minus any unamortized discount or plus any unamortized premium. The next section discusses unamortized premium on bonds payable.

**Bonds issued at a premium** Assume that Carr issued the USD 100,000 face value of 12 per cent bonds to yield a current market rate of 10 per cent. The bonds would sell at a premium calculated as follows:

	Cash Flow	X Present value Factor	=Present value
Principal of \$100,000 due in six interest periods multiplied by present value factor for 5% from Table A.3 of the Appendix (end of text)	\$100,000	X 0.74622	=\$74,622
Interest of \$6,000 due at the end of six interest periods multiplied by present value factor for 5% from Table A.4 of the Appendix (end of text)	6,000	X 5.07569	=30,454
Total price (present value)			\$105,076

The journal entry to record the issuance of the bonds is:

2010			
June 30	Cash (+A)	105,076	
	Bonds payable (+L)		100,000
	Premium on bonds payable (+L)	5,076	
	To record bonds issued at a premium.		

The **carrying value** of these bonds at issuance is USD 105,076, consisting of the face value of USD 100,000 and the premium of USD 5,076. The premium is an adjunct account shown on the balance sheet as an addition to bonds payable as follows:

Long-term liabilities:			
Bonds payable, 12%, due 2009 June 30	\$100,000		
Add: Premium on bonds payable	5,076	\$105,076	

When a company issues bonds at a premium or discount, the amount of bond interest expense recorded each period differs from bond interest payments. A discount increases and a premium decreases the amount of interest expense. For example, if Carr issues bonds with a face value of USD 100,000 for USD 95,233, the total interest cost of borrowing would be USD 40,767: USD 36,000 (which is six payments of USD 6,000) plus the discount of USD 4,767. If the bonds had been issued at USD 105,076, the total interest cost of borrowing would be USD 30,924: USD 36,000 less the premium of USD 5,076. The USD 4,767 discount or USD 5,076 premium must be allocated or charged to the six periods that benefit from the use of borrowed money. Two methods are available for amortizing a discount or premium on bonds—the straight-line method and the effective interest rate method.

## 15. Long-term financing: Bonds

The straight-line method records interest expense at a constant amount; the effective interest rate method records interest expense at a constant rate. *APB Opinion No. 21* states that the straight-line method may be used only when it does not differ materially from the effective interest rate method. In many cases, the differences are not material.

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### An accounting perspective:

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#### Business insight

US government bonds have traditionally offered a fixed rate of interest. In early 1997, the US Treasury began offering inflation-indexed bonds. The amount of interest on these bonds is tied to the officially reported rate of inflation. The bonds pay interest every six months, and the interest is based on the inflation-adjusted value of the principal. These bonds are designed to protect purchasers against purchasing power loss due to inflation. At that time, there was some concern by investors that the government had been considering calculating the official rate of inflation differently than in the past in such a way that it would lower the annual increase as compared to the then present method of calculation. This change in calculation, if adopted, would lower the amount of interest earned on these bonds. However, there were some assurances that for this purpose the official rate of inflation would be calculated the "old way".

**The straight-line method** The **straight-line method of amortization** allocates an equal amount of discount or premium to each month the bonds are outstanding. The issuer calculates the amount by dividing the discount or premium by the total number of months from the date of issuance to the maturity date. For example, if it sells USD 100,000 face value bonds for USD 95,233, Carr would charge the USD 4,767 discount to interest expense at a rate of USD 132.42 per month (equal to USD 4,767/36). Total discount amortization for six months would be USD 794.52, computed as follows: USD 132.42 X 6. Interest expense for each six-month period then would be USD 6,794.52, calculated as follows: USD 6,000 + (USD 132.42 X 6). The entry to record the expense on 2010 December 31, would be:

2010			
Dec. 31	Bond interest expense (-SE)	6,794.52	
	Cash (-A)		6,000.00
	Discount on bonds payable (\$132.42 x 6)		794.52
	(+L)		
	To record interest payment and discount amortization.		

By the maturity date, all of the discount would have been amortized.

To illustrate the straight-line method applied to a premium, recall that earlier Carr sold its USD 100,000 face value bonds for USD 105,076. Carr would amortize the USD 5,076 premium on these bonds at a rate of USD 141 per month, equal to USD 5,076/36. The entry for the first period's semiannual interest expense on bonds sold at a premium is:

2010			
Dec. 31	Bond interest expense (-SE)	5,154	
	Premium on bonds payable (\$141 x 6) (-L)	846	
	Cash (-A)		6,000
	To record interest payable and premium		

amortization.

By the maturity date, all of the premium would have been amortized.

**The effective interest rate method** *APB Opinion No. 21* recommends an amortization procedure called the **effective interest rate method**, or simply the **interest method**. Under the interest method, interest expense for any interest period is equal to the effective (market) rate of interest on the date of issuance times the carrying value of the bonds at the beginning of that interest period. Using the Carr example of 12 per cent bonds with a face value of USD 100,000 sold to yield 14 per cent, the carrying value at the beginning of the first interest period is the selling price of USD 95,233. Carr would record the interest expense for the first semiannual period as follows:

2010	
Dec. 31	Bond interest expense ( $\$95,233 \times 0.14 \times \frac{1}{2}$ ) (-SE) 6,666
	Cash ( $\$100,000 \times 0.12 \times \frac{1}{2}$ ) (-A) 6,000
	Discount on bonds payable (+L) 666
	To record discount amortization and interest payment.

Note that interest expense is the carrying value times the effective interest rate. The cash payment is the face value times the contract rate. The discount amortized for the period is the difference between the two amounts.

After the preceding entry, the carrying value of the bonds is USD 95,899, or USD 95,233 + USD 666. Carr reduced the balance in the Discount on Bonds Payable account by USD 666 to USD 4,101, or USD 4,767 - USD 666. Assuming the accounting year ends on December 31, the entry to record the payment of interest for the second semiannual period on 2011 June 30 is:

2011	
June 30	Bond interest expense ( $\$95,899 \times 0.14 \times \frac{1}{2}$ ) (-SE) 6,713
	Cash ( $\$100,000 \times 0.12 \times \frac{1}{2}$ ) (-A) 6,000
	Discount on bonds payable (+L) 713
	To record discount amortization and interest payment.

Carr can also apply the effective interest rate method to premium amortization. If the Carr bonds had been issued at USD 105,076 to yield 10 per cent, the premium would be USD 5,076. The firm calculates interest expense in the same manner as for bonds sold at a discount. However, the entry would differ somewhat, showing a debit to the premium account. The entry for the first interest period is:

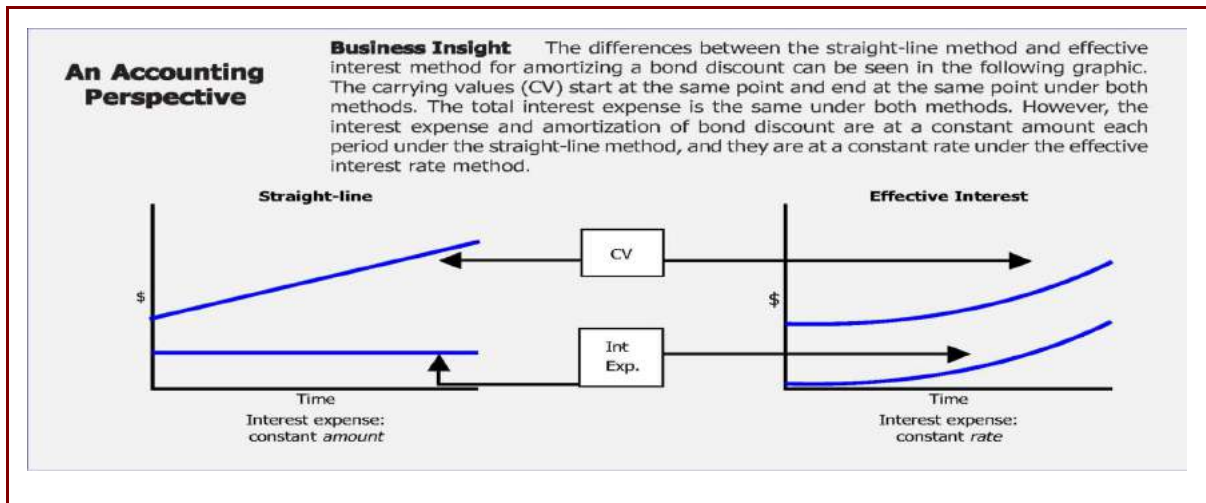
2010	
Dec. 31	Bond Interest Expense ( $\$105,076 \times 0.10 \times \frac{1}{2}$ ) (-SE) 5,254
	Premium on bonds payable (-L) 746
	Cash ( $\$100,000 \times 0.12 \times \frac{1}{2}$ ) (-A) 6,000
	To record interest payment and premium amortization.

After the first entry, the carrying value of the bonds is USD 104,330, or USD 105,076 - USD 746. The premium account now carries a balance of USD 4,330, or USD 5,076 - USD 746. The entry for the second interest period is:

2011	
June 30	Bond interest expense ( $\$104,330 \times 0.10 \times \frac{1}{2}$ ) (-SE) 5,216*
	Premium on bonds payable (-L) 784
	Cash ( $\$100,000 \times 0.12 \times \frac{1}{2}$ ) (-A) 6,000
	To record interest payment and premium amortization.

\*Rounded down.

15. Long-term financing: Bonds



**Discount and premium amortization schedules** A discount amortization schedule (Exhibit 120) and a premium amortization schedule (Exhibit 121) aid in preparing entries for interest expense. Usually, companies prepare such schedules when they first issue bonds, often using computer programs designed for this purpose. The companies then refer to the schedules whenever they make journal entries to record interest. Note that in each period the amount of interest expense changes; interest expense gets larger when a discount is involved and smaller when a premium is involved. This fluctuation occurs because the carrying value to which a constant interest rate is applied changes each interest payment date. With a discount, carrying value increases; with a premium, it decreases. However, the actual cash paid as interest is always a constant amount determined by multiplying the bond's face value by the contract rate.

Recall that the issue price was USD 95,233 for the discount situation and USD 105,076 for the premium situation. The total interest expense of USD 40,767 for the discount situation in Exhibit 120 is equal to USD 36,000 (which is six USD 6,000 payments) plus the USD 4,767 discount. This amount agrees with the earlier computation of total interest expense. In Exhibit 121, total interest expense in the premium situation is USD 30,924, or USD 36,000 (which is six USD 6,000 payments) less the USD 5,076 premium. In both illustrations, at the maturity date the carrying value of the bonds is equal to the face value because the discount or premium has been fully amortized.

**Adjusting entry for partial period** Exhibit 120 and Exhibit 121 also would be helpful if Carr must accrue interest for a partial period. Instead of a calendar-year accounting period, assume the fiscal year of the bond issuer ends on August 31. Using the information provided in the premium amortization schedule (Exhibit 121), the adjusting entry needed on 2010 August 31 is:

2010			
Aug. 31	Bond interest expense ( $\$5,254 \times (2/6)$ )	1,751	
	Premium on bonds payable ( $\$746 \times (2/6)$ )	249	
	Bond interest payable ( $\$6,000 \times (2/6)$ )		2,000
	To record two months' accrued interest.		

(A) Interest Payment Date	(B) Bond Interest Expense Debit (E x 0.14 x 1/2)	(C) Cash credit (\$100,000 x 0.12 x 1/2)	(D) Discount on Bonds Payable Credit (B-C)	(E) Carrying value of Bonds Payable (previous balance in E+D)
Issued Price				\$ 95,233
2010/12/31	\$6,666	\$6,000	\$666	95,899
2011/6/30	6,713	6,000	713	96,612
2011/12/31	6,763	6,000	763	97,375
2012/6/30	6,816	6,000	816	98,191
2012/12/31	6,873	6,000	873	99,064
2013/6/30	6,936*	6,000	936	100,000
	\$40,767	\$36,000	\$4,767	

**Exhibit 120: Discount amortization schedule for bonds payable**

This entry records interest for two months, July and August, of the six-month interest period ending on 2010 December 31. The first line of Exhibit 121 shows the interest expense and premium amortization for the six months. Thus, the previous entry records two-sixths (or one-third) of the amounts for this six-month period. Carr would record the remaining four months' interest when making the first payment on 2010 December 31. That entry reads:

2010				
Dec. 31	Bond interest payable (-L)			2,000
	Bond interest expense (\$5,254 x (4/6)) (-SE)			3,503
	Premium on bonds payable (\$746 x 4/6) (-L)			497
	Cash (-A)			6,000
	To record four months' interest expense and semiannual interest payment.			

During the remaining life of the bonds, Carr would make similar entries for August 31 and December 31. The amounts would differ, however, because Carr uses the interest method of accounting for bond interest. The entry for each June 30 would be as indicated in Exhibit 121.

**Redeeming bonds payable**

Bonds may be (1) paid at maturity, (2) called, or (3) purchased in the market and retired. Bonds may also be retired by being converted into stock. Each action is either a redemption of bonds or the extinguishment of debt. A company that pays its bonds at maturity would have already amortized any related discount or premium and paid the last interest payment. The only entry required at maturity would debit Bonds Payable and credit Cash for the face amount of the bonds as follows:

2013			
June 30	Bond payable (-L)	100,000	
	Cash (-A)		100,000
	To pay bonds on maturity date.		

(A) Interest Payment	(B) Bond Interest Expense Debit (E x 0.10 x 1/2)	(C) Cash credit (\$100,000 x 0.12 x 1/2)	(D) Discount on bonds Payable credit (B- C)	(E) Carrying value of Bonds payable (previous balance in E-D)
Issue Price				\$105,076
2010/12/31	\$ 5,254	\$6,000	\$ 746	104,330
2011/6/30	5,216*	6,000	784	103,546
2011/12/31	5,177	6,000	823	102,723
2012/6/30	5,136	6,000	864	101,859
2012/12/31	5,093	6,000	907	100,952
2013/6/30	5,048	6,000	952	100,000
	\$30,924	\$36,000	\$5,076	

\*Rounded down.

**Exhibit 121: Premium amortization schedule for bonds payable**

## 15. Long-term financing: Bonds

An issuer may redeem some or all of its outstanding bonds before maturity by calling them. The issuer may also purchase bonds in the market and retire them. In either case, the accounting is the same. Assume that on 2012 January 1, Carr calls bonds totaling USD 10,000 of the USD 100,000 face value bonds in Exhibit 121 at 103, or USD 10,300. Even though accrued interest would be added to the price, assume that the interest due on this date has been paid. A look at the last column on the line dated 2011/12/31 in Exhibit 121 reveals that the carrying value of the bonds is USD 102,723, which consists of Bonds Payable of USD 100,000 and Premium on Bonds Payable of USD 2,723. Since 10 per cent of the bond issue is being redeemed, Carr must remove 10 per cent from each of these two accounts. The firm incurs a loss for the excess of the price paid for the bonds, USD 10,300, over their carrying value, USD 10,272. The required entry is:

2012			
Jan. 1	Bond payable (-L)	10,000	
	Premium on bonds payable (\$2,723/10) (-L)	272	
	Loss on bond redemption 9\$10,272 - \$10,300 (-SE)	28	
	Cash (-A)		10,300
	To record bonds redeemed.		

According to *FASB Statement No. 4*, gains and losses from voluntary early retirement of bonds are extraordinary items, if material. We report such gains and losses in the income statement, net of their tax effects, as described in Chapter 13. The FASB is currently reconsidering the reporting of these gains and losses as extraordinary items.

To avoid the burden of redeeming an entire bond issue at one time, companies sometimes issue **serial bonds** that mature over several dates. Assume that on 2002 June 30, Jasper Company issued USD 100,000 face value, 12 per cent serial bonds at 100. Interest is payable each year on June 30 and December 31. A total of USD 20,000 of the bonds mature each year starting on 2010 June 30. Jasper has a calendar-year accounting period. Entries required for 2010 for interest expense and maturing debt are:

2010			
June 30	Bond interest expense (\$100,000 x 0.12 x ½) (-SE)	6,000	
	Cash (-A)		6,000
	To record interest payment.		
30	Serial bonds payable (-L)	20,000	
	Cash (-A)		20,000
	To record retirement of serial debt.		
Dec. 31	Bond interest expense (\$80,000 x 0.12 x ½) (-SE)	4,800	
	Cash (-A)		4,800
	To record payment of semiannual interest expense.		

Note that Jasper calculates the interest expense for the last six months of 2010 only on the remaining outstanding debt (USD 100,000 original issue less the USD 20,000 that matured on 2010 June 30). Each year after the bonds maturing that year are retired, interest expense decreases proportionately. Jasper reports the USD 20,000 amount maturing the next year as a current liability on each year-end balance sheet. The remaining debt is a long-term liability.

Naturally, bond investors are concerned about the safety of their investments. They fear the company may default on paying the entire principal at the maturity date. This concern has led to provisions in some bond indentures that require companies to make periodic payments to a **bond redemption fund**, often called a **sinking fund**. The fund trustee uses these payments to redeem a stated amount of bonds annually and pay the

accrued bond interest. The trustee determines which bonds to call and uses the cash deposited in the fund only to redeem these bonds and pay their accrued interest.

To illustrate, assume Hand Company has 12 per cent coupon bonds outstanding that pay interest on March 31 and September 30 and were issued at face value. The bond indenture requires that Hand pay a trustee USD 53,000 each September 30. The entry for the payment to the trustee is:

Sept. 30	Sinking fund (+A)	53,000	
	Cash (-A)		53,000
	To record payment to trustee of required deposit.		

The trustee calls USD 50,000 of bonds, pays for the bonds and accrued interest, and notifies Hand. The trustee also bills Hand for its fee and expenses incurred of USD 325. Assuming no interest has been recorded on these bonds for the period ended September 30, the entries are:

Sept. 30	Bonds Payable (-L)	50,000	
	Bond interest expense (-SE)	3,000	
	Sinking fund (-A)		53,000
	To record bond redemption and interest paid by trustee.		
30	Sinking fund expense (-SE)	325	
	Cash (-A)		325
	To record trustee fee and expenses.		

If a balance exists in the Sinking Fund account at year-end, Hand includes it in a category labeled Investments or Other Assets on the balance sheet. Hand would describe the USD 50,000 of bonds that must be retired during the coming year as "Current maturity of long-term debt" and report it as a current liability on the balance sheet.

The existence of a sinking fund does not necessarily mean that the company has created a retained earnings appropriation entitled "Appropriation for Bonded Indebtedness". A sinking fund usually is contractual (required by the bond indenture), and an appropriation of retained earnings is simply an announcement by the board of directors that dividend payments will be limited over the term of the bonds. The former requires cash to be paid in to a trustee, and the latter restricts retained earnings available for dividends to stockholders. Also, even if the indenture does not require a sinking fund, the corporation may decide to (1) pay into a sinking fund and not appropriate retained earnings, (2) appropriate retained earnings and not pay into a sinking fund, (3) do neither, or (4) do both.

A company may add to the attractiveness of its bonds by giving the bondholders the option to convert the bonds to shares of the issuer's common stock. In accounting for the conversions of **convertible bonds**, a company treats the carrying value of bonds surrendered as the capital contributed for shares issued.

Suppose a company has USD 10,000 face value of bonds outstanding. Each USD 1,000 bond is convertible into 50 shares of the issuer's USD 10 par value common stock. On May 1, when the carrying value of the bonds was USD 9,800, investors presented all of the bonds for conversion. The entry required is:

May 1	Bond payable (-L)	10,000	
	Discount bonds payable (+L)		200
	Common stock ( $\$10,000/\$1,000 = 10$ bonds;		
	10 bonds x 50 share x \$10 par) (+SE)	5,000	
	Paid-in capital in excess of par value – common (+SE)	4,800	
	To record bonds converted to common stock.		

The entry eliminates the USD 9,800 book value of the bonds from the accounts by debiting Bonds Payable for USD 10,000 and crediting Discount on Bonds Payable for USD 200. It credits Common Stock for the par value of



## 15. Long-term financing: Bonds

the 500 shares issued (500 shares X USD 10 par). The excess amount (USD 4,800) is credited to Paid-In Capital in Excess of Par Value—Common.

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### An accounting perspective:

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#### Business insight

The Securities and Exchange Commission took action to protect the public against abusive telemarketing calls from sellers of municipal bonds. The residence of any person can only be called between 8 am and 9 pm, without their prior consent. Callers must clearly disclose the purpose of the call. Also, a centralized "Do-not-call" list of people who do not wish to receive solicitations must be maintained and honored.

Source: "SEC Approves Rule Governing Calls From Muni-Bond Sellers to Investors," *The Wall Street Journal*, Friday, December 27, 1996, p. A2.

The two leading bond rating services are Moody's Investors Service and Standard & Poor's Corporation. The bonds are rated as to their riskiness. The ratings used by these services are:

	Moody's	Standard & Poor's
Highest quality to upper medium	Aaa	AAA
	Aa	AA
	A	A
Medium to speculative	Baa	BBB
	Ba	BB
	B	B
Poor to lowest quality	Caa	CCC
	Ca	CC
	C	C
In default, value is questionable		DDD
		DD
		D

Normally, Moody's rates junk bonds at Ba or below and Standard & Poor's at BB or below. As a company's prospects change over time, the ratings of its outstanding bonds change because of the higher or lower probability that the company can pay the interest and principal on the bonds when due. A severe recession may cause many companies' bond ratings to decline.

Bond prices appear regularly in certain newspapers. For instance, *The Wall Street Journal* quoted IBM's bonds as follows:

Issue	Coupon	Maturity	Yield	Price	Change
IBM	7°	2013	6.6	113	-2

The bonds carry a coupon rate of 7° per cent. The bonds mature in 2013. The current price is USD 113 per hundred, or USD 1,130.00 for a USD 1,000 bond. The price the preceding day was USD 115, since the change was -2. The current price yields a return to investors of 6.6 per cent. As the market rate of interest changes from day to day, the market price of the bonds varies inversely. Thus, if the market rate of interest increases, the market price of bonds decreases, and vice versa.

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## An accounting perspective:

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### Business insight

Companies sometimes invest in the bonds of other companies. According to *FASB Statement No. 115* (covered in Chapter 14), investments in these bonds fall into three categories—trading securities, available-for-sale securities, or held-to-maturity securities. The bonds would be classified as trading securities if they were acquired principally for the purpose of selling them in the near future. If the bonds were to be held for a longer period of time, but not until maturity, they would be classified as available-for-sale securities. Bonds that will be held to maturity are classified as held-to-maturity securities. All trading securities are current assets. Available-for-sale securities are either current assets or long-term assets, depending on how long management intends to hold them. Discounts and premiums on bonds classified as trading and available-for-sale securities are not amortized because management does not know how long they will be held. Held-to-maturity securities are long-term assets. Discounts and premiums on bonds classified as held-to-maturity securities are amortized by the holder of the bonds in the same manner as for the issuer of the bonds. Further discussion of investments in bonds is reserved for an intermediate accounting course.

### Analyzing and using the financial results—Times interest earned ratio

The **times interest earned ratio** (or interest coverage ratio) indicates the ability of a company to meet required interest payments when due. We calculate the ratio as follows:

$$\text{Time interest earned ratio} = \frac{\text{Income before interest also taxes (IBIT)}}{\text{Interest expense}}$$

Income before interest and taxes (IBIT), also called "earnings before interest and taxes (EBIT)", is the numerator because there would be no income taxes if interest expense is equal to or greater than IBIT. To find IBIT when the income statement is not complex, take net income and add back interest expense and taxes. However, in complex situations, when there are discontinued operations, changes in accounting principle, extraordinary items, interest revenue, and/or other similar items, analysts often use "operating income" to represent IBIT. The higher the ratio, the more comfortable creditors feel about receiving interest payments in the future.

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### An ethical perspective: Rawlings furniture company

The Rawlings brothers inherited 300,000 shares (30 per cent) of the common stock of the Rawlings Furniture Company from their father, who had founded the company 55 years earlier. One brother served as president of the company, and the other two brothers served as vice presidents. The company, which produced a line of fine furniture sold nationwide, earned an average of USD 4 million per year. Located in Jamesville, New York, USA, the company had provided steady

## 15. Long-term financing: Bonds

employment for approximately 10 per cent of the city's population. The city had benefited from the revenues the company attracted to the area and from the generous gifts provided by the father.

The remainder of the common stock was widely held and was traded in the over-the-counter market. No other stockholder held more than 4 per cent of the stock. The stock had recently traded at USD 30 per share. The company has USD 10 million of 10 per cent bonds outstanding, which mature in 15 years.

The brothers enjoyed the money they received from the company, but did not enjoy the work. They also were frustrated by the fact that they did not own a controlling interest (more than 50 per cent) of the company. If they had a controlling interest, they could make important decisions without obtaining the agreement of the other stockholders.

With the assistance of a New York City brokerage house, the brothers decided to pursue a plan that could increase their wealth. The company would offer to buy back shares of common stock at USD 40 per share. These shares would then be canceled, and the Rawlings brothers would have a controlling interest. The stock buy-back would be financed by issuing 10-year, 14 per cent, high-interest junk bonds. The brokerage house had located some financial institutions willing to buy the bonds. The interest payments on the junk bonds would be USD 3 million per year. The brothers thought the company could make these payments unless the country entered a recession. If need be, wage increases could be severely restricted or eliminated and the company's pension plan could be terminated. If the junk bonds could be paid at maturity, the brothers would own a controlling interest in what could be an extremely valuable company. If the interest payments could not be met or if the junk bonds were defaulted at maturity, the company could eventually be forced to liquidate. The risks are high, but so are the potential rewards. If another buyer entered the picture at this point and bid an even higher amount for the stock, the brothers could sell their shares and exit the company. Two of the brothers hoped that another buyer might bid as much as USD 50 per share so they could sell their shares and pursue other interests. The changes a new buyer might make are unpredictable at this point.

The times interest earned ratios in a recent year for several companies (described in footnotes to the table) were as follows:

Company	Earnings before Interest and Taxes (millions)	Interest Expense (Millions)	Times Interest Earned Ratio
Ford Motor Company <sup>a</sup>	\$19,136	\$10,902	1.76
Proctor & Gamble Company <sup>b</sup>	6,258	722	8.67
AMR Corporation <sup>c</sup>	1,754	467	3.76
Dell Computer Corporation <sup>d</sup>	3,241	47	68.96
Hewlett-Packard Company <sup>e</sup>	4,882	257	19.00

<sup>a</sup> Ford Motor Company is the world's largest producer of trucks and the second largest producer of cars and trucks combined.

<sup>b</sup> Proctor and Gamble markets more than 300 brands to nearly five billion customers in over 140 countries.

<sup>c</sup> AMR's principal subsidiary is America Airlines.

<sup>d</sup> Dell is the world's largest direct computer systems company.

<sup>e</sup> Hewlett-Packard Company designs, manufactures, and services products and systems for measurement, computation, and communications.

You can see from these data that a great deal of variability exists in the times interest earned ratios for real companies. To judge the ability of companies to pay bond interest when due, bondholders would carefully examine other financial data as well.

Some companies that issued high-interest junk bonds in the 1980s defaulted on their interest payments and had to declare Chapter 11 bankruptcy or renegotiate payment terms with bondholders in the 1990s. Other companies with high-interest bonds issued new low-interest bonds and used the proceeds to retire the high-interest bonds.

Chapter 16 discusses the fourth major financial statement—the statement of cash flows, which we mentioned in Chapter 1. This statement shows the cash inflows and outflows from operating, investing, and financing activities.

### Understanding the learning objectives

- A bond is a liability (with a maturity date) that bears interest that is deductible in computing both net income and taxable income.
- A stock is a unit of ownership on which a dividend is paid only if declared, and dividends are not deductible in determining net income or taxable income.
- Bonds may be secured or unsecured, registered or unregistered, callable, and/or convertible.
- Advantages include stockholders retaining control of the company, tax deductibility of interest, and possible creation of favorable financial leverage.
- Disadvantages include having to make a fixed interest payment each period, reduction in a company's ability to withstand a major loss, possible limitations on dividends and future borrowings, and possible reduction in earnings per share caused by unfavorable financial leverage.
- If bonds are issued at face value on an interest date, no accrued interest is recorded.
- If bonds are issued between interest dates, accrued interest must be recorded.
- If the market rate is lower than the contract rate, bonds sell for more than their face value, and a premium is recorded.
- If the market rate is higher than the contract rate, bonds sell for less than their face value, and a discount is recorded.
- The present value of the principal plus the present value of the interest payments is equal to the price of the bond.
- The contract rate of interest is used to determine the amount of future cash interest payments.
- The effective rate of interest is used to discount the future payment of principal and of interest back to the present value.
- When bonds are issued, Cash is debited, and Bonds Payable is credited. For bonds issued at a discount, Discount on Bonds Payable is also debited. For bonds issued at a premium, Premium on Bonds Payable is also credited. For bonds issued between interest dates, Bond Interest Payable is also credited.
- Any premium or discount must be amortized over the period the bonds are outstanding.
- Under the effective interest rate method, interest expense for any period is equal to the effective (market) rate of interest at date of issuance times the carrying value of the bond at the beginning of that interest period.
- Under the straight-line method of amortization, an equal amount of discount or premium is allocated to each month the bonds are outstanding.
- When bonds are redeemed before they mature, a loss or gain (an extraordinary item, if material) on bond redemption may occur.
- A bond sinking fund might be required in the bond indenture.

## 15. Long-term financing: Bonds

- Bonds may be convertible into shares of stock. The carrying value of the bonds is the capital contributed for shares of stock issued.
- Bonds are rated as to their riskiness.
- The two leading bond rating services are Moody's Investors Services and Standard & Poor's Corporation.
- Each of these services has its own rating scale. For instance, the highest rating is Aaa (Moody's) and AAA (Standard & Poor's).
- The times interest earned ratio indicates a company's ability to meet interest payments when due.
- The ratio is equal to income before interest and taxes (IBIT) divided by interest expense.
- The future value of an investment is the amount to which a sum of money invested today will grow in a stated time period at a specified interest rate.
- Present value is the current worth of a future cash receipt and is the reciprocal of future value. To discount future receipts is to bring them back to their present values.

### Appendix: Future value and present value

Managers apply the concepts of interest, future value, and present value in making business decisions. Therefore, accountants need to understand these concepts to properly record certain business transactions.

#### The time value of money

The concept of the time value of money stems from the logical reference for a dollar today rather than a dollar at any future date. Most individuals prefer having a dollar today rather than at some future date because (1) the risk exists that the future dollar will never be received; and (2) if the dollar is on hand now, it can be invested, resulting in an increase in total dollars possessed at that future date.

Most business decisions involve a comparison of cash flows in and out of the company. To be useful in decision making, such comparisons must be in dollars of the same point in time. That is, the dollars held now must be accumulated or rolled forward, or future dollars must be discounted or brought back to the present dollar value, before comparisons are valid. Such comparisons involve future value and present value concepts.

#### Future value

The **future value** or **worth** of any investment is the amount to which a sum of money invested today grows during a stated period of time at a specified interest rate. The interest involved may be simple interest or compound interest. **Simple interest** is interest on principal only. For example, USD 1,000 invested today for two years at 12 per cent simple interest grows to USD 1,240 since interest is USD 120 per year. The principal of USD 1,000, plus 2 X USD 120, is equal to USD 1,240. **Compound interest** is interest on principal and on interest of prior periods. For example, USD 1,000 invested for two years at 12 per cent compounded annually grows to USD 1,254.40 as follows:

Principal or present value	\$1,000.00
Interest, year 1 = $\$1,000 \times 0.12 =$	120.00
Value at end of year 1	\$1,120.00
Interest, year 2 = $\$1,120 \times 0.12 =$	134.40
Value at end of year 2 (future value)	\$1,254.40

In Exhibit 122, we graphically portray these computations of future worth and show how USD 1,000 grows to USD 1,254.40 with a 12 per cent interest rate compounded annually. The effect of compounding is USD 14.40—the interest in the second year that was based on the interest computed for the first year, or  $\text{USD } 120 \times 0.12 = \text{USD } 14.40$ .

Interest tables ease the task of computing the future worth to which any invested amount will grow at a given rate for a stated period. An example is Table A.1 in the Appendix at the end of this text. To use the Appendix tables, first determine the number of compounding periods involved. A compounding period may be any length of time, such as a day, a month, a quarter, a half-year, or a year, but normally not more than a year. The number of compounding periods is equal to the number of years in the life of the investment times the number of compoundings per year. Five years compounded annually is five periods, five years compounded quarterly is 20 periods, and so on.

Second, determine the interest rate per compounding period. Interest rates are usually quoted in annual terms; in fact, federal law requires statement of the interest rate in annual terms in some situations. Divide the annual rate by the number of compounding periods per year to get the proper rate per period. Only with an annual compounding period will the annual rate be the rate per period. All other cases involve a lower rate. For example, if the annual rate is 12 per cent and interest is compounded monthly, the rate per period (one month) will be 1 per cent.

To use the tables, find the number of periods involved in the Period column. Move across the table to the right, stopping in the column headed by the Interest Rate per Period, which yields a number called a *factor*. The factor shows the amount to which an investment of USD 1 will grow for the periods and the rate involved. To compute the future worth of the investment, multiply the number of dollars in the given situation by this factor. For example, suppose your parents tell you that they will invest USD 8,000 at 12 per cent for four years and give you the amount to which this investment grows if you graduate from college in four years. How much will you receive at the end of four years if the interest rate is 12 per cent compounded annually? How much will you receive if the interest rate is 12 per cent compounded quarterly?

To calculate these amounts, look at the end-of-text Appendix, Table A.1. In the intersection of the 4 period row and the 12 per cent column, you find the factor 1.57352. Multiplying this factor by USD 8,000 yields USD 12,588.16, the answer to the first question. To answer the second question, look at the intersection of the 16 period row and the 3 per cent column. The factor is 1.60471, and the value of your investment is USD 12,837.68. The more frequent compounding would add  $\text{USD } 12,837.68 - \text{USD } 12,588.16 = \text{USD } 249.52$  to the value of your investment. The reason for this difference in amounts is that 12 per cent compounded quarterly is a higher rate than 12 per cent compounded annually.

An **annuity** is a series of equal cash flows (often called rents) spaced equally in time. The semiannual interest payments received on a bond investment are a common example of an annuity. Assume that USD 100 will be received at the end of each of the next three semiannual periods. The interest rate is 6 per cent per semiannual period. Using Table A.1 in the Appendix, we find the future value of each of the USD 100 receipts as follows:

## 15. Long-term financing: Bonds

Illustration 15.6 Compound Interest and Future Value

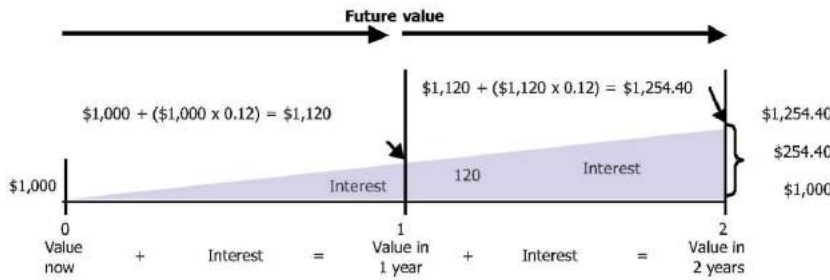


Exhibit 122: Compound interest and future value

Future value (after three periods) of \$100 received at the end of the -

First period:	$1.12360 \times \$100 = \$112.36$
Second period:	$1.06000 \times 100 = 106.00$
Third period:	$1.00000 \times 100 = 100.00$
Total future value	$\$318.36$

Such a procedure would become quite tedious if the annuity consisted of many receipts. Fortunately, tables are available to calculate the total future value directly. See the Appendix, Table A.2. For the annuity just described, you can identify one single factor by looking at the 3 period row and 6 per cent column. The factor is 3.18360 (the sum of the three factors shown above), and when multiplied by USD 100, yields USD 318.36, which is the same answer. In Exhibit 123, we graphically present the future value of an annuity.

### Present value

**Present value** is the current worth of a future cash receipt and is the reciprocal of future value. In future value, we calculate the future value of a sum of money possessed now. In present value, we calculate the current worth of rights to future cash receipts possessed now. We discount future receipts by bringing them back to their present values.

Assume that you have the right to receive USD 1,000 in one year. If the appropriate interest rate is 12 per cent compounded annually, what is the present value of this USD 1,000 future cash receipt? You know that the present value is less than USD 1,000 because USD 1,000 due in one year is not worth USD 1,000 today. You also know that the USD 1,000 due in one year is equal to some amount, P, plus interest on P at 12 per cent for one year. Thus,  $P + 0.12P = \text{USD } 1,000$ , or  $1.12P = \text{USD } 1,000$ . Dividing USD 1,000 by 1.12, you get USD 892.86; this amount is the present value of your future USD 1,000. If the USD 1,000 was due in two years, you would find its present value by dividing USD 892.86 by 1.12, which equals USD 797.20. Portrayed graphically, present value looks similar to future value, except for the direction of the arrows (Exhibit 124).

Table A.3 (end-of-text Appendix) contains present value factors for combinations of a number of periods and interest rates. We use Table A.3 in the same manner as Table A.1. For example, the present value of USD 1,000 due in four years at 16 per cent compounded annually is USD 552.29, computed as  $\text{USD } 1,000 \times 0.55229$ . The 0.55229 is the present value factor found in the intersection of the 4 period row and the 16 per cent column.

**Illustration 15.7** Future Value of an Annuity

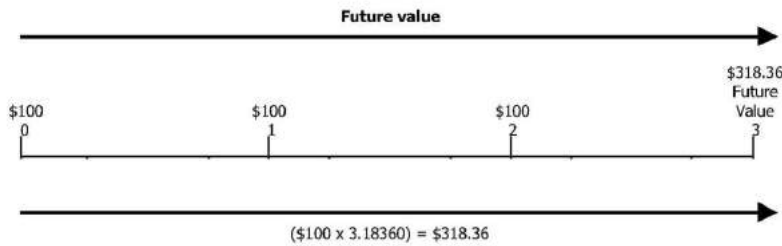


Exhibit 123: Future value of an annuity

**Illustration 15.8** Compound Interest and Present Value

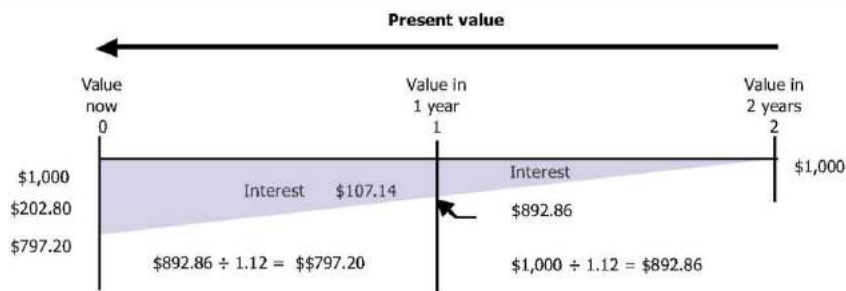


Exhibit 124: Compound interest and present value

As another example, suppose that you wish to have USD 4,000 in three years to pay for a vacation in Europe. If your investment increases at a 20 per cent rate compounded quarterly, how much should you invest now? To find the amount, you would use the present value factor found in Table A.3, 12 period row, 5 per cent column. This factor is 0.55684, which means that an investment of about 55 cents today would grow to USD 1 in 12 periods at 5 per cent per period. To have USD 4,000 at the end of three years, you must invest 4,000 times this factor (0.55684), or USD 2,227.36.

The semiannual interest payments on a bond are a common example of an annuity. As an example of calculating the present value of an annuity, assume that USD 100 is received at the end of each of the next three semiannual periods. The interest rate is 6 per cent per semiannual period. By using Table A.3 (Appendix), you can find the present value of each of the three USD 100 payments as follows:

Present value of \$100 due in:	
1 period:	$0.94340 \times \$100 = \$94.34$
2 period:	$0.89000 \times 100 = 89.00$
3 period:	$0.83962 \times 100 = 83.96$
Total present value	\$267.30



## 15. Long-term financing: Bonds

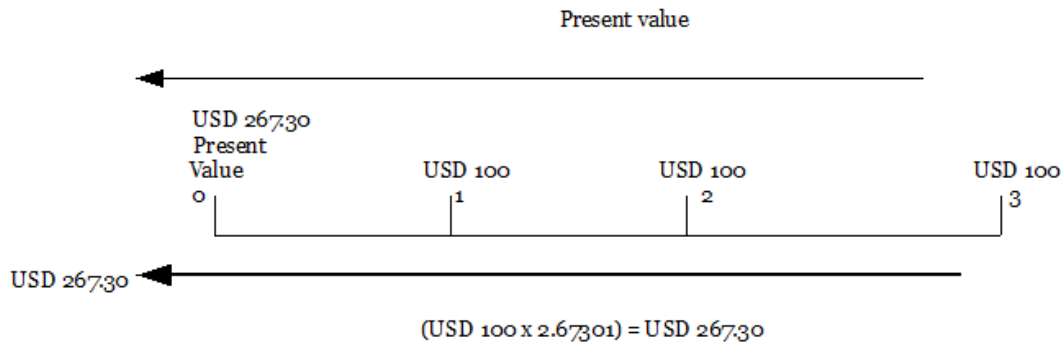


Exhibit 125: Present value of an annuity

Such a procedure could become quite tedious if the annuity consisted of a large number of payments. Fortunately, tables are also available showing the present values of an annuity of USD 1 per period for varying interest rates and periods. See the end-of-text Appendix, Table A.4. For the annuity just described, you can obtain a single factor from the table to represent the present value of an annuity of USD 1 per period for three (semiannual) periods at 6 per cent per (semiannual) period. This factor is 2.67301; it is equal to the sum of the present value factors for USD 1 due in one period, USD 1 in two periods, and USD 1 in three periods found in the Appendix, Table A.3. When this factor is multiplied by USD 100, the number of dollars in each payment, it yields the present value of the annuity, USD 267.30. In Exhibit 125, we graphically present the present value of this annuity and show how to find the present value of the three USD 100 cash flows by multiplying the USD 100 by a present value of an annuity factor, 2.67301.

Suppose you won a lottery that awarded you a choice of receiving USD 10,000 at the end of each of the next five years or USD 35,000 cash today. You believe you can earn interest on invested cash at 15 per cent per year. Which option should you choose? To answer the question, compute the present value of an annuity of USD 10,000 per period for five years at 15 per cent. The present value is USD 33,521.60, or USD 10,000 X 3.35216. You should accept the immediate payment of USD 35,000 since it has the larger present value.

### Demonstration problem

Jackson Company issued USD 100,000 face value of 15 per cent, 20-year junk bonds on 2010 April 30. The bonds are dated 2010 April 30, call for semiannual interest payments on April 30 and October 31, and are issued to yield 16 per cent (8 per cent per period).

- a. Compute the amount received for the bonds.
- b. Prepare an amortization schedule. Enter data in the schedule for only the first two interest periods. Use the effective interest rate method.
- c. Prepare journal entries to record issuance of the bonds, the first six months' interest expense on the bonds, the adjustment needed on 2010 December 31 (assuming Jackson's accounting year ends on that date), and the second six months' interest expense on 2011 April 30.

### Solution to demonstration problem

#### a.

Price received:

Present value of principal:  $\$100,000 \times 0.04603$

(see Appendix, Table A.3, 40 period row, 8% column)	\$ 4,603
Present value of interest: $\$7,500 \times 11.92461$	
(see Appendix, Table A.4, 40 period row, 8% column)	89,435
Total	\$94,038

**b.**

(A) Interest Payment Date	(B) Bond Interest Expense Debit ( $E \times 0.16 \times \frac{1}{2}$ )	(C) Cash Credit ( $\$100,000 \times$ $0.15 \times \frac{1}{2}$ )	(D) Discount on Bonds Payable Credit (B – C)	(E) Carrying Value of Bonds Payable (previous balance in E + D)
Issued price				\$94,038
2010/10/31	\$7,523	\$7,500	\$23	94,061
2011/4/30	7,525	7,500	25	94,086

**c.**

2010				
Apr. 30	Cash		94,038	
	Discount on bonds payable		5,962	
	Bonds payable			100,000
	Issued \$100,000 face value of 20-year, 15% bonds to yield 16%.			
Oct. 31	Bond interest expense		7,523	
	Discount on bonds payable		23	
	Cash		7,500	
	Paid semiannual bond interest expense.			
Dec. 31	Bond interest expense ( $\$7,525 \times (1/3)$ )		2,508	
	Discount on bonds payable		8	
	Bond interest payable ( $\$7,500 \times (1/3)$ )		2,500	
	To record accrual of two months' interest expense.			
2011				
Apr. 30	Bond interest payable		2,500	
	Bond interest expense ( $\$7,525 \times (2/3)$ )		5,017	
	Discount on bonds payable		17	
	cash		7,500	
	Paid semiannual bond interest expense.			

## Key terms

**Annuity** A series of equal cash flows spaced in time.

**Bearer bond** See unregistered bond.

**Bond** A long-term debt, or liability, owed by its issuer. A bond certificate, a negotiable instrument, is the formal, physical evidence of the debt owed.

**Bond indenture** The contract or loan agreement under which bonds are issued.

**Bond redemption (or sinking) fund** A fund used to bring about the gradual redemption of a bond issue.

**Callable bond** A bond that gives the issuer the right to call (buy back) the bond before its maturity date.

**Call premium** The price paid in excess of face value that the issuer of bonds must pay to redeem (call) bonds before their maturity date.

**Carrying value (of bonds)** The face value of bonds minus any unamortized discount or plus any unamortized premium. Sometimes referred to as net liability on the bonds.

**Compound interest** Interest calculated on the principal and on interest of prior periods.

**Contract rate of interest** The interest rate printed on the bond certificates and specified on the bond indenture; also called the stated, coupon, or nominal rate.

**Convertible bond** A bond that may be exchanged for shares of stock of the issuing corporation at the bondholders' option.

**Coupon bond** A bond not registered as to interest; it carries detachable coupons that are to be clipped and presented for payment of interest due.

**Debenture bond** An unsecured bond backed only by the general creditworthiness of its issuer.

**Discount (on bonds)** Amount a bond sells for below its face value.

## 15. Long-term financing: Bonds

**Effective interest rate method (interest method)** A procedure for calculating periodic interest expense (or revenue) in which the first period's interest is computed by multiplying the carrying value of bonds payable (bond investments) by the market rate of interest at the issue date. The difference between computed interest expense (revenue) and the interest paid (received), based on the contract rate times face value, is the discount or premium amortized for the period. Computations for subsequent periods are based on the carrying value at the beginning of the period.

**Face value** Principal amount of a bond.

**Favorable financial leverage** An increase in EPS and the rate of return on stockholders' equity resulting from earning a higher rate of return on borrowed funds than the fixed cost of such funds. Unfavorable financial leverage results when the cost of borrowed funds exceeds the income they generate, resulting in decreased income to stockholders.

**Future value or worth** The amount to which a sum of money invested today will grow during a stated period of time at a specified interest rate.

**Interest method** See effective interest rate method.

**Junk bonds** High-interest rate, high-risk bonds; many were issued in the 1980s to finance corporate restructurings.

**Market interest rate** The minimum rate of interest investors will accept on bonds of a particular risk category. Also called effective rate or yield.

**Mortgage** A legal claim (lien) on specific property that gives the bondholder the right to possess the pledged property if the company fails to make required payments. A bond secured by a mortgage is called a mortgage bond.

**Premium (on bonds)** Amount a bond sells for above its face value.

**Present value** The current worth of a future cash receipt(s); computed by discounting future receipts at a stipulated interest rate.

**Registered bond** A bond with the owner's name on the bond certificate and in the register of bond owners kept by the bond issuer or its agent, the registrar.

**Secured bond** A bond for which a company has pledged specific property to ensure its payment.

**Serial bonds** Bonds in a given bond issue with maturities spread over several dates.

**Simple interest** Interest on principal only.

**Sinking fund** See Bond redemption fund.

**Stock warrant** A right that allows the bondholder to purchase shares of common stock at a fixed price for a stated period of time. Warrants issued with long-term debt may be detachable or nondetachable.

**Straight-line method of amortization** A procedure that, when applied to bond discount or premium, allocates an equal amount of discount or premium to each period in the life of a bond.

**Term bond** A bond that matures on the same date as all other bonds in a given bond issue.

**Times interest earned ratio** Income before interest and taxes (IBIT) divided by interest expense. In complex situations, "operating income" is often used to represent IBIT.

**Trading on the equity** A company using its stockholders' equity as a basis for securing funds on which it pays a fixed return.

**Trustee** Usually a bank or trust company appointed to represent the bondholders and to enforce the provisions of the bond indenture against the issuer.

**Underwriter** An investment company or a banker that performs many tasks for the bond issuer in issuing bonds; may also guarantee the issuer a fixed price for the bonds.

**Unfavorable financial leverage** Results when the cost of borrowed funds exceeds the revenue they generate; it is the reverse of favorable financial leverage.

**Unregistered (bearer) bond** Ownership transfers by physical delivery.

**Unsecured bond** A debenture bond, or simply a debenture.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

An unsecured bond is called a debenture bond.

Callable bonds may be called at the option of the holder of the bonds.

Favorable financial leverage results when borrowed funds are used to increase earnings per share of common stock.

If the market rate of interest exceeds the contract rate, the bonds are issued at a discount.

The straight-line method of amortization is the recommended method.

### Multiple-choice

Select the best answer for each of the following questions.

Harner Company issued USD 100,000 of 12 per cent bonds on 2010 March 1. The bonds are dated 2010 January 1, and were issued at 96 plus accrued interest. The entry to record the issuance would be:

- a.
- |                           |        |         |
|---------------------------|--------|---------|
| Cash                      | 98,000 |         |
| Discount on bonds payable | 4,000  |         |
| Bonds payable             |        | 100,000 |
| Bonds interest payable    |        | 2,000   |
- b.
- |                       |         |         |
|-----------------------|---------|---------|
| Cash                  | 102,000 |         |
| Bonds payable         |         | 100,000 |
| Bond interest payable |         | 2,000   |
- c.
- |                           |        |         |
|---------------------------|--------|---------|
| Cash                      | 96,000 |         |
| Discount on bonds payable | 4,000  |         |
| Bonds payable             |        | 100,000 |
- d. None of the above.

If the bonds in the first question had been issued at 104, the entry to record the issuance would have been:

- a.
- |                          |         |         |
|--------------------------|---------|---------|
| Cash                     | 104,000 |         |
| Bonds payable            |         | 100,000 |
| Premium on bonds payable |         | 4,000   |
- b.
- |                        |         |         |
|------------------------|---------|---------|
| Cash                   | 102,000 |         |
| Bonds payable          |         | 100,000 |
| Bonds interest payable |         | 2,000   |
- c.
- |                          |         |         |
|--------------------------|---------|---------|
| Cash                     | 106,000 |         |
| Bonds payable            |         | 100,000 |
| Premium on bonds payable |         | 4,000   |
| Bonds interest payable   |         | 2,000   |
- d. None of the above.

On 2010 January 1, the Alvarez Company issued USD 400,000 face value of 8 per cent, 10-year bonds for cash of USD 328,298, a price to yield 11 per cent. The bonds pay interest semiannually and mature on 2020 January 1. Using the effective interest rate method, the bond interest expense for the first six months of 2010 would be:

- a. USD 36,113.  
b. USD 18,056.  
c. USD 32,000.  
d. USD 16,000.

If the straight-line amortization method had been used in the previous question, the interest expense for the first six months would have been:

- a. USD 39,170.  
b. USD 32,000.  
c. USD 18,000.

## 15. Long-term financing: Bonds

d. USD 19,585.

Assume a company has net income of USD 100,000, income tax expense of USD 40,000, and interest expense of USD 20,000. The times interest earned ratio is:

- a. 5 times.
- b. 7 times.
- c. 8 times.
- d. 9 times.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- What are the advantages of obtaining long-term funds by the issuance of bonds rather than additional shares of capital stock? What are the disadvantages?
- What is a bond indenture? What parties are usually associated with it? Explain why.
- Explain what is meant by the terms coupon, callable, convertible, and debenture.
- What is meant by the term trading on the equity?
- When bonds are issued between interest dates, why should the issuing corporation receive cash equal to the amount of accrued interest (accrued since the preceding interest date) in addition to the issue price of the bonds?
- Why might it be more accurate to describe a sinking fund as a bond redemption fund?
- Indicate how each of the following items should be classified in a balance sheet on 2009 December 31.
  - Cash balance in a sinking fund.
  - Accrued interest on bonds payable.
  - Debenture bonds payable due in 2019.
  - Premium on bonds payable.
  - First-mortgage bonds payable, due 2010 July 1.
  - Discount on bonds payable.
  - First National Bank—Interest account.
  - Convertible bonds payable due in 2012.
- Why is the effective interest rate method of computing periodic interest expense considered theoretically preferable to the straight-line method?
- Why would an investor whose intent is to hold bonds to maturity pay more for the bonds than their face value?
- Of what use is the times interest earned ratio?

### Exercises

**Exercise A** On 2010 September 30, Domingo's Construction Company issued USD 120,000 face value of 12 per cent, 10-year bonds dated 2010 August 31, at 100, plus accrued interest. Interest is paid semiannually on February 28 and August 31. Domingo's accounting year ends on December 31. Prepare journal entries to record the issuance of these bonds, the accrual of interest at year-end, and the payment of the first interest coupon.

**Exercise B** On 2009 December 31, East Lansing Office Equipment Company issued USD 1,600,000 face value of 8 per cent, 10-year bonds for cash of USD 1,400,605, a price to yield 10 per cent. The bonds pay interest semiannually and mature on 2019 December 31.

- State which is higher, the market rate of interest or the contract rate.
- Compute the bond interest expense for the first six months of 2010, using the interest method.
- Show how the USD 1,400,605 price must have been determined.

**Exercise C** Compute the annual interest expense on the bonds in the previous exercise, assuming the bond discount is amortized using the straight-line method.

**Exercise D** After recording the payment of the interest coupon due on 2010 June 30, the accounts of Myrtle Beach Sailboat, Inc., showed Bonds Payable of USD 300,000 and Premium on Bonds Payable of USD 10,572. Interest is payable semiannually on June 30 and December 31. The five-year, 12 per cent bonds have a face value of USD 300,000 and were originally issued to yield 10 per cent. Prepare the journal entry to record the payment of interest on 2010 December 31. Use the interest method. (Round all amounts to the nearest dollar.)

**Exercise E** On 2010 June 30 (a semiannual interest payment date), Holiday Rollerblade Company redeemed all of its USD 400,000 face value of 10 per cent bonds outstanding by calling them at 106. The bonds were originally issued on 2006 June 30, at 100. Prepare the journal entry to record the payment of the interest and the redemption of the bonds on 2010 June 30.

**Exercise F** On 2009 August 31, as part of the provisions of its bond indenture, Caribbean Cruise Line, Inc., acquired USD 480,000 of its outstanding bonds on the open market at 96 plus accrued interest. These bonds were originally issued at face value and carry a 12 per cent interest rate, payable semiannually. The bonds are dated 2002 November 30, and pay semiannual interest on May 31 and November 30. Prepare the journal entries required to record the accrual of the interest to the acquisition date on the bonds acquired and the acquisition of the bonds.

**Exercise G** Cleveland Heating Systems, Inc., is required to make a deposit of USD 18,000 plus semiannual interest expense of USD 540 on 2009 October 31, to the trustee of its sinking fund so that the trustee can redeem USD 18,000 of the company's bonds on that date. The bonds were issued at 100. Prepare the journal entries required on October 31 to record the sinking fund deposit, the bond retirement, payment of interest (due on that date), and payment of trustee expenses, assuming the latter is USD 100.

**Exercise H** After interest was paid on 2010 September 30, USD 60,000 face value of Miami Video Rentals, Inc., outstanding bonds were converted into 8,000 shares of the company's USD 5 par value common stock. Prepare the journal entry to record the conversion, assuming the bonds were issued at 100.

**Exercise I** A recent annual report of Wal-Mart Corporation showed the following amounts as of the dates indicated:

	<b>Year</b>	<b>Ended</b>	<b>January 31</b>
	<b>2001</b>	<b>2000</b>	<b>1999</b>
Earnings before interest (and taxes) (millions)	\$11,583	\$10,162	\$8,008
Interest expense (millions)	1,467	1,079	838

Calculate the times interest earned ratio for each year and comment on the results.

**Exercise J** What is the present value of a lump-sum payment of USD 20,000 due in five years if the market rate of interest is 10 per cent per year (compounded annually) and the present value of USD 1 due in five periods at 10 per cent is 0.62092?

## 15. Long-term financing: Bonds

**Exercise K** What is the present value of a series of semiannual payments of USD 10,000 due at the end of each six months for the next five years if the market rate of interest is 10 per cent per year and the present value of an annuity of USD 1 for 10 periods at 5 per cent is 7.72173?

**Exercise L** Joe Mordino bought a ticket in the Georgia lottery for USD 1, hoping to strike it rich. To his amazement, he won USD 4,000,000. Payment was to be received in equal amounts at the end of each of the next 20 years. Mordino heard from relatives and friends he had not heard from in years. They all wanted to renew their relationship with this new millionaire. Federal and state income taxes were going to be about 40 per cent (36 per cent for federal and 4 per cent for state) on each year's income from the lottery check. The discount rate to use in all present value calculations is 12 per cent.

- a. How much will Mordino actually receive after taxes each year?
- b. Is Mordino a multimillionaire according to the present value of his cash inflow after taxes?
- c. What is the present value of the net amount the state has to pay out? Remember that the state gets part of the money back in the form of taxes.

**Exercise M** After Joe Mordino won USD 4,000,000 in the Georgia lottery, he decided to purchase USD 10,000 of lottery tickets at the end of each year for the next 20 years. He was hoping to hit the lottery again, but he never did. If the state can earn 12 per cent on ticket revenue received, how much will the annuity of USD 10,000 from Mordino grow to by the end of 20 years?

### Problems

**Problem A** On 2009 June 1, Economy Auto Parts, Inc., issued USD 180,000 of 10-year, 16 per cent bonds dated 2009 April 1, at 100. Interest on bonds is payable semiannually on presentation of the appropriate coupon. All of the bonds are of USD 1,000 denomination. The company's accounting period ends on June 30, with semiannual statements prepared on December 31 and June 30. The interest payment dates are April 1 and October 1.

All of the first coupons on the bonds are presented to the company's bank and paid on 2009 October 2. All but two of the second coupons are similarly received and paid on 2010 April 1.

Prepare all necessary journal entries for these transactions through 2010 April 1, including the adjusting entry needed at 2009 June 30.

**Problem B** Ecological Water Filtration, Inc., is going to issue USD 400,000 face value of 10 per cent, 15-year bonds. The bonds are dated 2009 June 30, call for semiannual interest payments, and mature on 2024 June 30.

a. Compute the price investors should offer if they seek a yield of 8 per cent on these bonds. Also, compute the first six months' interest, assuming the bonds are issued at this price. Use the interest method and calculate all amounts to the nearest dollar.

b. Repeat part (a), assuming investors seek a yield of 12 per cent.

**Problem C** On 2009 July 1, South Carolina Table Company issued USD 600,000 face value of 10 per cent, 10-year bonds. The bonds call for semiannual interest payments and mature on 2019 July 1. The company received cash of USD 531,180, a price that yields 12 per cent.

Assume that the company's fiscal year ends on March 31. Prepare journal entries (to the nearest dollar) to record the bond interest expense on 2010 January 1, and the adjustment needed on 2010 March 31, using the interest method. Calculate all amounts to the nearest dollar.

**Problem D** Storall Company issued USD 200,000 face value of 16 per cent, 20-year junk bonds on 2010 July 1. The bonds are dated 2010 July 1, call for semiannual interest payments on July 1 and January 1, and were issued to yield 12 per cent (6 per cent per period).

- a. Compute the amount received for the bonds.
- b. Prepare an amortization schedule similar to that in Exhibit 121. Enter data in the schedule for only the first two interest periods. Use the interest method.
- c. Prepare journal entries to record issuance of the bonds, the first six months' interest expense on the bonds, and the adjustment needed on 2011 May 31, assuming the company's fiscal year ends on that date.

**Problem E** Kelly Furniture Company issued USD 400,000 face value of 18 per cent, 20-year junk bonds on 2009 October 1. The bonds are dated 2009 October 1, call for semiannual interest payments on April 1 and October 1, and are issued to yield 16 per cent (8 per cent per period).

- a. Compute the amount received for the bonds.
- b. Prepare an amortization schedule similar to that in Exhibit 121. Enter data in the schedule for only the first two interest periods. Use the interest method and make all calculations to the nearest dollar.
- c. Prepare entries to record the issuance of the bonds, the first six months' interest on the bonds, and the adjustment needed on 2010 June 30, assuming the company's fiscal year ends on that date.

**Problem F** Houston Clothing Company issued USD 600,000 of 12 per cent serial bonds on 2009 July 1, at face value. The bonds are dated 2009 July 1; call for semiannual interest payments on July 1 and January 1; and mature at the rate of USD 120,000 per year, with the first maturity date falling on 2010 July 1. The company's accounting period ends on September 30.

Prepare journal entries to record the interest payment of 2010 July 1; the maturing of USD 120,000 of bonds on 2010 July 1; and the adjusting entry needed on 2010 September 30. Also, show how the bonds would be presented in the company's balance sheet for 2010 September 30.

#### [Alternate problems](#)

**Alternate problem A** On 2009 December 1, New Jersey Waste Management Company issued USD 300,000 of 10-year, 9 per cent bonds dated 2009 July 1, at 100. Interest on the bonds is payable semiannually on July 1 and January 1. All of the bonds are registered. The company's accounting period ends on March 31. Quarterly financial statements are prepared.

The company deposits a sum of money sufficient to pay the semiannual interest on the bonds in a special checking account in First National Bank and draws interest payment checks on this account. The deposit is made the day before the checks are drawn.

Prepare journal entries to record the issuance of the bonds; the December 31 adjusting entry; the 2010 January 1, interest payment; and the adjusting entry needed on 2010 March 31, to prepare quarterly financial statements.

**Alternate problem B** Safe Toy Company is seeking to issue USD 800,000 face value of 10 per cent, 20-year bonds. The bonds are dated 2009 June 30, call for semiannual interest payments, and mature on 2029 June 30.

- a. Compute the price investors should offer if they seek a yield of 8 per cent on these bonds. Also, compute the first six months' interest assuming the bonds are issued at that price. Use the interest method and calculate all amounts to the nearest dollar.
- b. Repeat part (a) assuming investors seek a yield of 12 per cent.



## 15. Long-term financing: Bonds

**Alternate problem C** On 2009 July 1, Tick-Tock Clock Company issued USD 100,000 face value of 8 per cent, 10-year bonds. These bonds call for semiannual interest payments and mature on 2019 July 1. The company received cash of USD 87,538, a price that yields 10 per cent.

Assume that the company's fiscal year ends on March 31. Prepare journal entries to record the bond interest expense on 2010 January 1, and the adjustment needed on 2010 March 31, using the interest method. Calculate all amounts to the nearest dollar.

**Alternate problem D** Creative Web Page issued USD 600,000 face value of 15 per cent, 20-year bonds on 2010 October 1. The bonds are dated 2010 October 1, call for semiannual interest payments on April 1 and October 1, and are issued to yield 16 per cent (8 per cent per period).

- a. Compute the amount received for the bonds.
- b. Prepare an amortization schedule similar to that in Exhibit 120. Enter data in the schedule for only the first two interest periods. Use the interest method.
- c. Prepare journal entries to record issuance of the bonds, the first six months' interest expense on the bonds, and the adjustment needed on 2011 May 31, assuming Creative Web Page's fiscal year ends on that date.

**Alternate problem E** Goodhew Software Systems, Inc., issued USD 100,000 face value of 10 per cent, 20-year bonds on 2009 July 1. The bonds are dated 2009 July 1, call for semiannual interest payments on July 1 and January 1, and are issued to yield 12 per cent (6 per cent per period).

- a. Compute the amount received for the bonds.
- b. Prepare an amortization schedule similar to that in Exhibit 120. Enter data in the schedule for only the first two interest periods. Use the interest method and calculate all amounts to the nearest dollar.
- c. Prepare entries to record the issuance of the bonds, the first six months' interest on the bonds, and the adjustment needed on 2010 June 30, assuming Goodhew's fiscal year ends on that date.

**Alternate problem F** Western Solar Energy Company issued USD 400,000 of 12 per cent bonds on 2009 July 1, at face value. The bonds are dated 2009 July 1, call for semiannual payments on July 1 and January 1, and mature at the rate of USD 40,000 per year on July 1, beginning in 2010. The company's accounting period ends on September 30.

- a. Prepare journal entries to record the interest expense and payment for the six months ending 2010 July 1; the maturing of the bonds on 2010 July 1; and the adjusting entries needed on 2010 September 30.
- b. Show how the bonds would be presented in the company's balance sheet for 2010 September 30.

### Beyond the numbers—Critical thinking

**Business decision case A** A company is trying to decide whether to invest USD 2 million on plant expansion and USD 1 million to finance a related increase in inventories and accounts receivable. The USD 3 million expansion is expected to increase business volume substantially. Profit forecasts indicate that income from operations will rise from USD 1.6 million to USD 2.4 million. The income tax rate will be about 40 per cent. Net income last year was USD 918,000. Interest expense on debt now outstanding is USD 70,000 per year. There are 200,000 shares of common stock currently outstanding. The USD 3 million needed can be obtained in two alternative ways:

- Finance entirely by issuing additional shares of common stock at an expected issue price of USD 75 per share.

- Finance two-thirds with bonds, one-third with additional stock. The bonds would have a 20-year life, bear interest at 10 per cent, and sell at face value. The issue price of the stock would be USD 80 per share.

Should the investment be made? If so, explain which financing plan you would recommend. (Hint: Calculate earnings per share for last year and for future years under each of the alternatives.)

**Business decision case B** An annual report of a company contained the following paragraph in the notes to the financial statements:

The 9 7/8 per cent Senior Subordinated Debentures are redeemable at the option of [the company] at 103.635 per cent of the principal amount plus accrued interest if redeemed prior to [a certain date], and at decreasing prices thereafter. Mandatory sinking fund payments of USD 3,000,000 (which [the company] may increase to USD 6,000,000 annually)...and are intended to retire, at par plus accrued interest, 75 per cent of the issue prior to maturity.

Answer the following questions:

- What does the term debentures mean?
- How much is the call premium initially? Does this premium decrease over time?
- Under what circumstances might the company want to increase the sinking fund payments?

**Business decision case C** *The Wall Street Journal* contained a table showing yield comparisons for groups of corporate bonds. The following data have been adapted from the table:

	4/28	Yield As of 4/27	Percentage 52-week High	Low
Risk category				
1-10 year maturities:				
High quality	7.08%	6.94%	7.16%	5.32%
Medium quality	7.41	7.26	7.49	5.76
Over 10 year maturities:				
High quality	7.91	7.81	8.06	6.93
Medium quality	8.36	8.25	8.49	7.29
High-yield bonds	10.45	10.48	10.53	9.25

Standard & Poor's ratings were:

High quality	AAA to AA
Medium quality	A to BBB
High yield	BB to C

Prepare written answers to the following questions.

- In each column of numbers, why do the yield rates increase from top to bottom?
- For the high quality and medium quality bonds, what could account for the increase in the yield rates from 4/27 to 4/28? Take into consideration possible economic events.
- Which risk class of bonds was closest to its 52-week high on 4/28? What could have been the cause?

**Annual report analysis D** Refer to the Annual report appendix and determine the times interest earned ratio for 2003 for The Limited. Use "operating income" to represent IBIT. Prepare written comments on the results of your analysis.

**Annual report analysis E** A recent annual report of Emhart Corporation contained the following paragraph in its notes to the financial statements:

The 6 3/4 per cent convertible subordinated debentures may be converted into shares of common stock at a price of USD 26.50 per share at any time prior to maturity. They are redeemable at prices decreasing from 105 per cent of face amount currently to 100 per cent [at a certain future date].

## 15. Long-term financing: Bonds

Answer the following questions:

- a. If you held one USD 1,000 bond, how many shares of stock would you receive if you converted the bond into shares of stock? (Hint: You can use the principal amount of the bond to buy shares of stock at the stated price.)
- b. Assume you held one USD 1,000 bond and the bond was called by the company at a price of 105 per cent of the face amount. If the current market price per share of the stock was USD 29, would you convert the bond into shares of stock or would you surrender the bond? Explain.

**Ethics case – Writing experience F** Refer to "An ethical perspective: Rawlings furniture company". Write out the answers to the following questions:

- a. What motivates the brothers to pursue this new strategy?
- b. Are the brothers the only ones assuming the risks?
- c. How will workers, the city, the holders of the original bond issue, and the other present stockholders be affected if the junk bonds are issued and are then defaulted?
- d. How might these parties (stakeholders) be affected if a new buyer outbids the management?
- e. What ethical considerations are involved?

**Group project G** In groups of two or three students, write a two-page, double-spaced paper on one of the following topics:

The Use of Junk Bonds in the 1980s

Why Market Rates of Interest and Prices of Bonds Are Inversely Related

How a Company Can Force Conversion of Callable, Convertible Bonds

How Bond Sinking Funds Work

Do some library research on your topic and properly cite your sources. Make your analysis convincing. Your paper should be neat, contain no spelling or grammatical errors, and be the result of several drafts. Use a word processing program to prepare your paper if possible. Your paper should have a cover page with the title and the authors' names.

**Group project H** In a small group of students, locate *Accounting Principles Board Opinion No. 21* (from a faculty member or from the library) relating to the amortization of premiums and discounts on bonds. Investigate why the Board recommended the effective interest rate method over the straight-line method for amortizing bond premiums and discounts. Which method do you favor and why? Summarize the highlights of the APB Opinion and your own opinions in a written report to your instructor.

**Group project I** With one or two other students, locate the annual reports of three companies with bonds outstanding as part of their long-term debt. You should read the notes to the financial statements to determine the composition of the long-term debt. Identify the bonds (e.g. debentures, serial), their interest rates, and any other information pertaining to them. Compare the bonds outstanding for the three companies. Write a report to your instructor summarizing your findings.

**Using the Internet—A view of the real world**

Visit the following site for the Eastman Kodak Company:

<http://www.kodak.com>

By following the instructions on the screen, locate the notes to the financial statements and find the one pertaining to long-term debt. In your own words, write a short report to your instructor summarizing the types of long-term debt held by the company and some of the details of the arrangements with lenders.

Visit the following website for Eastman Chemical Company:

<http://www.eastman.com>

Pursue choices on the screen until you locate the financial information. Then investigate long-term borrowings. You will probably go down some "false paths" to get to this financial information, but you can get there. This experience is all part of learning to use the Internet. Check to determine the composition of the long-term borrowings. Check out the notes to the financial statements for further information. Browse around the site for any other interesting information concerning the company. Write a memo to your instructor summarizing your findings.

#### Answers to self-test

##### **True-false**

**True.** These unsecured bonds are called debenture bonds and are backed only by the general creditworthiness of the issuer.

**False.** Callable bonds may be called at the option of the issuer.

**True.** This statement is the definition of favorable financial leverage. However, unfavorable financial leverage can result when favorable financial leverage was planned. Unfavorable financial leverage will result if income before interest and taxes is much lower than anticipated. Then earnings per share for the common stockholders would be lower than they would have been without the borrowing.

**True.** Purchasers will not be willing to pay the face amount if the market rate of interest exceeds the contract rate. By paying less than the face value, purchasers can earn the market rate of interest on the bonds.

**False.** The effective interest rate method is the recommended method. The straight-line method may be used only when the results are not materially different from the interest method.

##### **Multiple-choice**

**a.** The discount of USD 4,000 must be recorded. Also, the accrued interest must be recognized (USD 100,000 X 12 per cent X 2/12 = USD 2,000).

**c.** The premium is USD 4,000, and the accrued interest is USD 2,000. Both must be recognized.

**b.** The interest is (USD 328,298 X 0.11 X 1/2 ) = USD 18,056.

**d.** The interest would have been (USD 400,000 X 0.04) + (USD 71,702/20) = USD 19,585.

**c.** Income before interest and taxes is (USD 100,000 + USD 40,000 + USD 20,000) = USD 160,000. This total of USD 160,000 divided by interest of USD 20,000 = 8 times.

# 16. Analysis using the statement of cash flows

## Learning objectives

After studying this chapter, you should be able to:

- Explain the purposes and uses of the statement of cash flows.
- Describe the content of the statement of cash flows and where certain items would appear on the statement.
- Describe how to calculate cash flows from operating activities under both the direct and indirect methods.
- Prepare a statement of cash flows, under both the direct and indirect methods, showing cash flows from operating activities, investing activities, and financing activities.
- Analyze a statement of cash flows of a real company.
- Analyze and use the financial results—cash flow per share of common stock, cash flow margin, and cash flow liquidity ratios.
- Use working paper to prepare a statement of cash flows (appendix).

## A career in external auditing

In 1929 the Dow Jones Industrial Average fell 40 per cent over the period from September 3rd to October 29th. The Dow bottomed out in July 1932, after losing 89 per cent of its value. Some blamed accounting for the run-up in prices and the subsequent crash. Stocks may have been overpriced because companies engaged in "window dressing" to enhance their reported income. At the time, accounting practices and reporting procedures were not well-established. As investors began to understand this, confidence fell. Investors panicked and sold stocks in a frenzy. This action contributed to the Great Depression of the 1930s. The Dow did not reach pre-crash levels again until 1954.

In response to the financial crisis, the Securities and Exchange Commission (SEC) was established in 1934 to regulate the filing requirements of firms listed on US stock exchanges. The SEC requires all listed firms in each year to prepare financial statements in accordance with generally accepted accounting principles (GAAP) and to have those financial statements audited by an independent party. This independent verification was meant to restore investor confidence and provide ongoing integrity in the capital market system. If a company fails to follow GAAP, it can be delisted from the stock exchange.

For many reasons, managers have incentives to manipulate income to enhance reported performance. It is the job of auditors to use their understanding of accounting principles and business practices to provide reasonable assurance that financial statements are free from such manipulation. One possible indication of income manipulation occurs when accrual earnings are high relative to cash flows from operating activities, sometimes referred to as "cash earnings". Accrual earnings are typically easier to manipulate because they employ estimates, whereas cash earnings are tied to actual cash receipts and payments from operations. Accrual earnings can be

## 16. Analysis using the statement of cash flows

managed upward by recognizing earnings prematurely (or falsely) or by underestimating expenses such as depreciation expense or bad debts expense.

In addition to the challenges of verifying the accuracy of financial statements, a career in auditing provides a variety of options. Students can work for global auditing firms or small local firms, choose to travel frequently or on a limited basis, and decide to live in any geographic area around the world. A career in auditing also provides an excellent springboard for future opportunities. Companies realize that their auditors can be a valuable part of the management team. Auditors have expertise about the firm, its industry, and its accounting practices. Auditors commonly leave the auditing profession to work for one of their many clients.

The income statement, statement of stockholders' equity (or statement of retained earnings), and the balance sheet do not answer all the questions raised by users of financial statements. Such questions include: How much cash was generated by the company's operations? How can the Cash account be overdrawn when my accountant said the business was profitable? Why is such a profitable company able to pay only small dividends? How much was spent for new plant and equipment, and where did the company get the cash for the expenditures? How was the company able to pay a dividend when it incurred a net loss for the year?

In this chapter, you will learn about the statement of cash flows, which answers these questions. The statement of cash flows is another major required financial statement; it shows important information not shown directly in the other financial statements.

### Purposes of the statement of cash flows

In November 1987, the Financial Accounting Standards Board issued *Statement of Financial Accounting Standards No. 95, "Statement of Cash Flows"*.<sup>50</sup> The Statement became effective for annual financial statements for fiscal years ending after 1988 July 15. Thus, the statement of cash flows is now one of the major financial statements issued by a company. The statement of cash flows replaced the statement of changes in financial position, on which funds were generally defined as working capital. **Working capital** is equal to current assets minus current liabilities.

The main purpose of the statement of cash flows is to report on the cash receipts and cash disbursements of an entity during an accounting period. Broadly defined, cash includes both cash and cash equivalents, such as short-term investments in Treasury bills, commercial paper, and money market funds. Another purpose of this statement is to report on the entity's investing and financing activities for the period. As shown in Exhibit 126, the statement of cash flows reports the effects on cash during a period of a company's operating, investing, and financing activities. Firms show the effects of significant investing and financing activities that do not affect cash in a schedule separate from the statement of cash flows.

### Uses of the statement of cash flows

The **statement of cash flows** summarizes the effects on cash of the operating, investing, and financing activities of a company during an accounting period; it reports on past management decisions on such matters as issuance of capital stock or the sale of long-term bonds. This information is available only in bits and pieces from

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<sup>50</sup> FASB, *Statement of Financial Accounting Standards No. 95, "Statement of Cash Flows"* (Stamford, Conn., 1987). Copyright by the Financial Accounting Standards Board, High Ridge Park, Stamford, Connecticut 06905. U.S.A. Quoted (or excerpted) with permission. Copies of the complete document are available from the FASB.

the other financial statements. Since cash flows are vital to a company's financial health, the statement of cash flows provides useful information to management, investors, creditors, and other interested parties.

The statement of cash flows presents the effects on cash of all significant operating, investing, and financing activities. By reviewing the statement, management can see the effects of its past major policy decisions in quantitative form. The statement may show a flow of cash from operating activities large enough to finance all projected capital needs internally rather than having to incur long-term debt or issue additional stock. Alternatively, if the company has been experiencing cash shortages, management can use the statement to determine why such shortages are occurring. Using the statement of cash flows, management may also recommend to the board of directors a reduction in dividends to conserve cash.

The information in a statement of cash flows assists investors, creditors, and others in assessing the following:

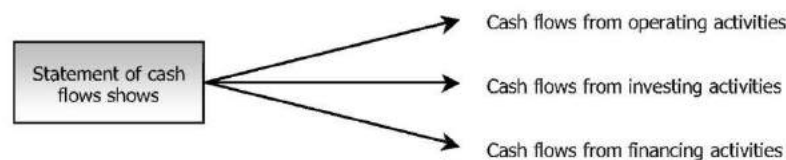
- Enterprise's ability to generate positive future net cash flows.
- Enterprise's ability to meet its obligations.
- Enterprise's ability to pay dividends.
- Enterprise's need for external financing.
- Reasons for differences between net income and associated cash receipts and payments.
- Effects on an enterprise's financial position of both its cash and noncash investing and financing transactions during the period (disclosed in a separate schedule).

### Information in the statement of cash flows

The statement of cash flows classifies cash receipts and disbursements as operating, investing, and financing cash flows. Both inflows and outflows are included within each category. Look at Exhibit 127 to see how activities can be classified to prepare a statement of cash flows.

**Operating activities** generally include the cash effects (inflows and outflows) of transactions and other events that enter into the determination of net income. Cash inflows from operating activities affect items that appear on the income statement and include: (1) cash receipts from sales of goods or services; (2) interest received from making loans; (3) dividends received from investments in equity securities; (4) cash received from the sale of trading securities; and (5) other cash receipts that do not arise from transactions defined as investing or financing activities, such as amounts received to settle lawsuits, proceeds of certain insurance settlements, and cash refunds from suppliers.

**Illustration 16.1** Statement of Cash Flows—Basic Content



Investing and financing activities that do not affect cash are shown in a separate schedule.

Exhibit 126: Statement of cash flows—Basic content

## 16. Analysis using the statement of cash flows

<b>Operating activities</b> Cash effect of transactions and other events that enter into the determination of net income	Cash outflows for:
Cash inflows from:	Cash outflows for:
Sales of goods or services	Merchandise Inventory
Interest	Salaries and wages
Dividends	Interest
Sale of trading securities	Purchase of trading securities
Other sources not related to investing or financing activities (e.g. insurance settlements)	Other items not related to investing or financing activities (e.g. contributions to charities)
<b>Investing activities</b> Transactions involving the acquisition or disposal of noncurrent assets	
Cash inflows from:	Cash outflows for:
Sale of property, plant, and equipment	Purchase of property, plant, and equipment
Sale of available-for-sale and held-to-maturity securities	Purchase of available-for-sale and held-to-maturity securities
Collection of loans	Making of loans
<b>Financing activities</b> Transactions with creditors and owners	
Cash inflows from:	
Issuing capital stock	Purchase of treasury stock
Issuing debt (bonds, mortgages, notes, and other short- or long-term borrowing of cash)	Cash dividends

### Exhibit 127: Rules for classifying activities in the statement of cash flows

Cash outflows for operating activities affect items that appear on the income statement and include payments: (1) to acquire inventory; (2) to other suppliers and employees for other goods or services; (3) to lenders and other creditors for interest; (4) for purchases of trading securities; and (5) all other cash payments that do not arise from transactions defined as investing or financing activities, such as taxes and payments to settle lawsuits, cash contributions to charities, and cash refunds to customers.

**Investing activities** generally include transactions involving the acquisition or disposal of noncurrent assets. Thus, cash inflows from investing activities include cash received from: (1) the sale of property, plant, and equipment; (2) the sale of available-for-sale and held-to-maturity securities; and (3) the collection of long-term loans made to others. Cash outflows for investing activities include cash paid: (1) to purchase property, plant, and equipment; (2) to purchase available-for-sale and held-to-maturity securities; and (3) to make long-term loans to others.

**Financing activities** generally include the cash effects (inflows and outflows) of transactions and other events involving creditors and owners. Cash inflows from financing activities include cash received from issuing capital stock and bonds, mortgages, and notes, and from other short- or long-term borrowing. Cash outflows for financing activities include payments of cash dividends or other distributions to owners (including cash paid to purchase treasury stock) and repayments of amounts borrowed. Payment of interest is not included because interest expense appears on the income statement and is, therefore, included in operating activities. Cash payments to settle accounts payable, wages payable, and income taxes payable are not financing activities. These payments are included in the operating activities section.

Information about all material investing and financing activities of an enterprise that do not result in cash receipts or disbursements during the period appear in a separate schedule, rather than in the statement of cash flows. The disclosure may be in narrative form. For instance, assume a company issued a mortgage note to acquire land and buildings. A separate schedule might appear as follows:

<u>Schedule of noncash financing also investing activities:</u>	\$ 35,000
Mortgage note issued for acquiring land also buildings	



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## An accounting perspective:

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### Business insight

In a supplemental schedule of noncash investing and financing activities, Johnson & Johnson reported one item as follows:

Treasury stock issued for employee compensation and stock option plans, net of cash proceeds  
USD 252 million

The company included the cash proceeds amount from the exercise of stock options (USD 149 million) in the cash flows from financing activities section of the statement of cash flows.

### Cash flows from operating activities

**Cash flows from operating activities** show the net amount of cash received or disbursed during a given period for items that normally appear on the income statement. You can calculate these cash flows using either the direct or indirect method. The **direct method** deducts from cash sales only those operating expenses that consumed cash. This method converts each item on the income statement directly to a cash basis. Alternatively, the **indirect (addback) method** starts with accrual basis net income and indirectly adjusts net income for items that affected reported net income but did not involve cash.

The *Statement of Financial Accounting Standards No. 95* encourages use of the direct method but permits use of the indirect method. Whenever given a choice between the indirect and direct methods in similar situations, accountants choose the indirect method almost exclusively. The American Institute of Certified Public Accountants reports that approximately 98 per cent of all companies choose the indirect method of cash flows.

The direct method converts each item on the income statement to a cash basis. For instance, assume that sales are stated at USD 100,000 on an accrual basis. If accounts receivable increased by USD 5,000, cash collections from customers would be USD 95,000, calculated as USD 100,000 - USD 5,000. The direct method also converts all remaining items on the income statement to a cash basis, as we will illustrate later.

The indirect method adjusts net income (rather than adjusting individual items in the income statement) for (1) changes in current assets (other than cash) and current liabilities, and (2) items that were included in net income but did not affect cash.

The most common example of an operating expense that does not affect cash is depreciation expense. The journal entry to record depreciation debits an expense account and credits an accumulated depreciation account. This transaction has no effect on cash and, therefore, should not be included when measuring cash from operations. Because accountants deduct depreciation in computing net income, net income understates cash from operations. Under the indirect method, since net income is a starting point in measuring cash flows from operating activities, depreciation expense must be added back to net income.

Consider the following example. Company A had net income for the year of USD 20,000 after deducting depreciation of USD 10,000, yielding USD 30,000 of positive cash flows. Thus, Company A had USD 30,000 of positive cash flows from operating activities. Company B had a net loss for the year of USD 4,000 after deducting

## 16. Analysis using the statement of cash flows

USD 10,000 of depreciation. Although Company B experienced a loss, it had USD 6,000 of positive cash flows from operating activities, as shown here:

	Company A	Company B
Net income (loss)	\$20,000	\$(4,000)
Add depreciation expense (which did not require use of cash)	10,000	10,000
Positive cash flows from operating activities	\$30,000	\$ 6,000

Company B's loss would have had to exceed USD 10,000 to generate negative cash flows from operating activities.

Companies add other expenses and losses back to net income because they do not actually use company cash; they call these addbacks **noncash charges or expenses**. Besides depreciation, the items added back include amounts of depletion that were expensed, amortization of intangible assets such as patents and goodwill, amortization of discount on bonds payable, and losses from disposals of noncurrent assets.

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### An accounting perspective:

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#### Business insight

Business Insight PSINet, Inc., an Internet-access provider, said it would have a positive cash flow from operations for the first time in early 1997. The company was the first to provide unlimited access to the Internet to consumers at a flat rate of USD 19.95 per month. However, it was costing about USD 22 per month per customer to provide the service. The company decided to abandon this market and sell only to the more profitable corporate market. Corporate clients can be charged about USD 200 per month for dial-up access.

Source: "PSINet Sees Positive Cash Flow in '97; Likely Financial Boost Lifts Shares 24 per cent," The Wall Street Journal, Friday, December 27, 1996, p. B11.

To illustrate the addback of losses from disposals of noncurrent assets, assume that Quick Company sold a piece of equipment for USD 6,000. The equipment had cost USD 10,000 and had accumulated depreciation of USD 3,000. The journal entry to record the sale is:

Cash (+A)	6,000
Accumulated depreciation	3,000
Loss on sale of equipment (-SE)	1,000
Equipment (-A)	10,000

To record disposal of equipment at a loss.

Quick would show the USD 6,000 inflow from the sale of the equipment as a cash inflow from investing activities on its statement of cash flows. Although Quick deducted the loss of USD 1,000 in calculating net income, it recognized the total USD 6,000 effect on cash (which reflects the USD 1,000 loss) as resulting from an investing activity. Thus, Quick must add the loss back to net income in converting net income to cash flows from operating activities to avoid double-counting the loss.

Certain revenues and gains included in arriving at net income do not provide cash; these items are **noncash credits or revenues**. Quick should deduct these revenues and gains from net income to compute cash flows from operating activities. Such items include gains from disposals of noncurrent assets, income from investments carried under the equity method, and amortization of premiums on bonds payable.

To illustrate why we deduct the gain on the disposal of a noncurrent asset from net income, assume that Quick sold the equipment just mentioned for USD 9,000. The journal entry to record the sale is:

Cash (+A)	9,000	
Accumulated depreciation	3,000	
Equipment (-A)		10,000
Gain on sale of equipment (+SE)		2,000

To record disposal of equipment at a gain.

Quick shows the USD 9,000 inflow from the sale of the equipment on its statement of cash flows as a cash inflow from investing activities. Thus, it has already recognized the total USD 9,000 effect on cash (including the USD 2,000 gain) as resulting from an investing activity. Since the USD 2,000 gain is also included in calculating net income, Quick must deduct the gain in converting net income to cash flows from operating activities to avoid double-counting the gain.

### Steps in preparing statement of cash flows

Accountants follow specific procedures when preparing a statement of cash flows. We show these procedures using the financial statements and additional data for Welby Company in Exhibit 128.

After determining the change in cash, the first step in preparing the statement of cash flows is to calculate the cash flows from operating activities, using either the direct or indirect method. The second step is to analyze all of the noncurrent accounts and additional data for changes resulting from investing and financing activities. The third step is to arrange the information gathered in steps 1 and 2 into the proper format for the statement of cash flows.

The direct method converts the income statement from the accrual basis to the cash basis. Accountants must consider changes in balance sheet accounts that are related to items on the income statement. The accounts involved are all current assets or current liabilities. The following schedule shows which balance sheet accounts are related to the items on Welby's income statement:

<b>Income statement Items</b>	<b>Related balance sheet items</b>	<b>Cash flows from Operating activities</b>
Sales	Accounts receivable	Cash received from customers
Cost of goods sold	Accounts payable and merchandise inventory	Cash paid for merchandise
Operating expenses and taxes	Accrued liabilities and prepaid expenses	Cash paid for operating expenses

For other income statement items, the relationship is often obvious. For instance, salaries payable relates to salaries expense, federal income tax payable relates to federal income tax expense, prepaid rent relates to rent expense, and so on.

The table below shows how income statement items are affected by balance sheet accounts:

<b>Accrual Basis</b>		<b>Cash basis (cash flows from operating activities)</b>
Sales	+ Decrease or – Increase in Accounts Receivable + Increase or – Decrease in Merchandise Inventory	=Cash received from customers
Cost of goods sold	and + Decrease or – Increase in Accounts Payable	=Cash paid for merchandise
Operating expenses	Decrease or – Increase in related accrued liability And	=Cash paid for operating expense

## 16. Analysis using the statement of cash flows

Increase or – Decrease in  
related prepaid expense

Noncash operating expenses (such as depreciation expense and amortization expense), revenues, gains, and losses are reduced to zero in the cash basis income statement.

<b>Welby Company</b>			
<b>Comparative balance sheet</b>			
<b>2010 December 31 and 2009</b>			
	<b>2010</b>	<b>2009</b>	<b>Increase/ (Decrease)</b>
<b>Assets</b>			
Cash	\$21,000	\$ 10,000	\$11,000
Accounts receivable	30,000	20,000	10,000
Merchandise inventory	26,000	30,000	(4,000)
Equipment	70,000	50,000	20,000
Accumulated depreciation – Equipment	(10,000)	(5,000)	(5,000)
<b>Total assets</b>	<b>\$137,000</b>	<b>\$105,000</b>	<b>\$32,000</b>
<b>Liabilities and stockholders' equity</b>			
Accounts payable	\$9,000	\$ 15,000	\$(6,000)
Accrued liabilities payable	2,000	-0-	2,000
Common stock (\$10 par value)	90,000	60,000	30,000
Retained earnings	36,000	30,000	6,000
<b>Total liabilities and stockholders' equity</b>	<b>\$137,000</b>	<b>\$105,000</b>	<b>\$32,000</b>
<b>Welby Company</b>			
<b>Income statement</b>			
<b>For the year ended 2010 December 31</b>			
Sales		\$140,000	
Cost of goods sold		100,000	
Gross margin		\$ 40,000	
Operating expenses (other than \$25,000 depreciation)			
Depreciation expense	5,000	30,000	
Net income		\$ 10,000	
<b>Additional data</b>			
1.	Equipment purchased for cash during 2010 amounted to \$20,000.		
2.	Common stock with a par value of \$30,000 was issued at par for cash.		
3.	Cash dividends declared and paid in 2010 totaled \$4,000.		

Exhibit 128: Financial statements and other data

**Welby Company**  
**Working paper to convert income statement from accrual basis to cash basis**  
**For the year ended 2010 December 31**

	Accrual Basis	Add	Deduct	Cash Basis (Cash activities)	Flows from operating
Sales	\$140,000		\$10,000*		\$130,000
Cost of goods sold	\$100,000	\$6,000†	4,000‡	\$102,000	
Operating expenses	25,000		2,000§	23,000	
Depreciation expense	5,000		5,000		
				-0-	
Net income	\$130,000				125,000
* Increase in Accounts Receivable.	\$10,000				\$ 5,000
† Decrease in Accounts Payable.					
‡ Decrease in Merchandise Inventory.					
§ Increase in Accrued Liabilities Payable.					

**Exhibit 129: Working paper to convert income statement from accrual basis to cash basis**

As a general rule, an increase in a current asset (other than cash) decreases cash inflow or increases cash outflow. Thus, when accounts receivable increases, sales revenue on a cash basis decreases (some customers who bought merchandise have not yet paid for it). When inventory increases, cost of goods sold on a cash basis increases (increasing cash outflow). When a prepaid expense increases, the related operating expense on a cash basis increases. (For example, a company not only paid for insurance expense but also paid cash to increase prepaid insurance.) The effect on cash flows is just the opposite for decreases in these other current assets.

An increase in a current liability increases cash inflow or decreases cash outflow. Thus, when accounts payable increases, cost of goods sold on a cash basis decreases (instead of paying cash, the purchase was made on credit). When an accrued liability (such as salaries payable) increases, the related operating expense (salaries expense) on a cash basis decreases. (For example, the company incurred more salaries than it paid.) Decreases in current liabilities have just the opposite effect on cash flows.

Welby Company had no prepaid expenses. The current assets and current liabilities affecting the income statement items changed as follows:

	Increase	Decrease
Accounts receivable	\$10,000	
Merchandise inventory		\$4,000
Accounts payable		6,000
Accrued liabilities payable	2,000	

Thus, Welby converted its income statement to a cash basis as shown in Exhibit 129.

The indirect method makes certain adjustments to convert net income to cash flows from operating activities. Welby must analyze the effects of changes in current accounts (other than cash) on cash. The firm should also take into account noncash items such as depreciation that affected net income but not cash. Welby had only one such item—depreciation expense of USD 5,000. Applying these adjustments to Welby's financial statements and other data in Exhibit 128 yields the following schedule:

Cash flow from operating activities:	
Net income	\$10,000
Adjustments to reconcile net income to net cash provided by operating activities:	

## 16. Analysis using the statement of cash flows

Increase in accounts receivable	(10,000)	
Decrease in merchandise inventory	4,000	
Decrease in accounts payable	(6,000)	
Increase in accrued liabilities payable	2,000	
Depreciation expense	5,000	
Net cash provided by operating activities		\$5,000

Notice that both the direct and indirect methods result in USD 5,000 net cash provided by operating activities.

You can use the following table to make the adjustments to net income for the changes in current assets and current liabilities:

For changes in these current assets and current liabilities:	Make these adjustments to convert accrual basis net income to cash basis net income:		
		<b>Add</b>	<b>Deduct</b>
Accounts receivable	Decrease	Increase	
Merchandise inventory	Decrease	Increase	
Prepaid expenses	Decrease	Increase	
Accounts payable	Increase	Decrease	
Accrued liabilities payable	Increase	Decrease	

Note that you would handle all changes in current asset accounts in a similar manner. All changes in current liability accounts require the opposite treatment of the current asset changes. Use this table in making these adjustments:

<b>For changes in-</b>	<b>Add the changes to net income</b>	<b>Deduct the changes from net income</b>
Current assets	Decreases	Increases
Current liabilities	Increases	Decreases

In applying the rules in this table, add a decrease in a current asset to net income, and deduct an increase in a current asset from net income. For current liabilities, add increases to net income, and deduct decreases from net income.

Under the indirect method, the amount of cash flows from operating activities is calculated as follows:

Accrual basis net income
+ or - Changes in noncash current asset and current liability accounts
+ Expenses and losses not affecting cash
- Revenues and gains not affecting cash
= Cash flows from operating activities

After analyzing the changes in current accounts for their effect on cash, we examine the noncurrent accounts and additional data. Remember that a change in a noncurrent account usually comes about because cash is received or disbursed.

In the Welby example, we must analyze four noncurrent accounts: Retained Earnings, Equipment, Accumulated Depreciation—Equipment, and Common Stock.

- The analysis of the noncurrent accounts can begin with any of the noncurrent accounts; we begin by reviewing the Retained Earnings account. Retained Earnings is the account to which net income or loss for the period was closed. The USD 6,000 increase in this account consists of USD 10,000 of net income less USD 4,000 of dividends paid.

		<b>Retained earnings</b>	
		Beg. Bal.	30,000
Dividends	4,000	Net income	10,000
		End bal.	36,000

The net income amount is in the income statement. We enter both net income and dividends on the statement of cash flows in Exhibit 130, Part B. The USD 10,000 net income is the starting figure in determining cash flows from operating activities. Thus, we enter the net income of USD 10,000 on the statement in the cash flows from operating activities section. The dividends are shown as a deduction in the cash flow from financing activities section.

- The Equipment account increased by USD 20,000. The dividends are shown as a deduction in the cash flow from financing activities section. The additional data indicate that USD 20,000 of equipment was purchased during the period. A purchase of equipment is a deduction in the cash flows from investing activities section.
- The USD 5,000 increase in the Accumulated Depreciation—Equipment account equals the amount of depreciation expense in the income statement for the period. As shown earlier, because depreciation does not affect cash, under the indirect (addback) method we add it back to net income on the statement of cash flows to convert accrual net income to a cash basis.
- The USD 30,000 increase in common stock resulted from the issuance of stock at par value, as disclosed in the additional data (item 2) in Exhibit 128. An issuance of stock in the statement of cash flows is a positive amount in the cash flows from financing activities section.

After we have analyzed the noncurrent accounts, we can prepare the statement of cash flows from the information generated. Part A of Exhibit 130 presents the statement of cash flows for Welby using the direct method. Part B shows the statement of cash flows for Welby using the indirect method. The appendix to this chapter shows how a working paper can be used to assist in preparing a statement of cash flows for the Welby Company under the indirect method. However, we believe you will gain a greater conceptual understanding by not using a working paper.

The statement of cash flows has three major sections: cash flows from operating activities, cash flows from investing activities, and cash flows from financing activities. The format in the operating activities section differs for the direct and indirect methods. The direct method adjusts each item in the income statement to a cash basis. The indirect method makes these same adjustments but to net income rather than to each item in the income statement. Both methods eliminate not only the effects of noncash items, such as depreciation, but also gains and losses on sales of plant assets.

The only item in the cash flows from investing activities section is the cash outflow of USD 20,000 for the purchase of equipment. In a more complex situation, other items could be included in this category.

Two items are under the cash flows from financing activities section: The issuance of common stock resulted in a cash inflow of USD 30,000 and the payment of dividends resulted in a cash outflow of USD 4,000.

The last line of the statement is the USD 11,000 increase in cash for the year. Other examples could result in a decrease in cash for the year.

If the direct method is used, the reconciliation of net income to net cash flows from operating activities (the indirect method) must be shown in a separate schedule. However, if the indirect method is used and the reconciliation is shown in the statement of cash flows, no such separate schedule is required. Possibly this is one of the reasons why so many companies use the indirect method.

However, if the indirect method is used, the amount of interest and income taxes paid must be provided in related disclosures, usually immediately below the statement of cash flows. For instance, if Welby Company had paid interest of USD 200 and income taxes of USD 8,000, these facts would be reported as follows:

## 16. Analysis using the statement of cash flows

### A. Direct Method

**Welby Company**  
**Statement of cash flows**  
**For the year ended 2010 December 31**

Cash flows from operating activities:			
Cash received from customers	\$130,000		
Cash paid for merchandise	(102,000)		
Cash paid for operating expenses	(23,000)		
Net cash provided by operating activities		\$5,000	
Cash flows from investing activities:			
Purchase of equipment		(20,000)	
Cash flows from financing activities:			
Proceeds from issuing common stock	\$ 30,000		
Paid cash dividends	(4,000)		
Net cash provided by financing activities		26,000	
Net increase (decrease) in cash		\$11,000	

### B. Direct Method

**Welby Company**  
**Statement of cash flows**  
**For the year ended 2010 December 31**

Cash flows from operating activities:			
Net income	\$10,000		
Adjustments to reconcile net income to net cash			
Provided by operating activities:			
Increase in accounts receivable	(10,000)		
Decrease in merchandise inventory	4,000		
Decrease in accounts payable	(6,000)		
Increase in accrued liabilities payable	2,000		
Depreciation expense	5,000		
Net cash provided by operating activities		\$ 5,000	
Cash flows from investing activities:			
Purchase of equipment		(20,000)	
Cash flows from financing activities:			
Proceeds from issuing common stock	\$ 30,000		
Paid cash dividends	(4,000)		
Net cash provided by financing activities		26,000	
Net increase (decrease) in cash		\$11,000	

#### Exhibit 130: Statement of cash flows-Welby company

#### Supplemental cash flow information:

Interest paid	\$ 200
Income taxes paid	8,000

### Analysis of the statement of cash flows

Business students will benefit throughout their careers from knowing how to analyze a statement of cash flows. We will use the consolidated statement of cash flows from Synotech, Inc. to illustrate the analysis. This company will be used in the next chapter to illustrate the complete analysis and interpretation of all the financial statements. The example is adapted from a real USA company's recent annual report.

Exhibit 131 shows the consolidated statements of cash flows for the years 2010, 2009, and 2008 for Synotech, Inc. We also include portions of Management's Discussion and Analysis of the 2010 statement of cash flows. We will then discuss the statement further, explaining various items and illustrating how the information might be used for decision making.

### Liquidity and capital resources

Net cash provided by operations increased 13 per cent to USD 1,101.0 in 2010 compared with USD 972.3 in 2009 and USD 995.3 in 2008. The increase in cash generated by operating activities in 2010 reflects the Company's improved profitability and working capital management. Cash generated from operations was used to fund capital spending, reduce debt levels and increase dividends.



During 2010, long-term debt decreased from USD 3,634.8 to USD 3,476.6. The Company continued to focus on enhancing its debt portfolio, resulting in the refinancing of a substantial portion of commercial paper and other short-term borrowings to longer term instruments. In 2010, the Company entered into a USD 595.6 loan agreement and obtained a USD 487.2 term loan with foreign commercial banks.

As of 2010 December 31, USD 410.3 of domestic and foreign commercial paper was outstanding. These borrowings carry a Standard & Poor's rating of A1. The commercial paper as well as other short-term borrowings are classified as long-term debt at 2010 December 31, as it is the Company's intent and ability to refinance such obligations on a long-term basis. The Company has additional sources of liquidity available in the form of lines of credit maintained with various banks. At 2010 December 31, such unused lines of credit amounted to USD 2,142.8.

The ratio of net debt to total capitalization (defined as the ratio of the book values of debt less cash and marketable securities ["net debt"] to net debt plus equity) decreased to 58 per cent during 2010 from 64 per cent in 2009. The decrease is primarily the result of higher Company earnings in 2010 as well as effective working capital management and lower acquisitions than in prior years. The ratio of market debt to market capitalization (defined as above using fair market values) decreased to 17 per cent during 2010 from 23 per cent in 2009. The Company primarily uses market value analyses to evaluate its optimal capitalization.

Capital expenditures were 5.2 per cent of net sales in both 2010 and 2009 and were 5.3 per cent of net sales in 2008. Capital spending continues to be focused primarily on projects that yield high aftertax returns, thereby reducing the Company's cost structure. Capital expenditures for 2008 are expected to continue at the current rate of approximately 5 per cent of net sales.

Other investing activities in 2010, 2009 and 2008 included strategic acquisitions and equity investments worldwide. The aggregate purchase price of all 2010, 2009 and 2008 acquisitions was USD 46.2, USD 1,586.3 and USD 179.8, respectively.

During 2008, the Company repurchased a significant amount of common shares in the open market and private transactions to provide for employee benefit plans and to maintain its targeted capital structure. Aggregate repurchases for the year approximated 6.9 million shares with a total purchase price of USD 493.3.

## 16. Analysis using the statement of cash flows

<b>(USD millions)</b>	<b>2010</b>	<b>2009</b>	<b>2008</b>
Operating activities			
Net income	\$762.0	\$ 206.4	\$ 696.2
Adjustments to reconcile net income to net cash provided by operations:			
Restructured operations, net	(126.7)	509.9	(46.9)
Depreciation and amortization	379.6	360.4	282.2
Deferred income taxes and other, net	(27.6)	(75.5)	77.6
Cash effects of changes in:			
Receivables	(18.5)	(52.9)	(60.1)
Inventories	(1.4)	(31.3)	(53.4)
Other current assets	-0-	(50.9)	(9.4)
Payables and accruals	133.6	106.2	109.1
Net cash provided by operations	\$ 1,101.0	\$ 972.3	\$ 995.3
Investing activities			
Capital expenditures	\$ (550.8)	\$ (518.2)	\$ (481.0)
Payment for acquisitions, net of cash acquired	(71.2)	(1,560.5)	(175.7)
Sale of marketable securities and other investments	31.6	7.4	70.1
Other, net	(14.4)	(20.6)	37.3
Net cash used for investing activities	\$ (604.8)	\$ (2,091.9)	\$ (549.3)
Financing activities			
Principal payments on debt	\$ (1,397.5)	\$ (20.5)	\$ (106.0)
Proceeds from issuance of debt, net	1,292.9	1,464.0	379.7
Proceeds from outside investors	10.3	36.6	18.2
Dividends paid	(355.5)	(331.8)	(296.3)
Purchase of common stock	(32.9)	(10.8)	(429.5)
Proceeds from exercise of stock options and other, net	36.8	33.9	22.2
Net cash (used for) provided by financing activities	\$ (445.9)	\$ 1,171.4	\$ (411.7)
Effect of exchange rate changes on cash and cash equivalents	\$ (2.8)	\$ (5.2)	\$ (3.3)
Net increase in cash and cash equivalents	\$ 47.5	\$ 46.6	\$ 31.0
Cash and cash equivalents at beginning of year	250.5	203.9	172.9
Cash and cash equivalents at end of year	\$ 298.0	\$ 250.5	\$ 203.9
Supplemental cash flow information			
Income taxes paid	\$ 304.4	\$ 351.0	\$ 313.3
Interest paid	274.9	274.3	116.3
Non-cash consideration in payment for acquisitions	-0-	58.7	9.6
Principal payments on ESOP debt, guaranteed by the Company	(6.0)	(5.3)	(4.8)

Exhibit 131: Consolidated statements of cash flows for Synotech, Inc. - Indirect method

Dividend payments were USD 355.5 in 2010, up from USD 331.8 in 2009 and USD 296.3 in 2008.

Internally generated cash flows appear to be adequate to support currently planned business operations, acquisitions and capital expenditures. Significant acquisitions would require external financing.

The Company is a party to various superfund and other environmental matters and is contingently liable with respect to lawsuits, taxes and other matters arising out of the normal course of business. Management proactively reviews and manages its exposure to, and the impact of, environmental matters. While it is possible that the

Company's cash flows and results of operations in particular quarterly or annual periods could be affected by the one-time impacts of the resolution of such contingencies, it is the opinion of management that the ultimate disposition of these matters, to the extent not previously provided for, will not have a material impact on the Company's financial condition or ongoing cash flows and results of operations.

Refer to Exhibit 131. First we will discuss the items in the operating activities section of the statement of cash flows, then we will discuss investing activities and financing activities.

**Operating activities** The company used the indirect method of calculating net cash provided by operations. Various adjustments were made to convert accrual based net income to cash basis net income.

The "restructured operations, net" item resulted from the fact that many companies restructured their operations by closing plants and significantly reducing their work forces. Some companies recognized a net loss from restructuring and others recognized a net gain. Apparently, the company recognized a net gain in 2010 because it deducted the item from net income on the statement of cash flows. The actual cash flows from restructuring will occur in a later period.

"Depreciation and amortization" includes depreciation on plant assets and amortization of intangible assets. Depreciation and amortization are noncash charges against revenues and must be added back to net income.

The "deferred income taxes and other, net" item deduction from net income results primarily from the fact that income tax expense on the income statement was lower than the actual income taxes paid in 2010. This phenomenon occurs because of using a different method for tax and accounting purposes for such items as depreciation.

Receivables and inventories increased (causing cash to decrease), while other current assets remained about the same. Payables and accruals increased (causing cash to increase). These changes are net of any amounts related to acquisitions, dispositions, or amounts that are included elsewhere, such as in "restructured operations, net". The changes described may differ from the amounts derived from only analyzing the balance sheets for the last two years because of certain technical "adjustments" that are beyond the scope of this text.

**Investing activities** "Capital expenditures" include the purchase of plant assets, such as new machinery and equipment, to modernize production facilities. Companies normally select those capital expenditures with the highest rate of return. For instance, if funds are limited (and they normally are) and two capital investments (a machine and a mainframe computer) are being considered, one yielding a 20 per cent return and the other yielding a 25 per cent return, the company will normally select the one with the 25 per cent return.

"Payment for acquisitions, net of cash acquired" shows the amount spent in acquiring other companies and segments of other companies, net of the amount of cash held by those companies and obtained as a part of the acquisition.

The company sold "marketable securities and other investments". These securities normally consist of stocks, bonds, and other instruments of other companies. For fiscal years beginning after 1993 December 15, marketable securities must be identified as trading securities, available-for-sale securities, or held-to-maturity securities. Trading securities and available-for-sale securities were discussed in some detail in Chapter 14. Held-to-maturity securities were mentioned briefly in Chapter 15. These held-to-maturity securities are debt securities (such as bonds of other companies) that the company has purchased and has both the intent and ability to hold to maturity. As mentioned earlier, the proceeds from sales and purchases of trading securities must be shown as cash flows from

## 16. Analysis using the statement of cash flows

operating activities, and the proceeds from sales and purchases of available-for-sale and held-to-maturity securities must be shown as cash flows from investing activities.

**Financing activities** The company paid off some old debt (USD 1,397.5 million) and incurred new debt (USD 1,292.9 million). Recently many companies are substituting new debt with a low interest rate for old debt with a high interest rate, just as homeowners refinance their homes to lower their interest rate.

The "proceeds from outside investors" resulted from the other participants in the formation of certain businesses in which the company holds more than a 50 per cent share.

"Dividends paid" is an item that should be familiar to you. Dividends paid increased each year for the period 2008 through 2010.

The company bought back some of its own stock (treasury stock). Companies often buy back their own shares because they (1) need the shares to issue to employees or officers under stock option plans, (2) want to bolster the market price of the stock, or (3) hope to later sell the stock at a substantially higher price.

"Proceeds from exercise of stock options and other, net" represents the proceeds received from employees and officers who exercised their stock options. Stock options are usually granted to employees to encourage them to work efficiently to increase profitability, which should increase the market price of the stock. Stock options made available to officers are for the same purpose or to attract or retain a talented executive. Normally, an option gives the recipient the right to buy a certain number of shares at a stated price within a given time frame. For instance, the president of a company may be granted an option to buy 10,000 shares at USD 40 per share any time after two years from that date and before six years from that date. Assume that the current market price is USD 38. If the market price of the stock rises to USD 80 at some time during the option period, the president could buy the shares at USD 40 and then hold them or sell them at the higher market price. Executives of companies have become multimillionaires by exercising their stock options. The employees and executives of Synotech, Inc., paid the company between USD 22.2 million and USD 36.8 million per year to exercise their stock options during the three-year period. The company re-issued some of its treasury stock as a result of the exercise of the stock options.

We will discuss some examples of the ways that the information in the statement of cash flows can be used by management, stockholders, and creditors to make decisions. Each of these parties would use more than the statement of cash flows to perform an analysis of the company's performance, but we will restrict ourselves to the statement of cash flows. The next chapter shows a more complete analysis of the company's performance.

**Management** Management is the first to see the information contained in the statement of cash flows. You have already read portions of "Management's Discussion and Analysis" concerning the information contained in that statement. Management concluded that the amount of internally generated cash flows (net cash provided by operations) appears adequate to support currently planned business operations, acquisitions, and capital expenditures. Thus, unless the company engages in a significant acquisition it will not have to sell more stock or borrow more funds in the foreseeable future. Also, the company apparently replaced some of its high interest rate debt (USD 1,397.5 million) with lower interest rate debt (USD 1,292.9 million). Many companies are doing this same thing recently to take advantage of the low interest rates available.

**Stockholders** Stockholders can see that dividend payments (USD 355.5 million) are comfortably covered by net cash provided by operations (USD 1,101.0 million). Stockholders are undoubtedly pleased that the per share dividend rate has increased each year during 2008 through 2010. The company continues to invest in its future by making capital expenditures (USD 550.8 million) to modernize its productive facilities. The repurchase of its own

stock (USD 32.9 million) decreases the number of shares outstanding, although some of the stock will undoubtedly be reissued in the future as employees and executives exercise their stock options. Any net reduction in the number of shares outstanding will tend to increase earnings per share and help to increase the market price per share in the future. Also, the company may decide to increase dividends per share in the future. These favorable factors might induce present stockholders to retain their stock or even increase their holdings. Potential stockholders might also be attracted to the stock.

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### A broader perspective:

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#### Johnson & Johnson

**Johnson & Johnson and Subsidiaries  
Consolidated statements of cash flows  
For the years ended 2000 June 30, 1999, and 1998  
(USD millions)**

<b>Cash flows from operating activities</b>	<b>2000</b>	<b>1999</b>	<b>1998</b>
Net earnings	\$ 4,800	4,167	3,003
Adjustments to reconcile net earnings to cash flows:			
Depreciation and amortization of property and intangibles	1,515	1,444	1,285
Purchased in-process research and development	54		298
Increase in deferred taxes	(167)	(7)	(297)
Accounts receivable reserves	33	11	24
Changes in assets and liabilities, net of effects from acquisition of businesses:			
Increase in accounts receivable	(451)	(671)	(163)
Decrease (increase) in inventories	125	(333)	(100)
Increase in accounts payable and accrued liabilities	57	242	646
Decrease in other current and non-current assets	143	457	142
Increase in other current and non-current liabilities	454	450	153
<b>Net cash flows from operating activities</b>	<b>\$ 6,563</b>	<b>\$ 5,760</b>	<b>\$ 4,991</b>
<b>Cash flows from investing activities</b>			
Additions to property, plant and equipment	\$(1,646)	\$(1,728)	\$(1,545)
Proceeds from the disposal of assets	161	35	108
Acquisitions of businesses, net of cash acquired	(68)	(271)	(3,818)
Purchases of investments	(5,383)	(3,538)	(1,005)
Sales of investments	4,670	2,817	400
Other	(102)	(257)	(205)
Net cash used by investing activities	\$ (2,368)	\$ (2,942)	\$ (6,065)
<b>Cash flows from financing activities</b>			
Dividends to shareowners	\$(1,724)	\$(1,479)	\$(1,305)
Repurchase of common stock	(973)	(840)	(930)
Proceeds from short-term debt	814	3,208	2,424
Retirement from short-term debt	(1,485)	(4,063)	(226)
Proceeds from long-term debt	4	793	535
Retirement from long-term debt	(28)	(176)	(471)
Proceeds from the exercise of stock options	292	180	178
<b>Net cash (used by) provided by financing activities</b>	<b>\$(3,100)</b>	<b>\$(2,377)</b>	<b>\$205</b>
Effect of exchange rate changes on cash and cash equivalents	(47)	(72)	24
Increase (decrease) in cash and cash equivalents	1,048	369	(845)
Cash and equivalents, beginning of year	2,363	1,994	2,839
<b>Cash and cash equivalents, end of year</b>	<b>\$3,411</b>	<b>\$2,363</b>	<b>\$ 1,994</b>

**Creditors** An encouraging factor is the increasing amount of net cash provided by operations in 2010. Also comforting to creditors is the information in Management's Discussion and Analysis that the company has access to USD 2,142.8 million in lines of credit.

The preceding discussions are merely examples of how the information contained in the statement of cash flows might be analyzed to make decisions. The next section describes three ratios that can provide further analyses of cash flows.

## 16. Analysis using the statement of cash flows

### Analyzing and using the financial results—Cash flow per share of common stock, cash flow margin, and cash flow liquidity ratios

The information in the statement of cash flows provides a basis for analyzing financial results. However, further analysis is possible through the use of three ratios relating to cash flow: the cash flow per share of common stock, cash flow margin, and cash flow liquidity ratios. The ratios shown below are results for Synotech, Inc. and recent results for other companies. All dollar amounts are rounded to the nearest million.

The **cash flow per share of common stock ratio** is equal to the net cash provided by operations divided by the average number of shares of common stock outstanding. This ratio indicates the company's ability to pay dividends and liabilities. The higher the ratio, the greater the ability to pay. The cash flow per share of common stock ratios for the companies were:

Company	Net cash provided by operating activities (millions)	Average shares of common stock outstanding* (millions)	Cash flow per share
Synotech, Inc.	\$1,101	147	\$7.49
J.C. Penney, Inc.	1,598	262	6.10
The Walt Disney Company	6,434	2,092	3.08
General Electric Company	22,690	9,893	2.29

\*To determine the average number of shares, add the beginning and ending numbers outstanding and divide by two.

The **cash flow margin ratio** is equal to net cash provided by operating activities divided by net sales. This ratio is a measure of a company's ability to turn sales revenue into cash. The higher the ratio, the better. The cash flow margin ratios for the companies were:

Company	Net Cash provided by operating activities (millions)	Net sales (millions)	Cash flow Margin
Synotech, Inc.	\$1,101	10,499	10.49%
J.C. Penney, Inc.	1,598	31,846	5.02%
The Walt Disney Company	6,434	25,402	25.33%
General Electric Company	22,690	128,051	17.72%

The **cash flow liquidity ratio** is equal to the total of cash, marketable securities, and net cash provided by operating activities divided by current liabilities. This ratio is a test of a company's short-term, debt-paying ability. The higher the ratio, the better. The cash flow liquidity ratios for the companies were:

Company	Cash, marketable securities, and net cash provided by operating activities (millions)	Current liabilities (millions)	Cash flow liquidity ratio
Synotech, Inc.	\$1,470	\$2,285	.64 times
J.C. Penney, Inc.	2,542	4,235	.60 times
The Walt Disney Company	7,276	8,402	.87 times
General Electric Company	35,913	156,116	.23 times

On the first of these measures, Synotech, Inc., seems to be in the strongest position, although all of the companies are financially sound. On the second measure, Walt Disney and General Electric have the highest cash flow margin ratios. On the third measure, Walt Disney seems to be in the strongest position. However, a more valid comparison on each of these measures would be made if each of these companies was compared with other

companies in its industry. Dun & Bradstreet's Industry Norms and key business ratios can be used for this purpose. (This source could also be used for comparisons of ratios in the next chapter.) A complete analysis using the techniques described in the next chapter would provide additional information about the strengths and weaknesses of each of these companies.

### Understanding the learning objectives

- The statement of cash flows summarizes the effects on cash of the operating, financing, and investing activities of a company during an accounting period.
- Management can see the effects of its past major policy decisions in quantitative form.
- Investors and creditors can assess the entity's ability to generate positive future net cash flows, to meet its obligations, and to pay dividends, and can assess the need for external financing.
- Operating activities generally include the cash effects (inflows and outflows) of transactions and other events that enter into the determination of net income. The cash flows from operating activities can be measured in two ways. The direct method deducts from cash sales only those operating expenses that consumed cash. The indirect method starts with net income and adjusts net income for items that affected reported net income but did not involve cash.
- Investing activities generally include transactions involving the acquisition or disposal of noncurrent assets.
- Financing activities generally include the cash effects (inflows and outflows) of transactions and other events involving creditors and owners.
- The direct method deducts from cash sales only those operating expenses that consumed cash. The FASB recommends use of the direct method. The indirect method starts with accrual basis net income and indirectly adjusts net income for items that affected reported net income but did not involve cash. A large majority of companies use the indirect method.
- The first step is to determine the cash flows from operating activities. Either the direct or indirect method may be used.
- The second step is to analyze all the noncurrent accounts for changes in cash resulting from investing and financing activities.
- The third step is to arrange the information gathered in steps 1 and 2 into the format required for the statement of cash flows.
- Business students will benefit throughout their careers from knowing how to analyze a statement of cash flows.
- "Management's Discussion and Analysis" in the annual report provides part of the analysis.
- Inspection of the statement of cash flows together with "Management's Discussion and Analysis" will provide the most insight as to the cash flow situation.
- The cash flow per share of common stock ratio tests a company's ability to pay dividends and liabilities and is equal to net cash provided by operating activities divided by the average number of shares of common stock outstanding.
- The cash flow margin ratio measures a company's ability to turn sales revenue into cash and is equal to net cash provided by operating activities divided by net sales.

## 16. Analysis using the statement of cash flows

- The cash flow liquidity ratio tests a company's short-term, debt-paying ability and is equal to the total of cash, marketable securities, and net cash provided by operating activities divided by current liabilities.
- A work sheet can be used to assist in preparing a statement of cash flows.
- A company's comparative balance sheets, income statement, and additional data are used to prepare the work sheet.
- The work sheet technique makes the recording of the effects of transactions on cash flows almost a mechanical process.

### Appendix: Use of a working paper to prepare a statement of cash flows

This appendix shows how a work sheet could be used to assist in preparing a statement of cash flows. We use the comparative balance sheets, income statement, and additional data for the Welby Company, shown on Exhibit 129, as the basis for this example.

Look at the working paper in Exhibit 132 for Welby Company, which we use to analyze the transactions and prepare the statement of cash flows. While discussing the steps in preparing the working paper, we describe the items and trace their effects in the entries.

- Enter the beginning account balances of all balance sheet accounts in the first column and the ending account balances in the fourth column. Notice that the debit items precede the credit items.
- Total the debits and credits in the first and fourth columns to make sure that debits equal credits in each column.
- Write "Cash Flows from Operating Activities" immediately below the total of the credit items. Skip sufficient lines for recording adjustments to convert accrual net income to cash flows from operating activities. Then write "Cash Flows from Investing Activities" and allow enough space for those items. Finally, write "Cash Flows from Financing Activities" and allow enough space for those items.
- Enter entries for analyzing transactions in the second and third columns. The entries serve two functions: (a) they explain the change in each account; and (b) they classify the changes into operating, investing, and financing activities. We discuss these entries individually in the next section.
- Total the debits and credits in the second and third columns; they should be equal. You will have one pair of totals for the balance sheet items and another pair for the bottom portion of the working paper. We use the bottom portion of the working paper to prepare the statement of cash flows.

To complete the working paper in Exhibit 132, we must analyze the change in each noncash balance sheet account. The focus of this working paper is on cash, and every change in cash means a change in a noncash balance sheet account. After we have made the proper entries to analyze all changes in noncash balance sheet accounts, the working paper shows all activities affecting cash flows. The following explanations are keyed to the entry numbers on the working paper:

**Entry o** In comparing the beginning and ending cash balances, we determine the change in the Cash account during the year is an USD 11,000 increase. An entry on the working paper debits Cash for USD 11,000 and credits Increase in Cash for Year near the bottom of the schedule. This o entry does not explain the change in cash but is the "target" of the analysis. The entry sets out the change in cash that the statement seeks to explain. No further attention need be paid to cash in completing the working paper.



We now direct our attention toward changes in other balance sheet accounts. These accounts can be dealt with in any order; first, we record the net income for the period and analyze the current assets (other than cash) and the current liabilities. Second, we analyze the changes in the noncurrent accounts.

**Entry 1** The income statement shows a net income for 2010 of USD 10,000. Entry 1 records the USD 10,000 as the starting point in measuring cash flows from operating activities and credits Retained Earnings as a partial explanation of the change in that account.

The next task is to analyze changes in current accounts other than Cash. The current accounts of Welby Company are closely related to operations, and their changes are included in converting net income to cash flows from operating activities.

**Entry 2** We deduct the USD 10,000 increase in accounts receivable from net income when converting it to cash flows from operating activities. If accounts receivable increased, sales to customers exceeded cash received from customers. To convert net income to a cash basis, we must deduct the USD 10,000.

The working paper technique makes the recording of these effects almost mechanical. By debiting Accounts Receivable for USD 10,000, we increase it from USD 20,000 to USD 30,000. If Accounts Receivable is debited, we must credit an item that can be entitled "Increase in Accounts Receivable". We deduct the increase from net income in converting it to cash flows from operating activities.

**Entry 3** is virtually a duplicate of entry 2, except it involves merchandise inventory rather than receivables and is a decrease rather than an increase.

**Entry 4** records the effect of a decrease in accounts payable on net income in converting it to cash flows from operating activities.

**Entry 5** records the effect of an increase in accrued liabilities payable in converting net income to cash flows from operating activities.

Next, we analyze the changes in the noncurrent balance sheet accounts.

**Entry 6** We add the USD 5,000 depreciation back to net income and credit the respective accumulated depreciation account. You can find the depreciation expense (1) on the income statement, or (2) by solving for the credit needed to balance the accumulated depreciation account on the balance sheet.

<b>Welby Company</b>				
<b>Working paper for Statement of Cash Flows</b>				
<b>For the Year Ending 2010 December 31</b>				
	<b>Account Balances</b>	<b>Analysis of transactions for 2010</b>		<b>Account balances</b>
	<b>2009/12/31</b>	<b>Debit</b>	<b>Credit</b>	<b>2010/12/31</b>
<b>Debits</b>				
Cash	10,000	(0) 11,000		21,000
Accounts receivable, net	20,000	(2) 10,000		30,000
Merchandise inventory	30,000		(3) 4,000	26,000
Equipment	50,000	(7) 20,000		70,000
Totals	110,000			147,000
<b>Credits</b>				
Accumulated depreciation – equipment	5,000		(6) 5,000	10,000
Accounts payable	15,000	(4) 6,000		9,000
Accrued liabilities payable	-0-		(5) 2,000	2,000
Common stock (\$10 par value)			(8) 30,000	90,000

## 16. Analysis using the statement of cash flows

Retained earnings	30,000	(9) 4,000	(1) 10,000	36,000
Totals	110,000	51,000	51,000	147,000
Cash flows from operating activities				
Net income		(1) 10,000		
Increase in accounts receivable			(2) 10,000	
Decrease in merchandise inventory		(3) 4,000		
Decrease in accounts payable			(4) 6,000	
Increase in accrued liabilities payable		(5) 2,000		
Depreciation expense		(6) 5,000		
Cash flows from investing activities:				
Purchase of equipment			(7) 20,000	
Cash flows from financing activities:				
Proceeds from issuing common stock		(8) 30,000		
Payment of cash dividends			(9) 4,000	
Increase in cash for year			(0) 11,000	
		51,000	51,000	
<b>Accumulated Depreciation - Equipment</b>				
	Beg. Bal.	5,000		
	(6)	5,000		
	End. Bal.	10,000		

Exhibit 132: Working paper for statement of cash flows

**Entry 7** We debit the Equipment account and credit "Purchase of Equipment" in the investing activities section for the USD 20,000 cash spent to acquire new plant assets (equipment).

**Entry 8** We show the USD 30,000 cash received from sale of common stock as a financing activity. The entry also explains the change in the Common Stock account. If stock had been sold for more than its stated value of USD 50 per share, we would record the excess in a separate Paid-In Capital in Excess of Stated Value account. However, we would report the total amount of cash received from the issuance of common stock as a single figure on the statement of cash flows. Only this total amount received is significant to creditors and other users of the financial statements trying to judge the solvency of the company.

**Entry 9** We debit Retained Earnings and credit Payment of Cash Dividends for the USD 4,000 dividends declared and paid. The entry also completes the following explanation of the change in Retained Earnings. Notice that on the statement of cash flows, the dividends must be paid to be included as a cash outflow from financing activities.

<b>Retained earnings</b>	
	Beg. 30,000
	Bal.
(9) 4,000	(1) 10,000
	End. 36,000
	Bal.

Using the data in the lower section of the working paper, we would prepare the statement of cash flows under the indirect method shown in Exhibit 130 (Part B).

### Demonstration problem

The following comparative balance sheets are for Dells Corporation as of 2010 June 30, and 2009 June 30. Also provided is the statement of income and retained earnings for the year ended 2010 June 30, with additional data.

<b>Dells Company</b>			
<b>Comparative balance sheet</b>			
<b>2010 June 30 and 2009</b>			
	<b>2010</b>	<b>2009</b>	<b>Increase (Decrease)</b>
<b>Assets</b>			
Current assets:			
Cash	\$ 30,000	\$ 80,000	\$ (50,000)
Accounts receivable, net	160,000	100,000	60,000
Merchandise inventory	100,000	70,000	30,000
Prepaid rent	20,000	10,000	10,000
Total current assets	\$310,000	\$260,000	\$ 50,000
Property, plant, and equipment:			
Equipment	\$400,000	\$200,000	\$200,000
Accumulated depreciation – equipment	(60,000)	(50,000)	(10,000)
Total property, plant, and equipment	\$340,000	\$150,000	\$190,000
<b>Liabilities and stockholders' equity</b>			
Current liabilities:			
Accounts payable	\$ 50,000	\$ 40,000	\$ 10,000
Notes payable – bank	-0-	50,000	(50,000)
Salaries payable	10,000	20,000	(10,000)
Federal income taxes payable	30,000	20,000	10,000
Total current liabilities	\$ 90,000	\$130,000	\$ (40,000)
Stockholders' equity:			
Common stock, \$10 par	\$300,000	\$100,000	\$200,000
Paid-in capital in excess of par	50,000	-0-	50,000
Retained earnings	210,000	180,000	30,000
Total stockholders' equity	\$560,000	\$280,000	\$280,000
Total liabilities and stockholders' equity	\$650,000	\$410,000	\$240,000

<b>Dells Corporation</b>		
<b>Statement of income and retained earnings</b>		
<b>For the year ended 2010 June 30</b>		
Sales		\$1,000,000
Cost of goods sold	\$600,000	
Salaries and wages expense	200,000	
Rent expense	40,000	
Depreciation expense	20,000	
Interest expense	3,000	
Loss on sale of equipment	7,000	870,000
Income before federal income taxes		\$ 130,000
Deduct: Federal income taxes		60,000
Net income		\$ 70,000
Retained earnings, 2009 July 1		180,000
		\$ 250,000
Deduct: Dividends		40,000
Retained earnings, 2010 June 30		\$210,000

Equipment with a cost of USD 20,000, on which USD 10,000 of depreciation had been recorded, was sold for USD 3,000 cash. Additional equipment was purchased for USD 220,000.

Stock was issued for USD 250,000 cash.

The USD 50,000 bank note was paid.

Using the data given for Dells Corporation:

a. Prepare a statement of cash flows—indirect method.

## 16. Analysis using the statement of cash flows

b. Prepare a working paper to convert net income from an accrual basis to a cash basis. Then prepare a partial statement of cash flows—direct method, showing only the cash flows from operating activities section.

### Solution to demonstration problem

a.

**Dells Company**  
**Statement of cash flows**  
**For the year ended 2010 June 30**

Cash flows from operating activities:	
Net income	\$ 70,000
Adjustments to reconcile net income to net cash provided by operating activities:	
Increase in accounts receivable	(60,000)
Increase in merchandise inventory	(30,000)
Increase in prepaid rent	(10,000)
Increase in accounts payable	10,000
Decrease in salaries payable	(10,000)
Increase in federal income taxes payable	10,000
Loss on sale of equipment	7,000
Depreciation expense	20,000
Net cash provided by operating activities	\$7,000
Cash flows from investing activities:	
Proceeds from sale of equipment	\$ 3,000
Purchase of equipment	(220,000)
Net cash used by investing activities	(217,000)
Cash flows from financing activities:	
Proceeds from issuing common stock	\$250,000
Repayment of bank note	(50,000)
Dividends paid	(40,000)
Net cash provided by financing activities	160,000
Net increase (decrease) in cash	\$(50,000)

b.

**Dells Corporation**  
**Working paper to convert income statement from accrual basis to cash basis**  
**For the year ended 2010 June 30**

	Accrual basis	Add	Deduct	Cash basis (Cash flows From operating activities)	
Sales	\$1,000,000		\$60,000 <sup>a</sup>		\$940,000
Cost of goods sold	\$600,000	\$30,000 <sup>b</sup>	10,000 <sup>c</sup>	\$620,000	
Salaries and wages expense	200,000	10,000 <sup>d</sup>		210,000	
Rent expense	40,000	10,000 <sup>e</sup>		50,000	
Depreciation expense	20,000		20,000	-0-	
Interest expense	3,000			3,000	
Loss on sale of equipment	7,000		7,000	-0-	
Federal income taxes	60,000		10,000 <sup>f</sup>	50,000	
Net income	930,000				933,000
	\$70,000				\$ 7,000

<sup>a</sup> Increase in accounts receivable.

<sup>b</sup> Increase in merchandise inventory.

<sup>c</sup> Increase in accounts payable.

<sup>d</sup> Decrease in salaries payable.

<sup>E</sup> Increase in prepaid rent.

<sup>F</sup> Increase in Federal Income Taxes Payable.

**Dells Corporation**  
**Partial Statement of cash flows- Direct Method**  
**For the Year Ended 2010 June 30**

Cash flows from operating activities:		
Cash received from customers	\$ 940,000	
Cash paid for merchandise	(620,000)	
Salaries and wages paid	(210,000)	
Rent paid	(50,000)	
Interest paid	(3,000)	
Federal income taxes paid	(50,000)	
Net cash provided by operating activities		\$ 7,000

### Key terms

**Cash flow liquidity ratio** Cash and marketable securities plus net cash provided by operating activities divided by current liabilities.

**Cash flow margin ratio** Net cash provided by operating activities divided by net sales.

**Cash flow per share of common stock ratio** Net cash provided by operating activities divided by the average number of shares of common stock outstanding.

**Cash flows from operating activities** The net amount of cash received or disbursed during a given period on items that normally appear on the income statement.

**Direct method** Deducts from cash sales only those operating expenses that consumed cash.

**Financing activities** Generally include the cash effects of transactions and other events involving creditors and owners. Cash payments made to settle current liabilities such as accounts payable, wages payable, and income taxes payable are not financing activities. These payments are operating activities.

**Indirect method** A method of determining cash flows from operating activities that starts with net income and indirectly adjusts net income for items that do not involve cash. Also called the **addback** method.

**Investing activities** Generally include transactions involving the acquisition or disposal of noncurrent assets. Examples include cash received or paid from the sale or purchase of property, plant, and equipment; available-for-sale and held-to-maturity securities; and loans made to others.

**Noncash charges or expenses** Expenses and losses that are added back to net income because they do not actually use cash of the company. The items added back include amounts of depreciation on plant assets, depletion that was expensed, amortization of intangible assets such as patents and goodwill, amortization of discount on bonds payable, and losses from disposals of noncurrent assets.

**Noncash credits or revenues** Revenues and gains included in arriving at net income that do not provide cash; examples include gains from disposals of noncurrent assets, income from investments carried under the equity method, and amortization of premium on bonds payable.

**Operating activities** Generally include the cash effects of transactions and other events that enter into the determination of net income.

**Statement of cash flows** A statement that summarizes the effects on cash of the operating, investing, and financing activities of a company during an accounting period. Both inflows and outflows are included in each category. The statement of cash flows must be prepared each time an income statement is prepared.

**Working capital** Equal to current assets minus current liabilities.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

The requirement for a statement of cash flows was preceded by the requirement for the statement of changes in financial position.

The statement of cash flows is one of the major financial statements.

Investing activities are transactions with creditors and owners.

The direct method of calculating cash flows from operations is encouraged by the FASB and is the predominant method used.

## 16. Analysis using the statement of cash flows

Issuance of capital stock and the subsequent reacquisition of some of those shares would both be financing activities.

### Multiple-choice

Select the best answer for each of the following questions.

Which of the following statements is true?

- The direct method of calculating cash flows from operations starts with net income and adjusts for noncash revenues and expenses and changes in current assets and current liabilities.
- The indirect method of calculating cash flows from operations adjusts each item in the income statement to a cash basis.
- The descriptions in (a) and (b) should be reversed.
- The direct method is easier to use than the indirect method.

Investing activities include all of the following except:

- Payment of debt.
- Collection of loans.
- Making of loans.
- Sale of available-for-sale and held-to-maturity securities.

If sales on an accrual basis are USD 500,000 and accounts receivable increased by USD 30,000, the cash received from customers would be:

- USD 500,000.
- USD 470,000.
- USD 530,000.
- Cannot be determined.

Assume cost of goods sold on an accrual basis is USD 300,000, accounts payable increased by USD 20,000, and inventory increased by USD 50,000. Cash paid for merchandise is:

- USD 370,000.
- USD 230,000.
- USD 270,000.
- USD 330,000.

Assume net income was USD 200,000, depreciation expense was USD 10,000, accounts receivable increased by USD 15,000, and accounts payable increased by USD 5,000. The amount of cash flows from operating activities is:

- USD 200,000.
- USD 180,000.
- USD 210,000.
- USD 190,000.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- What are the purposes of the statement of cash flows?
- What are some of the uses of the statement of cash flows?
- What information is contained in the statement of cash flows?

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- Which activities are generally included in operating activities?
- Which activities are included in investing activities?
- Which activities are included in financing activities?
- Where should significant investing and financing activities that do not involve cash flows be reported?
- Explain the difference between the direct and indirect methods for computing cash flows from operating activities.
- What are noncash expenses? How are they treated in computing cash flows from operating activities?
- Describe the treatment of a gain on the sale of equipment in preparing a statement of cash flows under the indirect method.
- Depreciation is sometimes referred to as a source of cash. Is it a source of cash? Explain.
- Why is it unlikely that cash flows from operating activities will be equal to net income for the same period?
- If the net income for a given period is USD 25,000, does this mean there is an increase in cash of the same amount? Why or why not?
- Why might a company have positive cash flows from operating activities even though operating at a net loss?
- Indicate the type of activity each of the following transactions represents (operating, investing, or financing) and whether it is an inflow or an outflow.
  - Sold goods.
  - Purchased building.
  - Issued capital stock.
  - Received cash dividends.
  - Paid cash dividends.
  - Purchased treasury stock.
  - Sold available-for-sale securities.
  - Made a loan.
  - Paid interest on loan.
  - Paid bond principal.
  - Received proceeds of insurance settlement.
  - Made contribution to charity.
- Refer to "A broader perspective: Johnson & Johnson". Answer the following questions:
  - What was the major investing activity in 2003?
  - Was there a net negative or positive cash flow from investing activities?
  - Was the positive cash flow from operating activities large enough to pay the cash dividends?
- **Real world question** Refer to The Limited in the Annual report appendix. Does it use the direct method or indirect method of reporting cash flows from operating activities?

## 16. Analysis using the statement of cash flows

### Exercises

**Exercise A** Indicate how the following data should be reported in a statement of cash flows. A company paid USD 500,000 cash for land. A building was acquired for USD 2,500,000 by assuming a mortgage on the building.

**Exercise B** Cost of goods sold in the income statement for the year ended 2010 was USD 260,000. The balances in Merchandise Inventory and Accounts Payable were:

	2010 January 1	2010 December 31
Merchandise inventory	\$160,000	\$180,000
Accounts payable	44,000	36,000

Calculate the amount of cash paid for merchandise for 2010.

**Exercise C** Fill in the following chart, showing how increases and decreases in these accounts affect the conversion of accrual basis income to cash basis income:

	Add	Deduct
Accounts receivable		
Merchandise inventory		
Prepaid expenses		
Accounts payable		
Accrued liabilities payable		

**Exercise D** The income statement of a company shows net income of USD 200,000; merchandise inventory on January 1 was USD 76,500 and on December 31 was USD 94,500; accounts payable for merchandise purchases were USD 57,000 on January 1 and USD 68,000 on December 31. Compute the cash flows from operating activities under the indirect method.

**Exercise E** The operating expenses and taxes (including USD 80,000 of depreciation) of a company for a given year were USD 600,000. Net income was USD 350,000. Prepaid insurance decreased from USD 18,000 to USD 14,000 during the year, while wages payable increased from USD 22,000 to USD 36,000 during the year. Compute the cash flows from operating activities under the indirect method.

**Exercise F** Dividends payable increased by USD 20,000 during a year in which total dividends declared were USD 120,000. What amount appears for dividends paid in the statement of cash flows?

**Exercise G** Following are balance sheet data for Quality Merchandise, Inc.:

	December 31	
	2011	2010
Cash	\$ 47,000	\$ 26,000
Accounts receivable, net	141,000	134,000
Merchandise inventory	83,000	102,000
Prepaid expenses	9,000	11,000
Plant assets (net of accumulated depreciation)	235,000	230,000
Accounts payable	122,000	127,000
Accrued liabilities payable	40,000	41,000
Capital stock	300,000	300,000
Retained earnings	53,000	35,000

Assume that the depreciation recorded in 2011 was USD 15,000. Compute the cash spent to purchase plant assets, assuming no assets were sold or scrapped in 2011.

**Exercise H** Use the data in the previous exercise. Assume the net income for 2011 was USD 24,000, depreciation was USD 15,000, and dividends declared and paid were USD 6,000. The company paid interest of USD 2,000 and income taxes of USD 14,000. Prepare a statement of cash flows—indirect method. Also prepare any necessary supplemental schedule(s).

**Exercise I** The following data are from a company's Automobile and the Accumulated Depreciation—Automobile accounts:



Date	Automobile	Debit	Credit	Balance
Jan. 1	Balance brought forward			16,000
July 1	Traded for new auto		16,000	-0-
	New auto	31,000		
	<b>Accumulated depreciation - Automobile</b>			
Jan. 1	Balance brought forward			12,000
July 1	One-half year's depreciation		2,000	14,000
	Auto traded	14,000		-0-
Dec. 31	One-half year's depreciation		4,000	4,000

The old auto was traded for a new one, with the difference in values paid in cash. The income statement for the year shows a loss on the exchange of autos of USD 1,200.

Indicate the dollar amounts, the descriptions of these amounts, and their exact locations in a statement of cash flows—indirect method.

### Problems

**Problem A** The income statement and other data of Dunbar Carpet Outlet, Inc., follow:

**Dunbar Carpet Outlet, Inc.**  
**Income statement**  
**For the Year Ended 2010 December 31**

Sales		\$920,000
Cost of goods sold		380,000
Gross margin		\$540,000
Operating expenses (other than depreciation)	\$140,000	
Depreciation expense	40,000	180,000
Net income		\$360,000

Changes in current assets (other than cash) and current liabilities during the year were:

	Increase	Decrease
Accounts receivable		\$20,000
Merchandise inventory	\$16,000	
Prepaid insurance	8,000	
Accounts payable	28,000	
Accrued liabilities payable	4,000	

Depreciation was the only noncash item affecting net income.

- Prepare a working paper to calculate cash flows from operating activities under the direct method.
- Prepare the cash flows from operating activities section of the statement of cash flows under the direct method.
- Prove that the same cash flows amount will be obtained under the indirect method by preparing the cash flows from operating activities section of the statement of cash flows under the indirect method. You need not prepare a working paper.

**Problem B** The following comparative balance sheets and other data are for Cellular Telephone Sales, Inc.:

**Cellular Telephone Sales, Inc.**  
**Comparative balance sheets**  
**2011 December 31 and 2010**

	2011	2010
<b>Assets</b>		
Cash	\$76,105	\$51,000
Accounts receivable, net	26,075	24,250
Merchandise inventory	30,000	35,000
Supplies on hand	1,750	2,550
Prepaid expenses	1,400	1,200
Land	180,000	142,500
Equipment	270,000	300,000
Accumulated depreciation – equipment	(75,000)	(67,500)
Total assets	\$510,330	\$489,000
<b>Liabilities and stockholders' equity</b>		
Accounts payable	\$ 45,330	\$ 76,300
Salaries payable	4,000	2,000

## 16. Analysis using the statement of cash flows

Accrued liabilities payable	2,000	8,250
Long-term note payable	150,000	150,000
Common stock (\$5 par)	185,000	165,000
Paid-in capital in excess of par	32,500	-0-
Retained earnings	91,500	87,450
Total liabilities and stockholders' equity	\$510,330	\$489,000

Land was bought for USD 37,500 cash. The company intends to build a building on the land. Currently the company leases a building for its operations.

Equipment costing USD 50,000 with accumulated depreciation of USD 30,000 was sold for USD 23,500 (a gain of USD 3,500), and equipment costing USD 20,000 was purchased for cash.

Depreciation expense for the year was USD 37,500.

Common stock was issued for USD 52,500 cash.

Dividends declared and paid in 2011 totaled USD 32,950.

Net income was USD 37,000.

The company paid interest of USD 3,000 and income taxes of USD 17,000.

Prepare a statement of cash flows under the indirect method. Also prepare any necessary supplemental schedule(s).

**Problem C** Computer Associates International, Inc., is leading business software company. The company was founded in 1977 with four employees and has grown to 18,200 employees and about 4.2 billion in revenues.

The company's statements of cash flows for the years 2002 through 2004 follow. Then the relevant portion of Management's Discussion and Analysis of the statement of cash flows is provided.

<b>Consolidated statements of cash flows</b>			
<b>Operating activities:</b>	<b>Year Ended</b>	<b>March 31</b>	
	<b>2004</b>	<b>2003</b>	<b>2002</b>
		(In millions)	
Net (loss) income	<b>\$ (591)</b>	\$ 696	\$ 626
Adjustments to reconcile net (loss) income to net cash provided by operating activities:			
Depreciation and amortization	<b>1,110</b>	594	325
Provision for deferred income taxes (benefit)	<b>(350)</b>	412	107
Charge for purchased research and development	---	795	---
Compensation (gain) expense related to stock pension plans	<b>(146)</b>	30	778
Decrease (increase) in noncurrent installment accounts receivable, net	<b>956</b>	(1,039)	(422)
Decrease (increase) in deferred maintenance revenue	<b>(3)</b>	113	43
Foreign currency transaction loss – before taxes	<b>14</b>	5	11
Charge for investment write-off	---	50	---
Gain on sale of property and equipment	---	(5)	(14)
Changes in other operating assets and liabilities, net of effects of acquisitions:			
Decrease (increase) in trade and installment receivables	<b>418</b>	83	(169)
Other changes in operating assets and liabilities	<b>(25)</b>	(168)	(18)
<b>Net cash provided by operating activities</b>	<b>\$ 1,383</b>	\$ 1,566	\$ 1,267
Investing activities:			
Acquisitions, primarily purchased software, marketing rights and intangibles, net of cash acquired	<b>\$ (174)</b>	\$ (3,049)	\$ (610)
Settlements of purchases accounting liabilities	<b>(367)</b>	(429)	(57)
Purchases of property and equipment	<b>(89)</b>	(198)	(222)
Proceeds from sale of property and equipment	<b>5</b>	12	38
Disposition of businesses	<b>158</b>	---	---
Purchases of marketable securities	<b>(48)</b>	(95)	(2,703)
Sales of marketable securities	<b>40</b>	189	2,639

Increase in capitalized development costs and other	<b>(49)</b>	(36)	(29)
<b>Net cash used in investing activities</b>	<b>\$ (524)</b>	\$ (3,606)	\$ (944)
<b>Financing activities:</b>			
Dividends	<b>\$ (47)</b>	\$ (43)	\$ (44)
Purchases of treasury stock	<b>(449)</b>	---	(1,090)
Proceeds from borrowings	<b>1,049</b>	3,672	2,141
Repayment of borrowings	<b>(1,981)</b>	(776)	(1,216)
Exercise of common stock options and other	<b>50</b>	96	38
<b>Net cash provided by (used in) financing activities</b>	<b>\$ (1,378)</b>	\$ 2,949	\$ (171)
<b>(Decrease) Increase in cash and cash equivalents before effect of exchange rate changes on cash</b>	<b>\$ (519)</b>	\$ 909	\$ 152
Effect of exchange rate changes on cash	<b>(25)</b>	(1)	(4)
<b>(Decrease) Increase in cash and cash equivalents</b>	<b>\$ (544)</b>	\$ 908	\$ 148
<b>Cash and cash equivalents – Beginning of year</b>	<b>1,307</b>	399	251
<b>Cash and cash equivalents – End of the year</b>	<b>\$ 763</b>	\$ 1,307	\$ 399

## Management's discussion and analysis

### Liquidity and capital resources

Cash, cash equivalents and marketable securities totaled USD 850 million at 2004 March 31, a decrease of USD 537 million from the 2003 March 31 balance of USD 1,387 million. During fiscal year 2004, the Company used cash on hand to repay over USD 900 million in debt and repurchase approximately USD 450 million in treasury stock. Cash generated from operations for fiscal year 2001 was USD 1,383 million, a decrease of USD 183 million from the prior year's cash from operations of USD 1,566 million. Cash from operations was unfavorably impacted this current fiscal year due to higher costs associated with increased headcount and other expenses related to the Sterling acquisition.

The Company's bank credit facilities consist of a USD 1 billion four-year revolving credit facility, a USD 2 billion four-year term loan, and a 75 million British Pound Sterling denominated 364-day term loan. During the year, the Company repaid all outstanding amounts under both its USD 1.3 billion 364-day and four-year revolving credit agreements. As a reflection of its continued reduced need for bank borrowings, emphasis on debt reduction, and overall expected ability to generate cash from operations, the Company did not renew its USD 1.3 billion 364-day revolving credit facility when it expired in May 2004.

As of 2004 March 31, USD 2 billion remained outstanding under the four-year term loan and approximately USD 124 million was outstanding under the pound sterling term loan at various interest rates. There are no drawings under the Company's USD 1 billion four-year revolving credit facility. The interest rates on such debt are determined based on a ratings grid, which applies a margin to the prevailing London InterBank Offered Rate ("LIBOR"). In addition, the Company established a USD 1 billion US Commercial Paper ("CP") program in the first quarter of this year to refinance some of its debt at more attractive interest levels. As of 2004 March 31, USD 340 million was outstanding under the CP program.

The Company also utilizes other financial markets in order to maintain its broad sources of liquidity. In fiscal 2002, USD 1.75 billion of unsecured Senior Notes were issued in a transaction governed by Rule 144A of the Securities Act of 1933. Amounts borrowed, rates and maturities for each issue were USD 575 million at 6.25 per cent due 2006 April 15, USD 825 million at 6.375 per cent due 2008 April 15 and USD 350 million at 6.5 per cent due 2011 April 15. As of 2004 March 31, USD 192 million was outstanding under the Company's 6.77 per cent Senior Notes. These Notes call for annual repayment of USD 64 million each April until final maturity in 2006.

## 16. Analysis using the statement of cash flows

Unsecured and uncommitted multicurrency lines of credit are available to meet any short-term working capital needs for subsidiaries operating outside the US. These lines total USD 56 million, of which USD 14 million was drawn as of 2004 March 31.

Debt ratings for the Company's senior unsecured notes and its bank credit facilities are BBB+ and Baa1 from Standard & Poor's and Moody's Investor Services, respectively. The Company's Commercial Paper program is rated A-2 from Standard & Poor's and P-2 from Moody's. Peak borrowings under all debt facilities during fiscal year 2004 totaled approximately USD 5.4 billion with a weighted-average interest rate of 7.2 per cent.

As of 2004 March 31, the cumulative number of shares purchased under the Company's various open market Common Stock repurchase programs, including almost 16 million shares purchased in the current fiscal year, was 166 million. The remaining number of shares authorized for repurchase is approximately 34 million.

Capital resource requirements as of 2004 March 31 consisted of lease obligations for office space, computer equipment, mortgage or loan obligations and amounts due as a result of product and company acquisitions. It is expected that existing cash, cash equivalents, marketable securities, the availability of borrowings under credit lines and cash provided from operations will be sufficient to meet ongoing cash requirements.

The Company expects its long-standing history of providing extended payment terms to customers to continue under the new business model and thus does not expect a change to its future cash flow, since customers are expected to continue to finance their purchases over the contract period.

a. Explain how the company could have a net loss in 2004 and yet have a positive net cash provided by operating activities.

b. What was the reason given by management for repaying all outstanding amounts under revolving credit agreements.

c. What is the interest rate on borrowings?

d. What information would normally appear immediately below the statement of cash flows that seems to be missing?

e. Does the amount of cash provided by operating activities seem large enough to continue the present dividend payments?

f. Given the following data, calculate the cash flow per share of common stock ratio, the cash flow margin ratio, and cash flow liquidity ratio.

	(in millions)
Average number of shares of common stock outstanding	583
Net sales	4,198
Cash and marketable securities	850
Current liabilities	2,286

**Problem D** Mechan Company develops, manufactures, markets, installs and supports a wide range of standards-based LAN and WAN connectivity hardware and software products. The company's statements of cash flow for the years 2008-2010 follow. Then the relevant portion of Management's Discussion and Analysis of the statement of cash flows is provided.

**Consolidated statements of cash flows**  
**Years ended 2010 February 29, and 2009 February 28 and 2008**  
(In thousands)

	2010	2009	2008
<b>Cash flows from operating activities:</b>			
Net income	\$ 164,418	\$ 161,974	\$ 119,218
<b>Adjustments to reconcile net income to net cash provided by operating activities:</b>			

Depreciation and amortization	<b>32,061</b>	26,832	17,335
Provision for losses on accounts receivable	<b>356</b>	72	1,734
Loss on disposals of property, plant and equipment	<b>93</b>	174	113
Deferred taxes	<b>(38,766)</b>	(4,434)	(6,151)
Changes in assets and liabilities:			
Accounts receivables	<b>(55,101)</b>	(27,698)	(17,707)
Inventories	<b>(50,483)</b>	(23,080)	(8,758)
Prepaid expenses and other assets	<b>(18,844)</b>	(3,123)	1,211
Accounts payable and accrued expenses	<b>62,908</b>	11,336	22,003
Income taxes payable	<b>3,705</b>	10,476	(3,924)
<b>Net cash provided by operating activities</b>	<b>\$100,347</b>	\$152,529	\$125,074
<b>Cash flows from investing activities:</b>			
Capital expenditures	<b>\$ (65,035)</b>	\$ (63,091)	\$ (39,399)
Purchase of available-for-sale securities	<b>(79,427)</b>	(71,598)	(30,097)
Purchase of held-to-maturity securities	<b>(205,852)</b>	(282,712)	(258,517)
Materials of marketable securities	<b>208,922</b>	323,682	197,406
<b>Net cash used in investing activities</b>	<b>\$(141,392)</b>	\$ (93,719)	\$(130,607)
<b>Cash flows from financing activities:</b>			
Repayment of notes receivable from stockholders	<b>\$ 174</b>	\$ 131	\$ 66
Repurchase of common stock	<b>(1,173)</b>	(13,070)	---
Tax benefit of options exercised	<b>7,215</b>	5,712	6,980
Common stock issued to employee stock purchase plan	<b>3,323</b>	2,287	1,637
Proceeds from stock option exercise	<b>16,021</b>	4,887	7,185
<b>Net cash provided by (used for) financing activities</b>	<b>\$ 25,560</b>	\$ (53)	\$ 15,868
Effect of exchange rate changes on cash	<b>\$ 166</b>	\$ 712	\$ 161
<b>Net increase (decrease) in cash and cash equivalents</b>	<b>\$ (15,319)</b>	\$ 59,469	\$ 10,469
<b>Cash and cash equivalents, beginning of year</b>	<b>114,032</b>	54,563	44,067
<b>Cash and cash equivalents, end of year</b>	<b>\$ 98,713</b>	\$ 114,032	\$ 54,563
<b>Cash paid during the year for:</b>			
Income taxes	<b>\$ 105,233</b>	\$ 68,420	\$ 67,263

### Management's discussion and analysis

Net cash provided by operating activities was USD 100.3 million in fiscal 2010, compared to USD 152.5 million in fiscal 2009 and USD 125.1 million in fiscal 2008.

Capital investment for fiscal 2010 of USD 65.0 million included USD 9.8 million for building costs of which USD 3.4 was for the purchase of an engineering building, USD 21.4 million for engineering computer and computer related software and equipment, USD 5.5 million for manufacturing and related equipment and USD 19.0 million for expanding global sales operations. During fiscal 2009, capital expenditures of USD 63.1 million included approximately USD 8.2 million for building costs related to expanding manufacturing and distribution capacities and enlarging worldwide sales operations, USD 12.5 million for manufacturing and manufacturing support equipment and USD 15.0 million for engineering computer and computer related equipment. Another USD 15.0 million was spent in support of expanded global sales activities. During fiscal 2008, capital expenditures of USD 39.4 million included USD 3.9 million on buildings, USD 10.1 million on engineering equipment, USD 7.8 million on manufacturing capacity expansions and USD 2.0 million to equip new sales offices.

Cash, cash equivalents and marketable securities increased during fiscal 2010 to USD 407.0 million, from USD 345.9 million in the prior fiscal year. State and local municipal bonds of approximately USD 264.2 million, maturing in approximately 1.5 years, were being held by the Company at 2010 February 29.

At 2010 February 29, the Company did not have any short or long term borrowing or any significant financial commitments outstanding, other than those required in the normal course of business.

In the opinion of management, internally generated funds from operations and existing cash, cash equivalents and marketable securities will be adequate to support the Company's working capital and capital expenditures requirements for both short and long term needs.

a. Which method did the company use in arriving at net cash flows from operating activities?

16. Analysis using the statement of cash flows

- b. Did current assets other than cash increase or decrease during the year ended 2010 February 29?
- c. Did current liabilities increase or decrease during the year ended 2010 February 29?
- d. What were the main investing activities during this three-year period?
- e. What was the main source of cash from financing activities during the three-year period?
- f. Did the company pay any interest expense during the year ended 2010 February 19?
- g. Given the following data, calculate the cash flow per share of common stock ratio, the cash flow margin ratio, and the cash flow liquidity ratio. How do these ratios compare with the ratios shown for other companies in the chapter?

(in thousands)

Average number of shares of common stock outstanding	71,839
Net sales	\$ 1,069,715
Cash and marketable securities	253,540
Current liabilities	164,352

**Problem E** The following comparative balance sheets and other data are for Dayton Tent & Awning Sales, Inc.:

**Dayton Tent & Awning Sales, Inc.**  
**Comparative Balance Sheets**  
**2011 June 30 and 2010**

	2011	2010
<b>Assets</b>		
Cash	\$ 441,800	\$ 332,600
Accounts receivable, net	750,750	432,900
Merchandise inventory	819,000	850,200
Prepaid insurance	3,900	5,850
Land	312,000	351,000
Buildings	2,184,000	1,209,000
Machinery and tools	858,000	468,000
Accumulated depreciation – machinery and tools	(809,250)	(510,900)
Total assets	\$ 4,560,200	\$ 3,138,650
<b>Liabilities and stockholders' equity</b>		
Accounts payable	\$ 226,750	\$ 275,500
Accrued liabilities payable	185,800	111,700
Bank loans (due in 2009)	56,550	66,300
Mortgage bonds payable	382,200	185,250
Common stock - \$100 par	1,755,000	585,000
Paid-in capital in excess of par	58,500	-0-
Retained earnings	1,895,400	1,914,900
Total liabilities and stockholders' equity	\$ 4,560,200	\$ 3,138,650

Net income for the year was USD 128,000.

Depreciation for the year was USD 356,850.

There was a gain of USD 7,800 on the sale of land. The land was sold for USD 46,800.

The additional mortgage bonds were issued at face value as partial payment for a building valued at USD 975,000. The amount of cash paid was USD 778,050.

Machinery and tools were purchased for USD 448,500 cash.

Fully depreciated machinery with a cost of USD 58,500 was scrapped and written off.

Additional common stock was issued at USD 105 per share. The total proceeds were USD 1,228,500.

Dividends declared and paid were USD 147,500.

A payment was made on the bank loan, USD 9,750.

The company paid interest of USD 9,000 and income taxes of USD 75,000.

- a. Prepare a working paper for a statement of cash flows.

b. Prepare a statement of cash flows under the indirect method. Also prepare any necessary supplemental schedule(s).

### Alternate problems

**Alternate problem A** The following income statement and other data are for Kennesaw Auto Glass Specialists, Inc..

<b>Kennesaw auto glass specialists, Inc.</b>		
<b>Income Statement</b>		
<b>For the year ended 2010 December 31</b>		
Sales		\$450,000
Cost of goods sold		125,000
Gross margin		\$325,000
Operating expenses (other than depreciation)	\$60,000	
Depreciation expense	20,000	80,000
Net income		\$245,000

Changes in current assets (other than cash) and current liabilities during the year were:

	<b>Increase</b>	<b>Decrease</b>
Accounts receivable	\$15,000	
Merchandise inventory		\$25,000
Prepaid insurance	8,000	
Accounts payable		15,000
Accrued liabilities payable	4,000	

Depreciation was the only noncash item affecting net income.

- Prepare a working paper to calculate cash flows from operating activities under the direct method.
- Prepare the cash flows from operating activities section of the statement of cash flows under the direct method.
- Prove that the same cash flows amount is obtained under the indirect method by preparing the cash flows from operating activities section of the statement of cash flows under the indirect method. You need not prepare a working paper.

**Alternate problem B** The following information relates to Dunwoody Nursery & Garden Center, Inc. The company leases a building adjacent to its land.

<b>Dunwoody Nursery &amp; Garden Center, Inc.</b>		
<b>Comparative Balance Sheets</b>		
<b>2011 December 31 and 2010</b>		
	<b>2011</b>	<b>2010</b>
<b>Assets</b>		
Cash	\$44,500	\$ 52,000
Accounts receivable, net	59,000	60,000
Merchandise inventory	175,000	120,000
Equipment	412,500	315,000
Accumulated depreciation – equipment	(120,000)	(105,000)
Land	75,000	15,000
Total assets	\$646,000	\$457,000
<b>Liabilities and stockholders' equity</b>		
Accounts payable	\$ 43,750	\$40,750
Accrued liabilities payable	2,250	3,750
Capital stock – common - \$10 par	375,000	300,000
Paid-in capital in excess of par	150,000	75,000
Retained earnings	75,000	37,500
Total liabilities and stockholders' equity	\$646,000	\$457,000

Net income was USD 97,500 for the year.

Fully depreciated equipment costing USD 15,000 was sold for USD 3,750 (a gain of USD 3,750), and equipment costing USD 112,500 was purchased for cash.

Depreciation expense for the year was USD 30,000.

## 16. Analysis using the statement of cash flows

Land was purchased, USD 60,000.

An additional 7,500 shares of common stock were issued for cash at USD 20 per share (total proceeds, USD 150,000).

Cash dividends of USD 60,000 were declared and paid.

The company paid interest of USD 6,000 and income taxes of USD 65,000. Prepare a statement of cash flows under the indirect method. Also prepare any necessary supplemental schedule(s).

**Alternate problem C** Drexler, Inc., is an independent service organization that markets and services electronic credit card authorization and payment systems to small retail, wholesale, and professional businesses located throughout the United States. Prior to installing the company's electronic system, most of these businesses have used manual, paper-based systems to process credit card transactions or have not accepted credit cards at all. As the use of credit cards has significantly expanded, electronic processing has proven more convenient by accelerating customer purchases, lowering processing expenses, and reducing losses from fraudulent cards.

The company's account portfolio has grown through the purchase of account portfolios as well as through the internal development of accounts using telemarketing and field sales. With approximately 90,000 accounts at 2010 July 31, the company is one of the largest independent service organizations in the country.

The company's statements of cash flows for the years 2008-2010 follow. Then the relevant portion of Management's Discussion and Analysis of the statement of cash flows is provided.

### Consolidated statement of cash flows

	Year ended July 31, 2008	2009	2010
Cash flows from operating activities:			
Net cash received from merchants	\$ 19,657,697	\$ 34,353,326	\$ 67,313,124
Cash paid to vendors and employees	(14,758,040)	(28,467,472)	(49,128,150)
Interest received	22,262	310,136	1,672,714
Interest paid	(268,586)	(198,485)	(505,856)
Income taxes paid	(994,969)	(1,600,405)	(5,630,881)
Net cash provided by operating activities	\$ 3,658,354	\$ 4,397,100	\$ 13,720,951
Cash flows from investing activities:			
Purchase of merchant portfolios	\$ (8,415,055)	\$(24,576,426)	\$(31,787,725)
Purchase of property and equipment	(1,465,984)	(1,917,395)	(1,777,955)
Net cash used in investing activities	\$(9,881,039)	\$(26,493,821)	\$(33,565,680)
Cash flows from financing activities:			
Proceeds from issuance of long-term debt	\$ 7,650,000	\$ 16,450,000	\$ 305,000
Payments on long-term debt	(1,163,170)	(12,828,503)	(16,545,500)
Proceeds from issuance of common stock	---	17,098,894	140,963,115
Payments to repurchase treasury stock	(45,000)	(32,500)	(12,000)
Proceeds from minority shareholder contribution	---	---	120,000
Net cash provided by financing activities	\$6,441,830	\$ 20,687,891	\$124,830,615
Net increase (decrease) in cash and cash equivalents	\$ 219,145	\$ (1,408,830)	\$(104,985,886)
Cash and cash equivalents at beginning of year	1,664,830	1,883,975	475,145



Cash and cash equivalents at end of year      \$ 1,883,975                      \$ 475,145                      \$105,461,031

**Supplemental schedule of noncash activities:**

In connection with the purchase of merchant portfolios in fiscal years 2008 and 2009, the Company issued promissory notes totaling USD 5,061,804 and USD 80,500, respectively.

The company recognized a tax benefit of USD 318,517 for the year ended 2010 July 31, for the excess of the fair market value at the exercise date over that at the award date for stock options exercised.

In connection with the purchase of merchant portfolio in March 2008, the Company issued 312,500 shares of common stock.

In connection with an agreement between the Company and a processing back entered into simultaneously with the purchase of a merchant portfolio in March 2008, the Company issued warrants to purchase 120,000 shares of common stock.

**Reconciliation of net income to net cash provided by operating activities:**

Net income	\$2,592,444	\$3,640,155	\$ 8,625,376
Martin Howe fiscal year conversion	---	---	(356,914)
Adjustments:			
Depreciation and amortization expense	1,648,023	3,517,852	7,509,630
Provision for merchant losses	484,993	483,245	654,705
Stock award compensation and other	239,659	241,477	120,395
Deferred income taxes	(453,658)	35,982	(761,705)
Changes in assets and liabilities:			
Accounts receivable	(1,562,961)	(1,459,799)	(2,125,510)
Inventory	(50,235)	(157,087)	(186,289)
Other assets	(1,716,464)	(1,895,097)	(501,353)
Accounts payable	1,557,611	44,106	587,784
Accrued liabilities	975,065	(223,411)	210,064
Deferred revenues	(56,123)	169,677	(55,232)
Net cash provided by operating activities	\$ 3,658,354	\$ 4,397,100	\$ 13,720,951

**Management's discussion and analysis**

**Capital expenditures and investing activities**

Capital expenditures were approximately USD 1.8 million for fiscal year 2010 as compared to USD 1.9 million for fiscal year 2009 and USD 1.5 million for fiscal year 2008. The increase in capital expenditures was primarily the result of additional expenditures related to the Company's management information system, the purchase of additional credit card terminals, the Company's relocation of its office facilities and the purchase of peripheral equipment for lease to merchants. In addition to the increase in capital expenditures, the Company used USD 8.4 million, USD 24.6 million and USD 31.8 million for the purchase of merchant portfolios in fiscal years 2008, 2009 and 2010, respectively. The Company purchased five merchant portfolios in fiscal 2008, nine merchant portfolios in fiscal year 2009 and five in fiscal year 2010.

**Financing activities**

The significant increase in cash provided by financing activities for fiscal year 2009 resulted from the consummation of the Company's initial public offering in August 2008. Cash provided by financing activities for fiscal year 2009 was USD 20.7 million which reflects the net proceeds of the initial public offering after retirement of the Company's outstanding indebtedness. Additionally, the Company issued USD 15.3 million of long-term debt in connection with three of the nine merchant portfolios purchased in fiscal year 2009.

The cash provided by financing activities for fiscal 2010 reflects the Company's consummation of its second and third public offerings in October 2009 and April 2010, respectively. Net cash provided by financing activities was

## 16. Analysis using the statement of cash flows

USD 124.8 million in fiscal 2010 which reflects the net proceeds from the offerings after retirement of the Company's outstanding bank indebtedness.

### Future capital needs

Management believes that significant expenditures for the purchase of additional merchant portfolios may be required for the Company to sustain its growth in the future. Management expects to fund such purchases primarily through cash generated from operations and additional bank borrowings. Management believes the combination of these sources will be sufficient to meet the Company's anticipated liquidity needs and its growth plans through fiscal year 2008. The Company, however, may pursue additional expansion opportunities, including purchases of additional merchant portfolios, which may require additional capital, and the Company may incur, from time to time, additional short-term and long-term indebtedness or issue, in public or private transactions, equity or debt securities, the availability and terms of which will depend upon then prevailing market and other conditions.

The Company's revolving credit facility was amended and restated during fiscal year 2009 to increase the line of credit to USD 17.5 million. The Company repaid all outstanding debt related to this credit facility with the proceeds from its second public offering during fiscal year 2010. The amended agreement expires 2010 November 1, with all amounts then outstanding under the agreement due on 2010 November 1, unless the agreement is extended or the outstanding amounts have been converted to a term loan requiring equal monthly payments for 48 months.

Borrowings under the amended revolving credit facility are used to finance purchases of merchant portfolios and equipment and for working capital purposes. Borrowings are secured by substantially all the Company's assets and life insurance policies on the lives of two of the Company's executive officers.

- a. Which method is the company using to determine net cash provided by operating activities?
- b. Why does the company show the indirect method below the statement of cash flows?
- c. What is the trend of net cash provided by operating activities over the three years?
- d. How has the company increased its merchant portfolios?
- e. What items of property and equipment were acquired during the three-year period?
- f. What was the major source of the huge increase in cash and cash equivalents over the three-year period? How were the proceeds used?
- g. How does the company expect to finance future expenditures to acquire additional merchant portfolios?
- h. How are amounts secured that are borrowed under the line of credit?
- i. Given the following data, calculate the cash flow per share of common stock ratio, the cash flow margin ratio, and the cash flow liquidity ratio. (Round the net cash provided from operating activities to the nearest thousand before you calculate the ratios.) How do the ratios compare with the ones for companies illustrated in the chapter?

	<b>(in thousands)</b>
Average number of shares of common stock outstanding	28,539
Net sales	\$149,840
Cash and marketable securities	105,461
Current liabilities	6,862

**Alternate problem D** Founded in 1901, The Gillette Company is the world leader in male grooming products, a category that includes blades and razors, shaving preparations and electric shavers. Gillette also holds the number one position worldwide in selected female grooming products, such as wet shaving products and hair epilation devices. The Company is the world's top seller of writing instruments and correction products, toothbrushes and oral care appliances. In addition, the Company is the world leader in alkaline batteries.

Gillette manufacturing operations are conducted at 38 facilities in 19 countries, and products are distributed through wholesalers, retailers, and agents in over 200 countries and territories.

The company's statements of cash flows for the years 2001-2003 follow. Then the relevant portion of Management's Discussion and Analysis of the statement of cash flows is provided.

<b>Consolidated statement of cash flows (millions of dollars)</b>			
<b>Years ended 2003, 2002, 2001</b>	<b>December 31 2003</b>	<b>2002</b>	<b>2001</b>
Operating activities			
Income from continuing operations	\$ 832	\$1,248	\$1,073
Adjustments to reconcile net income to net cash provided by operating activities:			
Provision of restructuring and asset impairment	572	---	440
Depreciation and amortization	535	464	421
Other	5	(7)	(46)
Changes in assets and liabilities, excluding effects from acquisition and divestitures:			
Accounts receivable	(100)	(48)	(442)
Inventories	149	(140)	(62)
Accounts payable and accrued liabilities	(45)	65	72
Other working capital items	(136)	97	(104)
Other noncurrent assets and liabilities	(197)	(252)	(142)
Funding German pension plans	---	---	(252)
Net cash provided by operating activities	\$ 1,604	\$1,427	\$ 958
Investing activities			
Additions to property, plant and equipment	\$ (793)	\$ (889)	\$ (952)
Disposals of property, plant and equipment	41	124	65
Acquisitions of businesses, less cash acquired	---	---	(91)
Sale of businesses	539	---	200
Other	(1)	2	5
Net cash used in investing act	\$(214)	\$(763)	\$(773)
Financing activities			
Purchase of treasury stock	\$ (944)	\$(2,021)	\$(1,066)
Proceeds from sale of put options	23	72	56
Proceeds from exercise of stock options and purchase plans	36	149	126
Proceeds from long-term debt	494	1,105	500
Repayment of long-term debt	(365)	---	(12)
Increase (decrease) in loans payable	(385)	484	708
Dividends paid	(671)	(626)	(552)
Settlements of debt-related derivative contracts	279	42	9
Net cash used in financing activities	\$(1,553)	\$(795)	\$(231)
Effect of exchange rate changes on cash	\$(5)	\$(2)	\$(2)
Net cash provided by discontinued operations	130	111	45
Decrease in cash and cash equivalents	\$(18)	\$(22)	\$(3)
Cash and cash equivalents at beginning of year	80	102	105
Cash and cash equivalents at end of year	\$ 62	\$ 80	\$ 102
Supplemental disclosure of cash paid for:			
Interest	\$ 243	\$ 126	\$ 120
Income taxes	\$ 480	\$ 457	\$ 473
Noncash investing and financing activities:			
Acquisition of businesses			
Fair value of assets acquired	\$---	\$---	\$ 100
Cash paid	---	---	91
Liabilities assumed	\$ ---	\$ ----	\$ 9

### Management's discussion and analysis\*

#### Financial condition

The Company's financial condition continued to be strong in 2003. Net debt (total debt net of associated swaps, less cash and cash equivalents) decreased USD 82 million during 2003, despite additional spending under the Company's share repurchase program, due to improved cash flow from operations, proceeds from the sale of the Stationery Products business and the favorable exchange impact on foreign currency debt. Net debt at 2003 December 31, amounted to USD 4.45 billion, compared with USD 4.53 billion and USD 3.18 billion at 2002 December 31 and 2001, respectively. The market value of Gillette equity was USD 38 billion at the end of 2003,

## 16. Analysis using the statement of cash flows

compared with USD 43 billion at the end of 2002. The Company's book equity position amounted to USD 1.92 billion at the end of 2003, compared with USD 3.06 billion at the end of 2002 and USD 4.54 billion at the end of 2001. The decreases in book equity in 2003 and 2002 were due primarily to the Gillette share repurchase program, as well as to the effect of foreign currency translation.

Net cash provided by operating activities in 2003 was USD 1.60 billion, compared with USD 1.43 billion in 2002 and USD .96 billion in 2001. The current ratio of the Company was .86 for 2003, compared with ratios of 1.39 for 2002 and 1.40 for 2001. The decrease in the 2003 current ratio was primarily attributable to the Company's reclassification of all commercial paper borrowings to short-term debt, due to the Company's credit facility agreements expiring within 2001. Capital spending in 2003 amounted to USD 793 million, compared with USD 889 million in 2002 and USD 952 million in 2001. Spending in all three years reflected substantial investments in the blade and razor, Duracell and Braun Products segments.

In 2003, the Company sold the Stationery Products business for USD 528 million. In 2001, the Company made acquisitions in the Duracell Products segment for USD 100 million and sold the Jafra business for USD 200 million.

Share repurchase funding in 2003, net of proceeds received from the sale of put options on Company stock, amounted to USD 921 million, compared with USD 1,949 million in 2002 and USD 1,010 million in 2001.

Strong cash inflows from operations, proceeds from the sale of the Stationery Products business and alternate financing sources enabled the Company to reduce its USD 2.0 billion revolving credit facility in 2003 to USD 1.4 billion, expiring October 2004, and its USD 1.1 billion credit facility, expiring December 2004, to USD 550 million in January 2004. Both facilities are used by the Company to complement its commercial paper program.

In order to increase flexibility in sourcing short-term borrowing, the Company launched a USD 1 billion Euro commercial paper program in 2003. At year-end 2003, there was USD 586 million outstanding under this program and USD 1.45 billion outstanding under the US program, compared with USD 2.41 billion at the end of 2002 and USD 1.66 billion at the end of 2001.

During 2003, the Company issued Euro-denominated notes for USD 228 million, due December 2005, and entered into a USD 264 million Euro-denominated debt obligation, with redemption rights in December 2004. During 2002, the Company issued Euro-denominated notes for USD 343 million, due February 2007, and entered into a USD 325 million Euro-denominated debt obligation, with redemption rights in March 2005, and a USD 437 million Euro-denominated debt obligation, with redemption rights in January 2007. The net proceeds were used to refinance existing short-term debt associated with the Company's share repurchase program.

During 2003, both Standard & Poor's and Moody's maintained the Company's current credit ratings. Standard & Poor's rates the Company's long-term debt at AA, while Moody's rating is Aa3. The commercial paper rating is A1+ by Standard & Poor's and P1 by Moody's.

Gillette will continue to have capital available for growth through both internally generated funds and significant credit resources. The Company has substantial unused lines of credit and access to worldwide financial market sources for funds.

Source: The Gillette Company's 2000 annual report, p. 22.

- a. Does the company use the direct or indirect method of calculating net cash provided by operating activities?
- b. Determine whether each of the current assets (other than cash) and current liabilities increased or decreased during 2003.

- c. How is the company expanding its asset base?
- d. How much greater is the total market value of the company's outstanding shares of common stock than the book equity (stockholders; equity)?
- e. What is the likelihood that the company will be able to pay at least the current level of dividends in the future?
- f. Do you expect to see purchases of treasury stock increase or decrease in the future?
- g. Given the following data, calculate the cash flow per share of common stock ratio, the cash flow margin ratio, and the cash flow liquidity ratio. (Round the net cash provided by operating activities to the nearest million before you calculate the ratios.) How do the ratios compare with the ones for companies illustrated in the chapter?

	(in millions)
Average number of shares of common stock outstanding	1,059
Net sales	9,295
Cash and marketable securities	62
Current liabilities	5,471

**Alternate problem E** The following information is from the accounting records of Wescott Office Supplies, Inc., for the fiscal years 2011 and 2010:

	2011	2010
<b>Assets</b>		
Cash	\$ 66,250	\$ 61,000
Accounts receivable, net	84,000	42,000
Merchandise inventory	42,000	48,250
Prepaid expenses	7,875	12,125
Land	94,500	78,750
Buildings	199,500	147,000
Accumulated depreciation – buildings	(31,500)	(26,250)
Equipment	257,250	210,000
Accumulated depreciation- equipment	(78,750)	(63,000)
Total assets	\$641,125	\$509,875
<b>Liabilities and stockholders' equity</b>		
Accounts payable	\$73,500	\$ 47,250
Accrued liabilities payable	50,500	55,750
Five-year note payable	52,500	-0-
Capital stock -\$50 par	420,000	367,500
Retained earnings		39,375
Total liabilities and stockholders' equity	\$641,125	\$509,875

Net income for year ended 2011 June 30, was USD 56,250.

Additional land was acquired for cash, USD 15,750.

No equipment or building retirements occurred during the year.

Equipment was purchased for cash, USD 47,250.

The five-year note for USD 52,500 was issued to pay for a building erected on land leased by the company.

Stock was issued at par for cash, USD 52,500.

Dividends declared and paid were USD 51,000.

The company paid interest of USD 10,000 and income taxes of USD 40,000.

- a. Prepare a working paper for a statement of cash flows.
- b. Prepare a statement of cash flows under the indirect method. Also prepare any necessary supplemental schedule(s).

#### Beyond the numbers—Critical thinking

**Business decision A** National Sports, Inc., is a sports equipment sales company. During 2011, the company replaced USD 18,000 of its fully depreciated equipment with new equipment costing USD 23,000. Although a

## 16. Analysis using the statement of cash flows

midyear dividend of USD 5,000 was paid, the company found it necessary to borrow USD 5,000 from its bank on a two-year note. Further borrowing may be needed since the Cash account is dangerously low at year-end.

Following are the income statement and "cash flow statement", as the company's accountant calls it, for 2011.

<b>National sports, Inc.</b>		
<b>Income Statements</b>		
<b>For the year ended 2011 December 31</b>		
Sales		\$195,000
Cost of goods sold	\$140,000	
Operating expense and taxes	49,700	189,700
Net income		\$5,300

<b>National Sports, Inc.</b>		
<b>Cash flow Statement</b>		
<b>For the Year ended 2011 December 31</b>		
Cash received:		
From operations:		
Net income	\$5,300	
Depreciation	5,000	
Total cash from operations	\$10,300	
Note issued to bank	5,000	
Mortgage note issued	16,000	
Total funds provided	\$31,300	
Cash paid:		
New equipment	\$23,000	
Dividends	5,000	28,000
Increase in cash		\$ 3,300

The company's president is very concerned about what he sees in these statements and how it relates to what he knows has actually happened. He turns to you for help. Specifically, he wants to know why the cash flow statement shows an increase in cash of USD 3,300 when he knows the cash balance decreased from USD 15,000 to USD 500 during the year. Also, why is depreciation shown as providing cash?

You believe you can answer the president's questions after receiving the following condensed balance sheet data:

<b>National Sports, Inc.</b>		
<b>Comparative Balance Sheets</b>		
<b>2011 December 31, and 2010</b>		
<b>Assets</b>	<b>December 31 2011</b>	<b>2010</b>
Current assets:		
Cash	\$ 500	\$ 15,000
Accounts receivable, net	17,800	13,200
Merchandise inventory	28,500	17,500
Prepaid expenses	700	300
Total current assets	\$ 47,500	\$ 46,000
Property, plant, and equipment:		
Equipment	\$40,000	\$35,000
Accumulated depreciation – equipment	(11,000)	(24,000)
Total property, plant, and equipment	\$ 29,000	\$ 11,000
<b>Liabilities and stockholders' equity</b>		
Current liabilities:		
Accounts payable	\$ 8,700	\$ 10,000
Accrued liabilities payable	600	1,100
Total current liabilities	\$ 9,300	\$ 11,100
Long-term liabilities:		
Notes payable	5,000	-0-
Mortgage note payable	16,000	-0-
Total liabilities	\$ 30,300	\$ 11,100
Stockholders' equity:		
Common stock	\$ 40,000	\$ 40,000
Retained earnings	6,200	5,900
Total stockholders' equity	\$ 46,200	\$ 45,900
Total liabilities and stockholders' equity	\$ 76,500	\$ 57,000

Prepare a correct statement of cash flows using the indirect method that shows why National Sports, Inc., is having such a difficult time keeping sufficient cash on hand. Also, answer the president's questions. The company paid interest of USD 400 and income taxes of USD 3,000.

**Business decision case B** Following are comparative balance sheets for Hardiplank Siding, Inc.:

<b>Hardiplank Siding, Inc.</b>		
<b>Comparative Balance Sheets</b>		
<b>2011 December 31, and 2010</b>		
	<b>2011</b>	<b>2010</b>
<b>Assets</b>		
Cash	\$ 80,000	\$ 57,500
Accounts receivable, net	60,000	45,000
Merchandise inventory	90,000	52,500
Land	67,500	60,000
Buildings	90,000	90,000
Accumulated depreciation-buildings	(30,000)	(27,000)
Equipment	285,000	225,000
Accumulated depreciation – equipment	(52,500)	(48,000)
Goodwill	120,000	150,000
Total assets	\$710,000	\$605,000
<b>Liabilities and stockholders' equity</b>		
Accounts payable	\$ 95,000	\$ 65,000
Accrued liabilities payable	30,000	22,500
Capital stock	315,000	300,000
Paid-in capital – stock dividends	75,000	67,500
Paid-in capital – land donations	15,000	-0-
Retained earnings	180,000	150,000
Total liabilities and stockholders' equity	\$710,000	\$605,000

An analysis of the Retained Earnings account for the year reveals the following:

Balance, 2011 January 1	\$150,000
Add: Net income for the year	107,500
	\$257,500
Less: cash dividends	\$55,000
Stock dividends	22,500
Balance, 2011 December 31	\$180,000

a. Equipment with a cost of USD 30,000 on which USD 27,000 of depreciation had been accumulated was sold during the year at a loss of USD 1,500. Included in net income is a gain on the sale of land of USD 9,000.

b. The president of the company has set two goals for 2012: (1) increase cash by USD 40,000 and (2) increase cash dividends by USD 35,000. The company's activities in 2012 are expected to be quite similar to those of 2011, and no new fixed assets will be acquired.

Prepare a schedule showing cash flows from operating activities under the indirect method for 2011. Can the company meet its president's goals for 2012? Explain.

**Annual report analysis C** Refer to the Annual report appendix. Evaluate the ease with which The Limited will be able to maintain its dividend payments in the future at 2006 amounts. (Hint: Compare current dividend amount with net cash provided by operating activities.)

**Annual report analysis D** Refer to "A broader perspective: Johnson & Johnson" and answer the following questions:

a. Over the last three years from which major activities (operations, investing, financing) has Johnson & Johnson received net cash inflows and on which major activities have they spent the funds?

b. What relationship do you see between "Depreciation and amortization of property and intangibles" and "Additions of property, plant, and equipment"?

## 16. Analysis using the statement of cash flows

- c. What were the two major sources of cash outflows to stockholders and which was larger?
- d. By how much did the investments in marketable securities grow or shrink over the three-year period?
- e. By how much did long-term debt grow or shrink over the three-year period?
- f. If you were a stockholder, would you feel uncertain or confident that this company will be able to pay future dividends at the same rate as in the past?
- g. For what reason or reasons might the company be buying back its own stock?
- h. For the latest year, did the current assets (other than cash) and current liabilities go up or down?
- i. From the information that is available, does it appear that the company is performing well or poorly?

**Group project E** In groups of two or three students write a two-page, double-spaced paper on one of the following topics:

Which Is Better, the Direct or Indirect Method (of calculating net cash provided by operating activities)?

Analysis of the Johnson & Johnson Cash Flow Statement (shown in "A broader perspective" in this chapter)

Analysis of Cash Flow Statement for The Limited (shown in the Annual Report Appendix)

Your analysis should be convincing and have no spelling or grammatical errors. Your paper should be neat and the result of several drafts. The paper should have a cover page with the title and the authors' names. Use a word processing program if possible.

**Group project F** In a group of one or two other students, go to the library and locate *Statement of Financial Accounting Standards No. 95*, "Statement of Cash Flows", published by the Financial Accounting Standards Board.

Write a report to your instructor answering the following questions:

Why did the Board settle on cash flows instead of working capital flows?

Why did the Board strongly recommend use of the direct method?

Why did some members of the Board dissent from the final statement?

**Group project G** In a group of one or two other students, go to the library and locate *Statement of Financial Accounting Standards No. 95*, "Statement of Cash Flows", published by the Financial Accounting Standards Board.

Write a report to your instructor covering the following points:

Describe the controversy over how to treat interest and dividends received.

What is the Board's position on reporting cash flow per share? Why did they take that position?

What is the Board's position on noncash transactions? Why did they take that position?

### Using the Internet—A view of the real world

Visit the following website for the Eastman Kodak Company:

<http://www.kodak.com>

By following the instructions on the screen, locate the latest statement of cash flows and then print it. Analyze the statement and write a report to your instructor summarizing your analysis.

Visit the following website for Verizon:

<http://www.verizon.com>

By following the information on the screen, locate the latest statement of cash flows and then print it. Analyze the statement and then write a report to your instructor summarizing your analysis.

### Answers to self-test

#### True-false



**True.** Before July 1988, the statement of changes in financial position was required. This statement emphasized changes in working capital rather than changes in cash.

**True.** The statement of cash flows must be published every time an income statement is published.

**False.** Investing activities are transactions involving the acquisition or disposal of noncurrent assets. Transactions with creditors and owners are financing activities.

**False.** While the direct method is the method encouraged by the FASB, it is not the predominant method in use. In a recent study, only about 3 per cent of the companies surveyed used the direct method.

**True.** Both of these transactions are with owners and, therefore, would be financing activities.

### **Multiple-choice**

**c.** The descriptions in (a) and (b) would be correct if they were reversed. The indirect method is easier to use, and this characteristic is probably the main reason why it is used by most companies.

**a.** Payment of debt is a financing activity because it is a transaction with creditors. All of the others are investing activities because they are transactions involving the acquisition or disposal of noncurrent assets.

**b.** Sales of USD 500,000 minus the increase in accounts receivable of USD 30,000 = USD 470,000.

**d.** Cost of goods sold of USD 300,000, less the increase in accounts payable of USD 20,000, plus the increase in inventory of USD 50,000 = USD 330,000.

**a.** Net income of USD 200,000, plus depreciation of USD 10,000, less the increase in accounts receivable of USD 15,000, plus the increase in accounts payable of USD 5,000 = USD 200,000.

# 17. Analysis and interpretation of financial statements

## Learning objectives

After studying this chapter, you should be able to:

- Describe and explain the objectives of financial statement analysis.
- Describe the sources of information for financial statement analysis.
- Calculate and explain changes in financial statements using horizontal analysis, vertical analysis, and trend analysis.
- Perform ratio analysis on financial statements using liquidity ratios, long-term solvency ratios, profitability tests, and market tests.
- Describe the considerations used in financial statement analysis.

## Accountants as investment analysts

More than ever, accounting students are being hired as securities analysts, portfolio managers, strategists, consultants, or other investment specialists. Duties in these fields involve understanding the operations of the company, assessing the value of the company, and predicting its future performance. These fields can be enormously exciting and may reap tremendous monetary rewards to those who are successful. For example, Apple's stock closed at USD 21.82 per share in January 2002, and at USD 218.95 in March 2010. So, if you had invested in Apple stock in 2002 your investment would have been worth ten times as much in 2010. Not bad!

Of course, failure to understand the relationship between financial accounting information and company value can result in negative consequences as well. For example, during the dot.com boom, the stock of Webvan, an online grocer, plummeted from a high of USD 40 to just six cents within a few months as investors realized that the company could not meet expected earnings projections and was therefore highly overvalued. (Later, however, framed Webvan stock certificates were selling on Ebay for over USD 100.00 as stark symbols of the dot.com bust). In the area of investing, what accounting information can be used to separate the winners from the losers?

This is the goal of investment analysts—to understand the current value of a company and then use available information in predicting future performance. Investment analysts rely heavily on financial statements as a source of information in predicting stock price movements. Since financial statements are prepared by accountants, it is no surprise that accountants are being hired for purposes of interpreting financial information and making predictions. Given the complexity of business organizations and business transactions in today's global markets, accounting professionals no longer are solely responsible for preparing financial statements, but are being asked to interpret these statements as well.

## 17. Analysis and interpretation of financial statements

The two primary objectives of every business are solvency and profitability. Solvency is the ability of a company to pay debts as they come due; it is reflected on the company's balance sheet. Profitability is the ability of a company to generate income; it is reflected on the company's income statement. Generally, all those interested in the affairs of a company are especially interested in solvency and profitability.

This chapter discusses several common methods of analyzing and relating the data in financial statements and, as a result, gaining a clear picture of the solvency and profitability of a company. Internally, management analyzes a company's financial statements as do external investors, creditors, and regulatory agencies. Although these users have different immediate goals, their overall objective in financial statement analysis is the same—to make predictions about an organization as an aid in decision making.

### Objectives of financial statement analysis

Management's analysis of financial statements primarily relates to parts of the company. Using this approach, management can plan, evaluate, and control operations within the company. Management obtains any information it wants about the company's operations by requesting special-purpose reports. It uses this information to make difficult decisions, such as which employees to lay off and when to expand operations. Our primary focus in this chapter, however, is not on the special reports accountants prepare for management. Rather, it is on the information needs of persons outside the firm.

Investors, creditors, and regulatory agencies generally focus their analysis of financial statements on the company as a whole. Since they cannot request special-purpose reports, external users must rely on the general-purpose financial statements that companies publish. These statements include a balance sheet, an income statement, a statement of stockholders' equity, a statement of cash flows, and the explanatory notes that accompany the financial statements.

Users of financial statements need to pay particular attention to the explanatory notes, or the financial review, provided by management in annual reports. This integral part of the annual report provides insight into the scope of the business, the results of operations, liquidity and capital resources, new accounting standards, and geographic area data. Moreover, this section provides an economic outlook that an analyst may find very helpful when considering the possible future profitability of the company.

Financial statement analysis consists of applying analytical tools and techniques to financial statements and other relevant data to obtain useful information. This information reveals significant relationships between data and trends in those data that assess the company's past performance and current financial position. The information shows the results or consequences of prior management decisions. In addition, analysts use the information to make predictions that may have a direct effect on decisions made by users of financial statements.

Present and potential investors are interested in the future ability of a company to earn profits—its profitability. These investors wish to predict future dividends and changes in the market price of the company's common stock. Since both dividends and price changes are likely to be influenced by earnings, investors may predict earnings. The company's past earnings record is the logical starting point in predicting future earnings.

Some outside parties, such as creditors, are more interested in predicting a company's solvency than its profitability. The liquidity of the company affects its short-term solvency. The company's **liquidity** is its state of possessing liquid assets, such as cash and other assets easily converted to cash. Because companies must pay short-term debts soon, liquid assets must be available for their payment. For example, a bank asked to extend a 90-day

loan to a company would want to know the company's projected short-term liquidity. Of course, the company's predicted ability to repay the 90-day loan is likely to be based at least partially on its past ability to pay off debts.

Long-term creditors are interested in a company's long-term solvency, which is usually determined by the relationship of a company's assets to its liabilities. Generally, we consider a company to be solvent when its assets exceed its liabilities so that the company has a positive stockholders' equity. The larger the assets are in relation to the liabilities, the greater the long-term solvency of the company. Thus, the company's assets could shrink significantly before its liabilities would exceed its assets and destroy the company's solvency.

Investors perform several types of analyses on a company's financial statements. All of these analyses rely on comparisons or relationships of data that enhance the utility or practical value of accounting information. For example, knowing that a company's net income last year was USD 100,000 may or may not, by itself, be useful information. Some usefulness is added when we know that the prior year's net income was USD 25,000. And even more useful information is gained if we know the amounts of sales and assets of the company. Such comparisons or relationships may be expressed as:

- Absolute increases and decreases for an item from one period to the next.
- Percentage increases and decreases for an item from one period to the next.
- Percentages of single items to an aggregate total.
- Trend percentages.
- Ratios.

Earlier chapters have discussed and illustrated many of these analysis techniques. However, in this chapter we apply all of these techniques in analyzing Synotech, Inc.'s performance. This was the company introduced in Chapter 16.

Items 1 and 2 make use of comparative financial statements. **Comparative financial statements** present the same company's financial statements for one or two successive periods in side-by-side columns. The calculation of dollar changes or percentage changes in the statement items or totals is **horizontal analysis**. This analysis detects changes in a company's performance and highlights trends.

Analysts also use vertical analysis of a single financial statement, such as an income statement. **Vertical analysis** (item 3) consists of the study of a single financial statement in which each item is expressed as a percentage of a significant total. Vertical analysis is especially helpful in analyzing income statement data such as the percentage of cost of goods sold to sales.

Financial statements that show only percentages and no absolute dollar amounts are **common-size statements**. All percentage figures in a common-size balance sheet are percentages of total assets while all the items in a common-size income statement are percentages of net sales. The use of common-size statements facilitates vertical analysis of a company's financial statements.

**Trend percentages** (item 4) are similar to horizontal analysis except that comparisons are made to a selected base year or period. Trend percentages are useful for comparing financial statements over several years because they disclose changes and trends occurring through time.

Ratios (item 5) are expressions of logical relationships between items in the financial statements of a single period. Analysts can compute many ratios from the same set of financial statements. A ratio can show a relationship between two items on the same financial statement or between two items on different financial statements (e.g.

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balance sheet and income statement). The only limiting factor in choosing ratios is the requirement that the items used to construct a ratio have a logical relationship to one another.

### Sources of information

Financial information about publicly owned corporations can come from different sources such as published reports, government reports, financial service information, business publications, newspapers, and periodicals.

Public corporations must publish annual financial reports. The Annual report appendix gives such data for The Limited, Inc.. The major sections of an annual report are (not necessarily in this order):

- **Consolidated financial statements** Consolidated financial statements include a balance sheet containing two years of comparative data; an income statement containing three years of comparative data; a statement of cash flows containing three years of comparative data; and a statement of shareholders' equity containing three years of comparative data. For examples of each statement, refer to the annual report booklet.

- **Notes to consolidated financial statements** Notes to consolidated financial statements provide an in-depth look into the numbers contained in the financial statements. The notes usually contain sections on significant accounting policies, long-term debt, leases, stock option plans, etc. These explanations allow stockholders to look beyond the numbers to the events that triggered the dollar amounts recorded in the financial statements.

- **Letters to stockholders** Most annual reports are introduced with a letter to the stockholders. The letter often includes information about the company's past history, its mission, current year operating results, and the company's future goals.

- **Reports of independent accountants** The Securities and Exchange Commission (SEC) requires the financial statements of certain companies to be audited. The report of independent accountants, found at the end of the financial statements, provides assurance that the financial statements prepared by the company have been audited and are free of material misstatements. The report also may include a paragraph highlighting the significant accounting policies that the company has changed recently.

- **Management discussion and analysis** The management discussion and analysis section of the annual report provides management's view of the performance of the company. The analysis is based on the financial statements, the conditions of the industry, and ratios.

Publicly held companies must file detailed annual reports (Form 10-K), quarterly reports (Form 10-Q), and special events reports (Form 8-K) with the Securities and Exchange Commission. These reports are available to the public for a small charge and sometimes contain more detailed information than the published reports.

Financial statement information is often more meaningful when users compare it with industry norms. Two firms that provide information on individual companies and industries are Moody's Investors Service and Standard & Poor's. Dun & Bradstreet Companies, Inc., publishes *Key Business Ratios* and Robert Morris Associates publishes *Annual Statement Studies*; both provide information for specific industries. Standard & Poor's *Industry Surveys* contains background descriptions and the economic outlook for different industries.

Business publications such as *The Wall Street Journal*, *Barron's*, *Forbes*, and *Fortune* also report industry financial news. Because financial statement users must be knowledgeable about current developments in business, the information in financial newspapers and periodicals is very valuable to them.

## Horizontal analysis and vertical analysis: An illustration

The comparative financial statements of Synotech, Inc., will serve as a basis for an example of horizontal analysis and vertical analysis of a balance sheet and a statement of income and retained earnings. Recall that horizontal analysis calculates changes in comparative statement items or totals, whereas vertical analysis consists of a comparison of items on a single financial statement.

Imagine that you are a prospective investor interested in Synotech, Inc.. You have acquired the 2010 Annual Report of the company and want to perform some horizontal and vertical analyses of the financial statements.

First, we begin with the balance sheets. Exhibit 133 shows the comparative balance sheets for 2010 and 2009 in Columns (1) and (2). Take a few minutes to study the balance sheets. Then review Columns (3) and (4), which show the horizontal analysis that would be performed on the comparative balance sheets.

Column (3) shows the change that occurred in each item between 2009 December 31, and 2010 December 31. If the change between the two dates is an increase from 2009 to 2010, the change is a positive figure. If the change is a decrease, the change is a negative figure and is shown in parentheses. Column (4) shows the percentage change in each item. You can calculate the percentage change by dividing the dollar change by the dollar balance of the earlier year (2009). While examining the horizontal analysis in Exhibit 133 note that:

- Total current assets have increased USD 14.3 million, consisting largely of increases in cash, marketable securities, and other current assets despite a USD 63.0 million decrease in net receivables, while total current liabilities have increased USD 181.4 million, largely as a result of increases in the current portion of long-term debt and other accruals.
- Total liabilities have decreased USD 114.1 million, while total assets increased by USD 311.0 million.

Next, study Column (4), which expresses as a percentage the dollar change in Column (3). Frequently, these percentage increases are more informative than absolute amounts, as illustrated by the current asset and current liability changes. Although the absolute amount of current liabilities has increased tremendously over the amount of current assets, the percentages reveal that current assets increased .5 per cent, while current liabilities increased 8.6 per cent. Thus, current liabilities are increasing at a faster rate than current assets. Current assets still exceed current liabilities. This fact indicates that the company will be able to pay its debts as they come due.

Studying the percentages in Column (4) could lead to several other observations. For instance, the 6.9 per cent decrease in long-term debt indicates that interest charges will be lower in the future, having a positive effect on future net income. The 14.2 per cent increase in retained earnings could be a sign of increased dividends in the future; in addition, the increase in cash of 19 per cent could support this conclusion.

Now examine Columns (5) and (6) to see the vertical analysis that would be performed. A vertical analysis of the company's balance sheet discloses each account's significance to total assets or total equities. This comparison aids in assessing the importance of the changes in each account. Columns (5) and (6) in Exhibit 133 express the dollar amount of each item in Columns (1) and (2) as a percentage of total assets or equities. For example, although other assets declined USD 6.3 million in 2010, the decrease of 1.4 per cent in the account represents only approximately 4.8 per cent of total assets and, therefore, probably does not have great significance. Vertical analysis also shows that total debt financing decreased from 78.0 per cent of total equities (liabilities and stockholders' equity) in 2009, to 74.3 per cent in 2010. At the same time, the percentage of stockholder financing to total assets of the company increased from 22.0 per cent to 25.7 per cent.

### Synotech, Inc.

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### Comparative balance sheets

2010 December 31, and 2009

Assets	December 31		Horizontal Analysis	Analysis	Vertical Analysis	
	(1) 2010	(2) 2009	(3) Increase or (Decrease) Dollars*	(4) 2010 over 2009 Per cent*	(5) Per cent of Total Assets 2010	(6) 2009
<b>Current assets</b>						
Cash and cash equivalents	\$ 298.0	\$ 250.5	\$47.5	19.0%	3.1 %	2.7 %
Marketable securities	71.3	57.5	13.8	24.0	0.8	0.6
Receivables, net	1,277.3	1,340.3	(63.0)	(4.7)	13.5	14.6
Inventories	924.8	929.8	(5.0)	(0.5)	9.8	10.1
Other current assets	275.3	254.3	21.0	8.3	2.9	2.8
Total current assets	\$2,846.7	\$2,832.4	\$14.3	0.5	30.0	30.9
Property, plant and equipment, net	2,914.7	2,586.2	328.5	12.7	30.7	28.2
Goodwill and other intangibles, net	3,264.5	3,290.0	(25.5)	(0.8)	34.4	35.9
Other assets	455.9	462.2	(6.3)	(1.4)	4.8	5.0
Total assets	\$9,481.8	\$9,170.8	\$311.0	3.4	100.0	100.0
<b>Liabilities and shareholders' equity</b>						
<b>Current liabilities</b>						
Notes and loans payable	\$ 206.8	\$ 245.3	\$ (38.5)	(15.7)	2.2	2.7
Current portion of long-term debt	132.5	44.4	88.1	198.4	1.4	0.5
Accounts payable	902.0	886.4	15.6	1.8	9.5	9.7
Accrued income taxes	111.7	92.1	19.6	21.3	1.2	1.0
Other accruals	932.2	835.6	96.6	11.6	9.8	9.1
Total current liabilities	\$2,285.2	\$2,103.8	\$181.4	8.6	24.1	22.9
Long-term debt	3,344.2	3,590.4	(246.2)	(6.9)	35.3	39.2
Deferred income taxes	281.2	284.8	(3.6)	(1.3)	3.0	3.1
Other liabilities	1,130.4	1,176.1	(45.7)	(3.9)	11.9	12.8
Total liabilities	\$7,041.0	\$7,155.1	\$(114.1)	(1.6)	74.3	78.0
<b>Shareholders' equity</b>						
Preferred stock	\$ 471.2	\$ 484.2	\$ (13.0)	(2.7)	5.0	5.3
Common stock, \$1.20 par value (500,000,000 shares authorized, 183,213,295 shares issued)	219.9	219.9	0.0	0.0	2.3	2.4
Additional paid-in capital	1,321.9	1,240.4	81.5	6.6	13.9	13.5
Retained earnings	3,277.1	2,870.6	406.5	14.2	34.6	31.3
Cumulative translation adjustments	(641.6)	(615.6)	(26.0)	4.2	-6.8	-6.7
Unearned compensation	\$4,648.5	\$4,199.5	\$449.0	10.7	49.0	45.8
Treasury stock, at cost	(1,762.6)	(1,30.2)	(32.4)	1.9	-18.6	-18.9
Total shareholders' equity	\$2,440.8	\$2,015.7	\$425.1	21.1	25.7	22.0
Total liabilities and stockholders equity	\$9,481.8	\$9,170.8	\$311.0	3.4	100.0	100.0

\*Dollars = (1) – (2); Per cent = (3)/(2)

#### Exhibit 133: Comparative balance sheets

Exhibit 134 provides the information needed to analyze Synotech's comparative statements of income and retained earnings. Such a statement merely combines the income statement and the statement of retained earnings. Columns (7) and (8) in Exhibit 134 show the dollar amounts for the years 2010 and 2009, respectively. Study these

statements for a few minutes. Then examine Columns (9) and (10) which show the horizontal analysis that would be performed on the company's comparative statements of income and retained earnings. Columns (9) and (10) show the absolute and percentage increase or decrease in each item from 2009 to 2010. The absolute change is determined by deducting the 2009 amount from the 2010 amount. If the change between two dates is an increase from 2009 to 2010, the change is a positive figure. If the change is a decrease, the change is a negative figure and is shown in parentheses. You calculate the percentage change by dividing the dollar change by the dollar amount for 2009.

<b>Synotech, Inc.</b>						
<b>Comparative statements of income and retained earnings</b>						
<b>For the years ended 2010 December 31, and 2009</b>						
<b>(USD millions)</b>						
<b>Year ended</b>	<b>December 31</b>	<b>Horizontal analysis</b>		<b>Vertical analysis</b>		
		<b>Increase or (decrease)</b>	<b>(10)</b>	<b>Per cent net sales</b>		
<b>(7)</b>	<b>(8)</b>	<b>(9)</b>	<b>(10)</b>	<b>(11)</b>	<b>(12)</b>	
<b>2007</b>	<b>2006</b>	<b>Dollars*</b>	<b>Per cent*</b>	<b>2010</b>	<b>2009</b>	
Net sales	\$10,498.8	\$10,029.8	\$469.0	4.7%	100.0%	100.0%
Cost of goods sold	5,341.3	5,233.7	117.6	2.3	50.9	52.1
Gross profit	\$5,157.5	\$4,806.1	\$351.4	7.3	49.1	47.9
Selling, general and administrative expenses	3,662.5	3,455.5	207.0	6.0	34.9	34.5
Provision for restructured operations	---	552.6	(552.6)	(100.0)	0.0	5.5
Other expense, net	112.6	115.3	(2.7)	(2.3)	1.1	1.1
Interest expense, net of interest income of \$41.2 and \$36.7, respectively	236.9	246.5	(9.6)	(3.9)	2.3	2.5
Income before income taxes	\$1,145.5	\$436.2	\$709.3	162.6	10.9	4.3
Provision for income taxes	383.5	229.8	153.7	66.9	3.7	2.3
Net income	\$762.0	\$206.4	\$555.6	269.2	7.3	2.1
Retained earnings, January 1	2,870.6	2,996.0	(125.4)	(4.2)		
Total	\$3,632.6	\$3,202.4	\$430.2	13.4		
Dividends declared:						
Series B convertible preference stock, net of income taxes	25.1	25.3	(0.2)	(0.8)		
Preferred stock	0.6	0.6	0.0	0.0		
Common stock	329.8	305.9	23.9	7.8		
Retained earnings, December 31	\$3,277.1	\$2,870.6	\$406.5	14.2		

\*Dollars = (7) – (8); Per cent = (9)/(8)

#### Exhibit 134: Comparative statements of income and retained earnings

Having completed the horizontal analysis and vertical analysis of Synotech's balance sheet and statement of income and retained earnings, you are ready to study trend percentages and ratio analysis. The last section in this chapter discusses some final considerations in financial statement analysis. Professional financial statement analysts use several tools and techniques to determine the solvency and profitability of companies.

The horizontal analysis shows that sales increased a total of USD 469.0 million, an increase of 4.7 per cent. Since cost of goods sold increased by a much smaller amount (USD 117.6 million), gross profit increased by USD 351.4, or 7.3 per cent. The USD 552.6 million expense in 2009 was the result of a provision for restructured operations. Although this is not a recurring expense, it does not classify as an extraordinary expense and is treated as part of income from continuing operations.

Now look at Columns (11) and (12) to see the vertical analysis that would be performed. Columns (11) and (12) express the dollar amount of each item in Columns (7) and (8) as a percentage of net sales. Even though cost of goods sold increased in 2010, it remained a fairly constant percentage of net sales. Therefore, gross profit as a



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percentage of net sales increased only slightly. The percentage of expenses to net sales decreased somewhat, thus yielding an increase in income before income taxes as a percentage of net sales.

### Trend percentages

Trend percentages, also referred to as index numbers, help you to compare financial information over time to a base year or period. You can calculate trend percentages by:

- Selecting a base year or period.
- Assigning a weight of 100 per cent to the amounts appearing on the base-year financial statements.
- Expressing the corresponding amounts on the other years' financial statements as a percentage of base-year or period amounts. Compute the percentages by dividing nonbase-year amounts by the corresponding base-year amounts and then multiplying the result by 100.

The following information for Synotech illustrates the calculation of trend percentages:

(USD millions)	2008	2009	2010
Net sales	\$ 9,105.5	\$10,029.8	\$10,498.8
Cost of goods sold	4,696.0	5,223.7	5,341.3
Gross profit	\$ 4,409.5	\$ 4,806.1	\$ 5,157.5
Operating expenses	3,353.6	4,369.9	4,012.0
Income before income taxes	\$ 1,055.9	\$ 436.2	\$ 1,145.5

If 2008 is the base year, to calculate trend percentages for each year divide net sales by USD 9,105.5 million; cost of goods sold by USD 4,696.0 million; gross profit by USD 4,409.5 million; operating expenses by USD 3,353.6 million; and income before income taxes by USD 1,055.9 million. After all divisions have been made, multiply each result by 100. The resulting percentages reflect trends as follows:

	2008	2009	2010
Net sales	100.0%	119.2%	115.3%
Cost of goods sold	100.0	111.2	113.7
Gross profit	100.0	109.0	117.0
Operating expenses	100.0	130.3	119.6
Income before income taxes	100.0	41.3	108.5

These trend percentages indicate the changes taking place in the organization and highlight the direction of these changes. For instance, the percentage of sales is increasing each year compared to the base year. Cost of goods sold increased at a lower rate than net sales in 2008 and 2010, causing gross profit to increase at a higher rate than net sales. Operating expenses in 2009 increased due to the provision for restructured operations, causing a significant decrease in income before income taxes. Percentages provide clues to an analyst about which items need further investigation or analysis. In reviewing trend percentages, a financial statement user should pay close attention to the trends in related items, such as the cost of goods sold in relation to sales. Trend analysis that shows a constantly declining gross margin (profit) rate may be a signal that future net income will decrease.

As useful as trend percentages are, they have one drawback. Expressing changes as percentages is usually straightforward as long as the amount in the base year or period is positive—that is, not zero or negative. Analysts cannot express a USD 30,000 increase in notes receivable as a percentage if the increase is from zero last year to USD 30,000 this year. Nor can they express an increase from a loss last year of USD 10,000 to income this year of USD 20,000 in percentage terms.

Proper analysis does not stop with the calculation of increases and decreases in amounts or percentages over several years. Such changes generally indicate areas worthy of further investigation and are merely clues that may lead to significant findings. Accurate predictions depend on many factors, including economic and political conditions; management's plans regarding new products, plant expansion, and promotional outlays; and the

expected activities of competitors. Considering these factors along with horizontal analysis, vertical analysis, and trend analysis should provide a reasonable basis for predicting future performance.

## Ratio analysis

Logical relationships exist between certain accounts or items in a company's financial statements. These accounts may appear on the same statement or on two different statements. We set up the dollar amounts of the related accounts or items in fraction form called ratios. These ratios include: (1) liquidity ratios; (2) equity, or long-term solvency, ratios; (3) profitability tests; and (4) market tests.

Liquidity ratios indicate a company's short-term debt-paying ability. Thus, these ratios show interested parties the company's capacity to meet maturing current liabilities.

**Current (or working capital) ratio** Working capital is the excess of current assets over current liabilities. The ratio that relates current assets to current liabilities is the **current (or working capital) ratio**. The current ratio indicates the ability of a company to pay its current liabilities from current assets and, thus, shows the strength of the company's working capital position.

You can compute the current ratio by dividing current assets by current liabilities:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

The ratio is usually stated as a number of dollars of current assets to one dollar of current liabilities (although the dollar signs usually are omitted). Thus, for Synotech in 2010, when current assets totaled USD 2,846.7 million and current liabilities totaled USD 2,285.2 million, the ratio is 1.25:1, meaning that the company has USD 1.25 of current assets for each USD 1.00 of current liabilities.

The current ratio provides a better index of a company's ability to pay current debts than does the absolute amount of working capital. To illustrate, assume that we are comparing Synotech to Company B. For this example, use the following totals for current assets and current liabilities:

	<b>Synotech</b>	<b>Company B</b>
Current assets (a)	\$ 2,846.7	\$120.0
Current liabilities (b)	2,285.2	53.2
Working capital (a – b)	\$ 561.5	\$ 66.8
Current ratio (a/b)	1.25:1	2.26:1

Synotech has eight times as much working capital as Company B. However, Company B has a superior debt-paying ability since it has USD 2.26 of current assets for each USD 1.00 of current liabilities.

Short-term creditors are particularly interested in the current ratio since the conversion of inventories and accounts receivable into cash is the primary source from which the company obtains the cash to pay short-term creditors. Long-term creditors are also interested in the current ratio because a company that is unable to pay short-term debts may be forced into bankruptcy. For this reason, many bond indentures, or contracts, contain a provision requiring that the borrower maintain at least a certain minimum current ratio. A company can increase its current ratio by issuing long-term debt or capital stock or by selling noncurrent assets.

A company must guard against a current ratio that is too high, especially if caused by idle cash, slow-paying customers, and/or slow-moving inventory. Decreased net income can result when too much capital that could be used profitably elsewhere is tied up in current assets.

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Refer to Exhibit 133. The Synotech data in Column (4) indicate that current liabilities are increasing more rapidly than current assets. We could also make such an observation directly by looking at the change in the current ratio. Synotech's current ratios for 2010 and 2009 follow:

(USD millions)	December 31		Amount of increase
	2010	2009	
Current assets (a)	\$2,846.7	\$,2832.4	14.3
Current liabilities (b)	2,285.6	2,103.8	181.4
Working capital (a – b)	\$ 561.5	\$ 728.6	\$(167.1)
Current ratio (a/b)	1.25:1	1.35:1	

Synotech's working capital decreased by USD 167.1 million, or 22.9 per cent (USD 167.1/USD 728.6), and its current ratio decreased from 1.35:1 to 1.25:1. Together, these figures reflect that its current liabilities increased faster than its current assets.

**Acid-test (quick) ratio** The current ratio is not the only measure of a company's short-term debt-paying ability. Another measure, called the **acid-test (quick) ratio**, is the ratio of quick assets (cash, marketable securities, and net receivables) to current liabilities. Analysts exclude inventories and prepaid expenses from current assets to compute quick assets because they might not be readily convertible into cash. The formula for the acid-test ratio is:

$$\text{Acid-test ratio} = \frac{\text{Quick assets}}{\text{Current liabilities}}$$

Short-term creditors are particularly interested in this ratio, which relates the pool of cash and immediate cash inflows to immediate cash outflows.

The acid-test ratios for 2010 and 2009 for Synotech are:

(USD millions)	December 31		Amount of increase or (decrease)
	2010	2009	
Quick assets (a)	\$1,646.6	\$1,648.3	\$ (1.7)
Current liabilities (b)	2,285.6	2,103.8	181.8
Net quick assets (a – b)	\$ (639.0)	\$ (455.5)	\$(183.5)
Acid-test ratio (a/b)	.72:1	.78:1	

In deciding whether the acid-test ratio is satisfactory, investors consider the quality of the marketable securities and receivables. An accumulation of poor-quality marketable securities or receivables, or both, could cause an acid-test ratio to appear deceptively favorable. When referring to marketable securities, poor quality means securities likely to generate losses when sold. Poor-quality receivables may be uncollectible or not collectible until long past due. The quality of receivables depends primarily on their age, which can be assessed by preparing an aging schedule or by calculating the accounts receivable turnover. (Covered in Chapter 9.)

**Cash flow liquidity ratio** Another approach to measuring short-term liquidity is the **cash flow liquidity ratio**. The numerator, as an approximation of cash resources, consists of (1) cash and marketable securities, or liquid current assets, and (2) net cash provided by operating activities, or the cash generated from the company's operations. This reflects the company's ability to sell inventory and collect accounts receivable. The formula for the cash flow liquidity ratio is:

$$\frac{\text{Cash also marketable securities} + \text{Net cash provided by operating activities}}{\text{Current liabilities}}$$

For 2010, Synotech has USD 298.0 million in cash and cash equivalents, USD 71.3 million in marketable securities, USD 2,285.2 million in current liabilities, and USD 1,101.0 million in cash provided by operating activities (taken from the statement of cash flows in its annual report). Its cash flow liquidity ratio is:

$$\frac{\text{USD } 298.0 + \text{USD } 71.3 + \text{USD } 1,101.0}{\text{USD } 2,285.2} = .64 \text{ time}$$

This indicates that the company is going to have to rely on some other sources of funding to pay its current liabilities. The company's liquid current assets will only cover about two-thirds of the current liabilities. Possibly net cash provided by operations will be substantially higher in 2011.

**Accounts receivable turnover** is the relationship between the amount of an asset and some measure of its use. **Accounts receivable turnover** is the number of times per year that the average amount of receivables is collected. To calculate this ratio, divide net credit sales (or net sales) by average net accounts receivable; that is, accounts receivable after deducting the allowance for uncollectible accounts:

$$\text{Accounts receivable turnover} = \frac{\text{Net credit sales (net sales)}}{\text{Average net accounts receivable}}$$

When a ratio compares an income statement item (like net credit sales) with a balance sheet item (like net accounts receivable), the balance sheet item should be an average. Ideally, analysts calculate average net accounts receivable by averaging the end-of-month balances or end-of-week balances of net accounts receivable outstanding during the period. The greater the number of observations used, the more accurate the resulting average. Often, analysts average only the beginning-of-year and end-of-year balances because this information is easily obtainable

## 17. Analysis and interpretation of financial statements

from comparative financial statements. Sometimes a formula calls for the use of an average balance, but only the

year-end amount is available. Then the analyst must use the year-end amount.<sup>51</sup>

In theory, the numerator of the accounts receivable turnover ratio consists of only net credit sales because those are the only sales that generate accounts receivable. However, if cash sales are relatively small or their proportion to total sales remains fairly constant, analysts can obtain reliable results by using total net sales. In most cases, the analyst may have to use total net sales because the separate amounts of cash sales and credit sales are not reported on the income statement.

Synotech's accounts receivable turnover ratios for 2010 and 2009 follow. Net accounts receivable on 2009 January 1, totaled USD 1,259.5 million.

(USD millions)	December 31		Amount of increase
	2010	2009	
Net sales (a)	\$10,498.8	\$10,029.8	\$469.0
Net accounts receivable:			
January 1	\$ 1,340.3	\$ 1,259.5	\$ 80.8
December 31	1,277.3	1,340.3	(63.0)
Total (b)	\$ 2,617.6	\$ 2,599.8	\$ 17.8
Average net receivables (c) (b/2 = c)	\$ 1,308.8	\$1,299.9	
Turnover of accounts receivable (a/c)	8.02	7.72	

The accounts receivable turnover ratio provides an indication of how quickly the company collects receivables. The accounts receivable turnover ratio for 2010 indicates that Synotech collected, or turned over, its accounts receivable slightly more than eight times. The ratio is better understood and more easily compared with a company's credit terms if we convert it into a number of days, as is illustrated in the next ratio.

**Number of days' sales in accounts receivable** The **number of days' sales in accounts receivable** ratio is also called the average collection period for accounts receivable. Calculate it as follows:

$$\text{Number of days' sales per accounts receivable} = \frac{\text{Number of days per year (365)}}{\text{Accounts receivable turnover}}$$

The turnover ratios for Synotech show that the number of days' sales in accounts receivable decreased from about 47 days (365/7.72) in 2009 to 46 days (365/8.02) in 2010. The change means that the average collection period for the company's accounts receivable decreased from 47 to 46 days.

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### An accounting perspective:

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#### Business insight

The number of days' sales in accounts receivable ratio measures the average liquidity of accounts receivable and indicates their quality. Generally, the shorter the collection period, the higher the quality of receivables. However, the average collection period varies by industry; for example, collection periods are short in utility companies and much longer in some retailing companies. A comparison of the average collection period with the credit terms extended customers by the company provides further insight into the quality of the accounts receivable. For example, receivables with terms of 2/10, n/30 and an average collection period of 75 days need to be investigated further. It is important to determine why customers are paying their accounts much later than expected.

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**Inventory turnover** A company's inventory turnover ratio shows the number of times its average inventory is sold during a period. You can calculate **inventory turnover** as follows:

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

When comparing an income statement item and a balance sheet item, measure both in comparable dollars. Notice that we measure the numerator and denominator in cost rather than sales dollars. (Earlier, when calculating accounts receivable turnover, we measured both numerator and denominator in sales dollars.) Inventory turnover relates a measure of sales volume to the average amount of goods on hand to produce this sales volume.

Synotech's inventory on 2009 January 1, was USD 856.7 million. The following schedule shows that the inventory turnover decreased slightly from 5.85 times per year in 2009 to 5.76 times per year in 2010. To convert these turnover ratios to the number of days it takes the company to sell its entire stock of inventory, divide 365 by the inventory turnover. Synotech's average inventory sold in about 63 and 62 (365/5.76 and 365/5.85) in 2010 and 2009, respectively.

(USD millions)	December 31		Amount of increase or (decrease)
	2010	2009	
Cost of goods sold (a)	\$5,341.3	\$5,223.7	\$117.6
Merchandise inventory:			
January 1	\$929.8	\$856.7	\$ 73.1
December 31	924.8	929.8	(5.0)
Total (b)	\$1,854.6	\$1,786.5	\$ 68.1
Average inventory (c) (b/2 = c)	\$927.3	\$893.3	
Turnover of inventory (a/c)	5.76	5.85	

Other things being equal, a manager who maintains the highest inventory turnover ratio is the most efficient. Yet, other things are not always equal. For example, a company that achieves a high inventory turnover ratio by keeping extremely small inventories on hand may incur larger ordering costs, lose quantity discounts, and lose sales due to lack of adequate inventory. In attempting to earn satisfactory income, management must balance the costs of inventory storage and obsolescence and the cost of tying up funds in inventory against possible losses of sales and other costs associated with keeping too little inventory on hand.

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### An accounting perspective:

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#### Business insight

Cabletron Systems develops, manufactures, installs, and supports a wide range of standards-based LAN and WAN connectivity hardware and software products. For the year ended 2009 December 31, both its number of day's sales in accounts receivable and its inventory turnover rate increased as compared to the prior year. In its 2009 annual report, the company explained these increases as follows:

Accounts receivable, net of allowance for doubtful accounts, were USD 210.9 million, or 66 days of sales outstanding, at 2009 December 31 compared to USD 228.4 million at 2008 December 31, or 54 days sales outstanding. The increase in days of sales outstanding was a result of the timing of sales and related collections.

Worldwide inventories were USD 98.1 million at 2009 December 31 or 63 days of inventory, compared to USD 85.0 million, or 37 days of inventory, at 2008 December 31. The increase of days in inventory was due to the increase in finished goods inventory purchased to protect against an anticipated shortage of supply components.

**Total assets turnover** **Total assets turnover** shows the relationship between the dollar volume of sales and the average total assets used in the business. We calculate it as follows:

$$\text{Total assets turnover} = \frac{\text{Net sales}}{\text{Average total assets}}$$

This ratio measures the efficiency with which a company uses its assets to generate sales. The larger the total assets turnover, the larger the income on each dollar invested in the assets of the business. For Synotech, the total asset turnover ratios for 2010 and 2009 follow. Total assets as of 2009 January 1, were USD 7,370.9 million.

(USD millions)	2010	2009	Amount of increase
Net sales (a)	\$ 10,498.8	\$ 10,029.8	\$ 469.0
Total assets:			
January 1	\$9,170.8	\$7,370.9	\$1,799.9
December 31	9,481.8	9,170.8	311.0
Total (b)	\$18,652.6	\$16,541.7	\$2,110.9
Average total assets (c) (b/2 = c)	\$9,331.8	\$8,270.9	
Turnover of total assets (a/c)	1.13:1	1.21:1	

Each dollar of total assets produced USD 1.21 of sales in 2009 and USD 1.13 of sales in 2010. In other words, between 2009 and 2010, the company had a decrease of USD .08 of sales per dollar of investment in assets.

Equity, or long-term solvency, ratios show the relationship between debt and equity financing in a company.

**Equity (stockholders' equity) ratio** The two basic sources of assets in a business are owners (stockholders) and creditors; the combined interests of the two groups are total equities. In ratio analysis, however, the term equity generally refers only to stockholders' equity. Thus, the **equity (stockholders' equity) ratio** indicates the proportion of total assets (or total equities) provided by stockholders (owners) on any given date. The formula for the equity ratio is:

$$\text{Equity ratio} = \frac{\text{Stockholders' equity}}{\text{Total assets (total equities)}}$$

Synotech's liabilities and stockholders' equity from Exhibit 133 follow. The company's equity ratio increased from 22.0 per cent in 2009 to 25.7 per cent in 2010. Exhibit 133 shows that stockholders increased their proportionate equity in the company's assets due largely to the retention of earnings (which increases retained earnings).

(USD millions)	2010		2009	
	December 31	Per cent	December 31	Per cent
Current liabilities	\$2,285.2	24.1%	\$2,103.8	22.9%
Long-term liabilities	4,755.8	50.2	5,051.3	55.1
Total liabilities	\$7,041.0	74.3	\$7,155.1	78.0
Total stockholders' equity	2,440.8	25.7	2,015.7	22.0
Total equity (equal to total assets)	\$9,481.8	100%	\$9,170.8	100.0%

The equity ratio must be interpreted carefully. From a creditor's point of view, a high proportion of stockholders' equity is desirable. A high equity ratio indicates the existence of a large protective buffer for creditors in the event a



## 17. Analysis and interpretation of financial statements

company suffers a loss. However, from an owner's point of view, a high proportion of stockholders' equity may or may not be desirable. If the business can use borrowed funds to generate income in excess of the net after-tax cost of the interest on such funds, a lower percentage of stockholders' equity may be desirable.

To illustrate the effect of higher leveraging (i.e. a larger proportion of debt), assume that Synotech could have financed an increase in its productive capacity with USD 40 million of 6 per cent bonds instead of issuing 5 million additional shares of common stock. The effect on income for 2010 would be as follows, assuming a federal income tax rate of 40 per cent:

Net income as presently stated (Exhibit 134)	\$762,000,000
Deduct additional interest on debt (0.06 x \$40 million)	2,400,000
	\$759,600,000
Add reduced taxes due to interest deduction (.4 x 2,400,000)	960,000
Adjusted net income	\$760,560,000

As shown, increasing leverage by issuing bonds instead of common stock reduces net income. However, there are also fewer shares of common stock outstanding. Assume the company has 183 million shares of common stock outstanding. Earnings per share (EPS) with the additional debt would be USD 4.16 (or USD 760,560,000/183 million shares), and EPS with the additional stock would be USD 4.05 (or USD 762,000,000/188 million shares).

Since investors place heavy emphasis on EPS amounts, many companies in recent years have introduced large portions of debt into their capital structures to increase EPS, especially since interest rates have been relatively low in recent years.

We should point out, however, that too low a percentage of stockholders' equity (too much debt) has its dangers. Financial leverage magnifies losses per share as well as EPS since there are fewer shares of stock over which to spread the losses. A period of business recession may result in operating losses and shrinkage in the value of assets, such as receivables and inventory, which in turn may lead to an inability to meet fixed payments for interest and principal on the debt. As a result, the company may be forced into liquidation, and the stockholders could lose their entire investments.

**Stockholders' equity to debt (debt to equity) ratio** Analysts express the relative equities of owners and creditors in several ways. To say that creditors held a 74.3 per cent interest in the assets of Synotech on 2010 December 31, is equivalent to saying stockholders held a 25.7 per cent interest. Another way of expressing this relationship is the **stockholders' equity to debt ratio**:

$$\text{Stockholders' equity for debt ratio} = \frac{\text{Stockholders' equity}}{\text{Total debt}}$$

Such a ratio for Synotech would be .28:1 (or USD 2,015.7 million/USD 7,155.1 million) on 2009 December 31, and .35:1 (or USD 2,440.8 million/USD 7,041.0 million) on 2010 December 31. This ratio is often inverted and called the **debt to equity ratio**. Some analysts use only long-term debt rather than total debt in calculating these ratios. These analysts do not consider short-term debt to be part of the capital structure since it is paid within one year.

Profitability is an important measure of a company's operating success. Generally, we are concerned with two areas when judging profitability: (1) relationships on the income statement that indicate a company's ability to recover costs and expenses, and (2) relationships of income to various balance sheet measures that indicate the company's relative ability to earn income on assets employed. Each of the following ratios utilizes one of these relationships.

**Rate of return on operating assets** The best measure of earnings performance without regard to the sources of assets is the relationship of net operating income to operating assets, the **rate of return on operating assets**. This ratio shows the earning power of the company as a bundle of assets. By disregarding both nonoperating assets and nonoperating income elements, the rate of return on operating assets measures the profitability of the company in carrying out its primary business functions. We can break the ratio down into two elements—the operating margin and the turnover of operating assets.

**Operating margin** reflects the percentage of each dollar of net sales that becomes net operating income. Net operating income excludes **nonoperating income elements** such as extraordinary items, cumulative effect on prior years of changes in accounting principle, losses or gains from discontinued operations, interest revenue, and interest expense. Another name for **net operating income** is "income before interest and taxes" (IBIT). The formula for operating margin is:

$$\text{Operating margin} = \frac{\text{Net operating income}}{\text{Net sales}}$$

**Turnover of operating assets** shows the amount of sales dollars generated for each dollar invested in operating assets. **Operating assets** are all assets actively used in producing operating revenues. Typically, we use year-end operating assets, even though in theory an average would be better. **Nonoperating assets** are owned by a company but not used in producing operating revenues, such as land held for future use, a factory building rented to another company, and long-term bond investments. Analysts do not use these nonoperating assets in evaluating earnings performance. Nor do they use total assets that include nonoperating assets not contributing to the generation of sales. The formula for the turnover of operating assets is:

$$\text{Turnover of operating assets} = \frac{\text{Net sales}}{\text{Operating assets}}$$

The rate of return on operating assets of a company is equal to its operating margin multiplied by turnover of operating assets. The more a company earns per dollar of sales and the more sales it makes per dollar invested in operating assets, the higher is the return per dollar invested. To find the rate of return on operating assets, use the following formulas:

$$\text{Operating margin} \times \text{Turnover of operating assets} = \text{Rate of return on operating assets}$$

or

$$\text{Rate of return on operating assets} = \frac{\text{Net operating income}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Operating assets}}$$

Because net sales appears in both ratios (once as a numerator and once as a denominator), we can cancel it out, and the formula for rate of return on operating assets becomes:

$$\text{Rate of return on operating assets} = \frac{\text{Net operating income}}{\text{Operating assets}}$$

For analytical purposes, the formula should remain in the form that shows margin and turnover separately, since it provides more information.

The rates of return on operating assets for Synotech for 2010 and 2009 are:

(USD millions)	2010	2009	Amount of increase or (decrease)
Net operating income (a)*	\$ 1,382.4	\$ 682.7	\$699.7
Net sales (b)	\$10,498.8	\$10,029.8	\$469.0
Operating assets (c) †	\$9,481.8	\$ 9,170.8	\$311.0
Operating margin (a/b)	13.17%	6.81%	

## 17. Analysis and interpretation of financial statements

Turnover of operating assets (b/c) 1.11 times 1.09 times

Rate of return on operating assets 14.58% 7.44%

(a/c)

\*Calculated as income before income taxes plus net interest expense. This method excludes nonoperating items.

†When companies have no nonoperating assets, total assets are used in the calculation

**Net income to net sales (return on sales) ratio** Another measure of a company's profitability is the **net income to net sales ratio**, calculated as follows:

$$\text{Net income to net sales} = \frac{\text{Net income}}{\text{Net sales}}$$

This ratio measures the proportion of the sales dollar that remains after deducting all expenses. The computations for Synotech for 2010 and 2009 are:

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### An accounting perspective:

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#### Business insight

Companies that are to survive in the economy must attain some minimum rate of return on operating assets. However, they can attain this minimum rate of return in many different ways. To illustrate, consider a grocery store and a jewelry store, each with a rate of return of 8 per cent on operating assets. The grocery store normally would attain this rate of return with a low margin and a high turnover, while the jewelry store would have a high margin and a low turnover, as shown here:

**Margin x Turnover = Rate of return on operating assets**

Grocery store	1% x	8.0 times	=	8%
Jewelry store	20 x	0.4	=	8

(USD millions)	2010	2009	Amount of increase or (decrease)
Net income (a)	\$ 762.0	\$206.4	\$555.6
Net sales (b)	\$10,498.	\$10,029.	\$469.0
	8	8	
Ratio of net income to net sales (a/b)	7.26%	2.06%	

Although the ratio of net income to net sales indicates that the net amount of profit increased on each sales dollar, exercise care in using and interpreting this ratio. The net income includes all nonoperating items that may occur only in a particular period; therefore, net income includes the effects of such things as extraordinary items, changes in accounting principle, effects of discontinued operations, and interest charges. Thus, a period that contains the effects of an extraordinary item is not comparable to a period that contains no extraordinary items. Also, since interest expense is deductible in the determination of net income while dividends are not, the methods used to finance a company's assets affect net income.

**Return on average common stockholders' equity** From the stockholders' point of view, an important measure of the income-producing ability of a company is the relationship of return on average common stockholders' equity, also called rate of **return on average common stockholders' equity**, or simply the **return on equity (ROE)**. Although stockholders are interested in the ratio of operating income to operating

assets as a measure of management's efficient use of assets, they are even more interested in the return the company earns on each dollar of stockholders' equity. The formula for return on average common stockholders' equity if no preferred stock is outstanding is:

$$\text{Return on average common stockholders' equity} = \frac{\text{Net income}}{\text{Average common stockholders' equity}}$$

When a company has preferred stock outstanding, the numerator of this ratio becomes net income minus the annual preferred dividends, and the denominator becomes the average book value of common stock. As described in Chapter 12, the book value of common stock is equal to total stockholders' equity minus (1) the liquidation value (usually equal to par value) of preferred stock and (2) any dividends in arrears on cumulative preferred stock. Thus, the formula becomes:

$$\text{Return on average common stockholders' equity} = \frac{(\text{Net income} - \text{Preferred stock dividends})}{\text{Average book value of common stock}}$$

Synotech has preferred stock outstanding. The ratios for the company follow. Total common stockholders' equity on 2009 January 1, was USD 1,697.4 million. Preferred dividends were USD 25.7 million in 2010 and USD 25.9 million in 2009.

(USD millions)	2010	2009	Amount of increase or (decrease)
Net income – Preferred stock dividends (a)	\$ 736.3	\$ 180.5	\$ 555.8
Total common stockholders' equity (book value of common stock):*			
January 1	\$1,531.5	\$1,697.4	\$(165.9)
December 31	1,969.6	1,531.5	438.1
Total (b)	\$3,501.1	\$3,228.9	\$ 272.2
Average common stockholders' equity: (c) (b/2 = c)	\$1,750.6	\$1,614.5	
Return on common stockholders' equity (a/c)	42.06%	11.18%	

\*Total stockholders' equity – par value of preferred stock

The stockholders would regard the increase in the ratio from 11.18 per cent to 42.06 per cent favorably. This ratio indicates that for each dollar of capital invested by a common stockholder, the company earned approximately 42 cents in 2010.

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### An accounting perspective:

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#### Business insight

Sometimes, two companies have the same return on assets but have different returns on stockholders' equity, as shown here:

	Company 1	Company 2
Return on assets	12.0%	12.0%
Return on stockholders' equity	6.4	8.0

The difference of 1.6 per cent in Company 2's favor is the result of Company 2's use of borrowed funds, particularly long-term debt, in its capital structure. Use of these funds (or preferred stock

## 17. Analysis and interpretation of financial statements

with a fixed return) is called trading on the equity. When a company is trading profitably on the equity, it is generating a higher rate of return on its borrowed funds than it is paying for the use of the funds. The excess, in this case 1.6 per cent, is accruing to the benefit of the common stockholders, because their earnings are being increased.

Companies that magnify the gains from this activity for the stockholders are using leverage. Using leverage is a risky process because losses also can be magnified, to the disadvantage of the common stockholders. We discussed trading on the equity and leverage in Chapter 15.

**Cash flow margin** The cash flow margin measures a company's overall efficiency and performance. The **cash flow margin** indicates the ability of a company to translate sales into cash. Measuring the amount of cash a company generates from every dollar of sales is important because a company needs cash to service debt, pay dividends, and invest in new capital assets. The formula for the cash flow margin is:

$$\text{Cash flow margin} = \frac{\text{Net cash provided by operating activities}}{\text{Net sales}}$$

Thus, we calculate Synotech's 2010 cash flow margin as follows:

$$\frac{\text{USD 1,101.0 million net cash provided by operating activities}}{\text{USD 10,498.8 million net sales}} = 10.49 \text{ per cent}$$

**Earnings per share of common stock** Probably the measure used most widely to appraise a company's operations is **earnings per share (EPS)** of common stock. EPS is equal to earnings available to common stockholders divided by the weighted average number of shares of common stock outstanding. The financial press regularly publishes actual and forecasted EPS amounts for publicly traded corporations, together with period-to-period comparisons. The Accounting Principles Board noted the significance attached to EPS by requiring that such

amounts be reported on the face of the income statement.<sup>52</sup> (Chapter 13 illustrates how earnings per share should be presented on the income statement.)

The calculation of EPS may be fairly simple or highly complex depending on a corporation's capital structure. A company has a simple capital structure if it has no outstanding securities (e.g. convertible bonds, convertible preferred stocks, warrants, or options) that can be exchanged for common stock. If a company has such securities outstanding, it has a complex capital structure. Discussion of EPS for a corporation with a complex capital structure is beyond the scope of this text.

A company with a simple capital structure reports a single basic EPS amount, which is calculated as follows:

$$\text{EPS of common stock} = \frac{\text{Earnings available for common stockholders}}{\text{Weighted - average number of common shares outstanding}}$$

The amount of earnings available to common stockholders is equal to net income minus the current year's preferred dividends, whether such dividends have been declared or not.

**Determining the weighted-average number of common shares** The denominator in the EPS fraction is the weighted-average number of common shares outstanding for the period. If the number of common shares outstanding did not change during the period, the weighted-average number of common shares outstanding would, of course, be the number of common shares outstanding at the end of the period. The balance in the Common Stock account of Synotech (Exhibit 133) was USD 219.9 million on 2010 December 31. The common stock had a USD 1.20 par value. Assuming no common shares were issued or redeemed during 2010, the weighted-average number of common shares outstanding would be 183.2 million (or USD 219.9 million/USD 1.20 per share). (Normally, common treasury stock reacquired and reissued are also included in the calculation of the weighted-average number of common shares outstanding. We ignore treasury stock transactions to simplify the illustrations.)

If the number of common shares changed during the period, such a change increases or decreases the capital invested in the company and should affect earnings available to stockholders. To compute the weighted-average number of common shares outstanding, we weight the change in the number of common shares by the portion of the year that those shares were outstanding. Shares are outstanding only during those periods that the related capital investment is available to produce income.

To illustrate, assume that during 2009 Synotech's common stock balance increased by USD 14.0 million (11.7 million shares). Assume that the company issued 9.5 million of these shares on 2009 April 1, and the other 2.2 million shares on 2009 October 1. The computation of the weighted-average number of common shares outstanding would be:

171.5 million shares x 1 year	171.500 million
9.5 million shares x $\frac{3}{4}$ year (April – December)	7.125 million
2.2 million shares x $\frac{1}{4}$ year (October – December)	.550
Weighted-average number of common shares outstanding	179.125 million

An alternate method looks at the total number of common shares outstanding, weighted by the portion of the year that the number of shares was outstanding, as follows:

171.5 million shares x $\frac{1}{4}$ year (January – March)	42.875 million
181.0 million shares x $\frac{1}{2}$ year (April – September)	90.500 million
183.2 million shares x $\frac{1}{3}$ year (October – December)	45.800 million
Weighted-average number of shares outstanding	179.175 million

Another alternate method is:

171.5 million shares x 3 months =	514.5 million share-months
181.0 million shares x 6 months =	1,086.0 million share-months
183.2 million shares x 3 months =	549.6 million share-months

## 17. Analysis and interpretation of financial statements

12 months 2,150.1 million share-months

2,150.1 million share-months/12 months = 179.175 million

Note that all three methods yield the same result. In 2010, the balance in the common stock account did not change as it had during 2009. Therefore, the weighted-average number of common shares outstanding during 2010 is equal to the number of common shares issued, 183.2 million. The EPS of common stock for the Synotech are:

(USD millions)	2010	2009	Amount of increase or (decrease)
Net income-preferred dividends (a)	USD 736.30	USD 180.50	USD 555.80
Average number of shares of common stock (b)	183.2	179.13	4.03
EPS of common stock (a,b)	USD 4.02	USD 1.01	

Synotech's stockholders would probably view the increase of approximately 298.0 per cent ( $[(\text{USD } 4.02 - \text{USD } 1.01)/\text{USD } 1.01]$ ) in EPS from USD 1.01 to USD 4.02 favorably.

**EPS and stock dividends or splits** Increases in shares outstanding as a result of a stock dividend or stock split do not require weighting for fractional periods. Such shares do not increase the capital invested in the business and, therefore, do not affect income. All that is required is to restate all prior calculations of EPS using the increased number of shares. For example, assume a company reported EPS for 2010 as USD 1.20 (or USD 120,000/100,000 shares) and earned USD 180,000 in 2011. The only change in common stock over the two years was a two-for-one stock split on 2011 December 1, which doubled the shares outstanding to 200,000. The firm would restate EPS for 2010 as USD 0.60 (or USD 120,000/200,000 shares) and as USD 0.90 (USD 180,000/200,000 shares) for 2011.

**Basic EPS and diluted EPS** In the merger wave of the 1960s, corporations often issued securities to finance their acquisitions of other companies. Many of the securities issued were calls on common or possessed equity kickers. These terms mean that the securities were convertible to, or exchangeable for, shares of their issuers' common stock. As a result, many complex problems arose in computing EPS. Until 1997, *APB Opinion No. 15* provided guidelines for solving these problems. In 1997, *FASB Statement No. 128*, "Earnings per Share" replaced *APB Opinion No. 15*. A company with a complex capital structure must present at least two EPS calculations, basic EPS and diluted EPS. Because of the complexities involved in the calculations, we reserve further discussion of these two EPS calculations for an intermediate accounting text.

**Times interest earned ratio** Creditors, especially long-term creditors, want to know whether a borrower can meet its required interest payments when these payments come due. The **times interest earned ratio**, or interest coverage ratio, is an indication of such an ability. It is computed as follows:

$$\text{Time interest earned ratio} = \frac{\text{Income before interest including taxes (IBIT)}}{\text{Interest expense}}$$

The ratio is a rough comparison of cash inflows from operations with cash outflows for interest expense. Income before interest and taxes (IBIT) is the numerator because there would be no income taxes if interest expense is equal to or greater than IBIT. (To find income before interest and taxes, take net income from continuing operations and add back the net interest expense and taxes.) Analysts disagree on whether the denominator should be (1) only interest expense on long-term debt, (2) total interest expense, or (3) net interest expense. We will use net interest expense in the Synotech illustration.

For Synotech, the net interest expense is USD 236.9 million. With an IBIT of USD 1,382.4 million, the times interest earned ratio is 5.84, calculated as:

$$\frac{\text{USD } 1,382.4}{\text{USD } 236.9} = 5.84 \text{ time}$$

The company earned enough during the period to pay its interest expense almost 6 times over.

Low or negative interest coverage ratios suggest that the borrower could default on required interest payments. A company is not likely to continue interest payments over many periods if it fails to earn enough income to cover them. On the other hand, interest coverage of 5 to 10 times or more suggests that the company is not likely to default on interest payments.

**Times preferred dividends earned ratio** Preferred stockholders, like bondholders, must usually be satisfied with a fixed-dollar return on their investments. They are interested in the company's ability to make preferred dividend payments each year. We can measure this ability by computing the **times preferred dividends earned ratio** as follows:

$$\text{Time preferred dividends earned ratio} = \frac{\text{Net income}}{\text{Annual preferred dividends}}$$

Synotech has a net income of USD 762.0 million and preferred dividends of USD 25.7 million. The number of times the annual preferred dividends are earned for 2010 is:

$$\frac{\text{USD } 762.0}{\text{USD } 25.7} = 29.65 : 1, \text{ or } 29.65 \text{ times}$$

The higher this rate, the higher is the probability that the preferred stockholders will receive their dividends each year.

Analysts compute certain ratios using information from the financial statements and information about the market price of the company's stock. These tests help investors and potential investors assess the relative merits of the various stocks in the marketplace.

The **yield** on a stock investment refers to either an earnings yield or a dividends yield.

**Earnings yield on common stock** You can calculate a company's **earnings yield on common stock** as follows:

$$\text{Earnings yield on common stock} = \frac{\text{EPS}}{\text{Current market price per share of common stock}}$$

Assume Synotech has common stock with an EPS of USD 5.03 and that the quoted market price of the stock on the New York Stock Exchange is USD 110.70. The earnings yield on common stock would be:

$$\frac{\text{USD } 5.03}{\text{USD } 110.7} = 4.54 \text{ per cent}$$

**Price-earnings ratio** When inverted, the earnings yield on common stock is the **price-earnings ratio**. To compute the price-earnings ratio:

$$\text{Price-earnings ratio} = \frac{\text{Current market price per share of common stock}}{\text{EPS}}$$

$$\frac{\text{USD } 110.7}{\text{USD } 5.03} = 22.01 : 1$$

Investors would say that this stock is selling at 22 times earnings, or at a multiple of 22. These investors might have a specific multiple in mind that indicates whether the stock is underpriced or overpriced. Different investors have different estimates of the proper price-earnings ratio for a given stock and also different estimates of the



## 17. Analysis and interpretation of financial statements

future earnings prospects of the company. These different estimates may cause one investor to sell stock at a particular price and another investor to buy at that price.

**Payout ratio on common stock** Using dividend yield, investors can compute the payout ratio on common stock. Assume that Synotech's dividends per share were USD 1.80 and earnings per share were USD 5.03. To calculate **payout ratio on common stock**, divide the dividend per share of common stock by EPS. The payout ratio of stock in 2010 is:

$$\text{Payout ratio on common stock} = \frac{\text{Dividend per share of common stock}}{\text{EPS}}$$

$$\frac{\text{USD } 1.80}{\text{USD } 5.03} = 35.8 \text{ per cent}$$

A payout ratio of 35.8 per cent means that the company paid out 35.8 per cent of its earnings in the form of dividends. Some investors are attracted by the stock of companies that pay out a large percentage of their earnings. Other investors are attracted by the stock of companies that retain and reinvest a large percentage of their earnings. The tax status of the investor has a great deal to do with this preference. Investors in high tax brackets often prefer to have the company reinvest the earnings with the expectation that this reinvestment results in share price appreciation.

**Dividend yield on common stock** The dividend paid per share of common stock is also of much interest to common stockholders. When the current annual dividend per share of common stock is divided by the current market price per share of common stock, the result is called the **dividend yield on common stock**. Synotech's 2010 December 31, common stock price was USD 110.70 per share. Its dividends per share were USD 1.80. The company's dividend yield on common stock was:

$$\text{Dividend yield on common stock} = \frac{\text{Dividend per share of common stock}}{\text{Current market price per share of common stock}}$$

$$\frac{\text{USD } 1.80}{\text{USD } 110.7} = 1.63 \text{ per cent}$$

**Dividend yield on preferred stock** Preferred stockholders, as well as common stockholders, are interested in dividend yields. The computation of the **dividend yield on preferred stock** is similar to the common stock dividend yield computation. Assume that Synotech's dividend per share of preferred stock is USD 5.10 with a current market price of USD 84.00 per share. We compute the dividend yield on preferred stock as follows:

$$\text{Dividend yield on preferred stock} = \frac{\text{Dividend per share of preferred stock}}{\text{Current market price per share of preferred stock}}$$

$$\frac{\text{USD } 5.10}{\text{USD } 84.00} = 6.07 \text{ per cent}$$

Through the use of dividend yield rates, we can compare different preferred stocks having different annual dividends and different market prices.

**Cash flow per share of common stock** Investors calculate the **cash flow per share of common stock** ratio as follows:

$$\text{Cash flow per share of common stock} = \frac{\text{Net cash provided by operating activities}}{\text{Average number of shares of common stock outstanding}}$$

Currently, *FASB Statement No. 95* does not permit the use of this ratio for external reporting purposes. However, some mortgage and investment banking firms do use this ratio to judge the company's ability to pay dividends and pay liabilities. The cash flow per share of common stock ratio for Synotech is as follows:

	<b>Fiscal Year</b>	
	<b>2010</b>	<b>2009</b>
Cash provided by operating activities (a)	\$1,101.0	\$972.3
Average shares outstanding (b) (assumed)	146.6	145.2
Cash flow per share of common stock (a)/(b)	\$7.51	\$6.70

#### Final considerations in financial statement analysis

Standing alone, a single financial ratio may not be informative. Investors gain greater insight by computing and analyzing several related ratios for a company. Exhibit 135 summarizes the ratios presented in this chapter, and Exhibit 136 presents them graphically.

Financial analysis relies heavily on informed judgment. As guides to aid comparison, percentages and ratios are useful in uncovering potential strengths and weaknesses. However, the financial analyst should seek the basic causes behind changes and established trends.

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### An accounting perspective:

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#### Uses of technology

Most companies calculate some of the ratios we have discussed, if not all of them. To efficiently and effectively perform these calculations, accountants use computers. Some programs that gather information in the preparation of financial statements calculate the ratios at the end of a period. Accountants also create spreadsheets to perform this task. Remember, to interpret the numbers correctly, investors and management must compare these ratios with the industry in which the company operates.

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<b>Liquidity ratios</b>	<b>Formula</b>	<b>Significance</b>
Current, or working capital, ratio	Current assets + Current liabilities	Test of debt-paying ability
Acid-test (quick) ratio	Quick assets (cash + marketable securities + net receivables) + Current liabilities	Test of immediate debt-paying ability
Cash flow liquidity ratio	(Cash and marketable securities + Net cash provided by operating activities) + Current liabilities	Test of short-term, debt-paying ability
Accounts receivable turnover	Net credit sales (or net sales) + Average net accounts receivable	Test of quality of accounts receivable
Number of days' sales in accounts receivable (average collection period of accounts receivable)	Number of days in year (365) + Accounts receivable turnover	Test of quality of accounts receivable
Inventory turnover	Cost of goods sold + Average inventory	Test of whether or not a sufficient volume of business is being generated relative to inventory
Total assets turnover	Net sales + Average total assets	Test of whether or not the volume of business generated is adequate relative to amount of capital invested in the business
<b>Equity, or Long-term Solvency, Ratios</b>		
Equity (stockholders' equity) ratio	Stockholders' equity + Total assets (or total equities)	Index of long-run solvency and safety
Stockholders' equity to debt (debt to equity) ratio	Stockholders' equity + Total debt	Measure of the relative proportion of stockholders' and of creditors' equities
<b>Profitability Tests</b>		
Rate of return on operating assets	Net operating income + Operating assets or Operating margin x Turnover operating assets	Measure of managerial
Net income to net sales (return on sales)	Net income + Net sales	Indicator of the amount of net profit on each dollar of sales
Return on average common stockholders' equity	Net income + Average common stockholders' equity	Measure of what a given company earned for its stockholders from all sources as a percentage of common stockholders' investment
Cash flow margin	Net cash provided by operating activities + Net sales	Measure of the ability of a firm to translate sales into cash
EPS of common stock	Earnings available to common stockholders' + Weighted-average number of common shares outstanding	Measure of the return to investors
Times interest earned ratio	Income before interest and taxes + Interest expense	Test of the likelihood that creditors will continue to receive their interest payments
Time preferred dividends earned ratio	Net income + Annual preferred dividends	Test of the likelihood that preferred stockholders will receive their dividend each year
<b>Market Tests</b>		
Earnings yield on common stock	EPS + Current market price per share of common stock	Comparison with other common stocks
Price-earnings ratio	Current market price per share of common stock + EPS	Index of whether a stock is relatively cheap or expensive based on the ratio
Pay cut ratio on common stock	Dividend per share of common stock + EPS	Index of whether company pays out a large percentage of earnings as dividends or reinvests most of its earnings
Dividend yield on common stock	Dividend per share of common stock + Current market price per share of common stock	Comparisons with other common stocks
Dividend yield on preferred stock	Dividend per share of preferred stock + Current market price per share of preferred stock	Comparison with other preferred stocks
Cash flow per share of common stock	Net cash provided by operating activities + Average number of share of common stock outstanding	Test of ability to pay dividends and liabilities

Exhibit 135: Summary of ratios

Analysts must be sure that their comparisons are valid—especially when the comparisons are of items for different periods or different companies. They must follow consistent accounting practices if valid interperiod comparisons are to be made. Comparable intercompany comparisons are more difficult to secure. Accountants cannot do much more than disclose the fact that one company is using FIFO and another is using LIFO for inventory and cost of goods sold computations. Such a disclosure alerts analysts that intercompany comparisons of inventory turnover ratios, for example, may not be comparable.

Also, when comparing a company's ratios to industry averages provided by an external source such as Dun & Bradstreet, the analyst should calculate the company's ratios in the same manner as the reporting service. Thus, if Dun & Bradstreet uses net sales (rather than cost of goods sold) to compute inventory turnover, so should the analyst. Net sales is sometimes preferable because all companies do not compute and report cost of goods sold amounts in the same manner.

Facts and conditions not disclosed by the financial statements may, however, affect their interpretation. A single important event may have been largely responsible for a given relationship. For example, competitors may put a new product on the market, making it necessary for the company under study to reduce the selling price of a product suddenly rendered obsolete. Such an event would severely affect the percentage of gross margin to net sales. Yet there may be little chance that such an event will happen again.

Analysts must consider general business conditions within the industry of the company under study. A corporation's downward trend in earnings, for example, is less alarming if the industry trend or the general economic trend is also downward.

Investors also need to consider the seasonal nature of some businesses. If the balance sheet date represents the seasonal peak in the volume of business, for example, the ratio of current assets to current liabilities may be much lower than if the balance sheet date is in a season of low activity.

Potential investors should consider the market risk associated with the prospective investment. They can determine market risk by comparing the changes in the price of a stock in relation to the changes in the average price of all stocks.

Potential investors should realize that acquiring the ability to make informed judgments is a long process and does not occur overnight. Using ratios and percentages without considering the underlying causes may lead to incorrect conclusions.

Relationships between financial statement items also become more meaningful when standards are available for comparison. Comparisons with standards provide a starting point for the analyst's thinking and lead to further investigation and, ultimately, to conclusions and business decisions. Such standards consist of (1) those in the analyst's own mind as a result of experience and observations, (2) those provided by the records of past performance and financial position of the business under study, and (3) those provided about other enterprises. Examples of the third standard are data available through trade associations, universities, research organizations (such as Dun & Bradstreet and Robert Morris Associates), and governmental units (such as the Federal Trade Commission).

In financial statement analysis, remember that standards for comparison vary by industry, and financial analysis must be carried out with knowledge of specific industry characteristics. For example, a wholesale grocery company would have large inventories available to be shipped to retailers and a relatively small investment in

17. Analysis and interpretation of financial statements

property, plant, and equipment, while an electric utility company would have no merchandise inventory (except for repair parts) and a large investment in property, plant, and equipment.

Even within an industry, variations may exist. Acceptable current ratios, gross margin percentages, debt to equity ratios, and other relationships vary widely depending on unique conditions within an industry. Therefore, it is important to know the industry to make comparisons that have real meaning.

**Illustration 17.4** Graphic Depiction of Financial Statement analysis Utilizing Financial Ratios

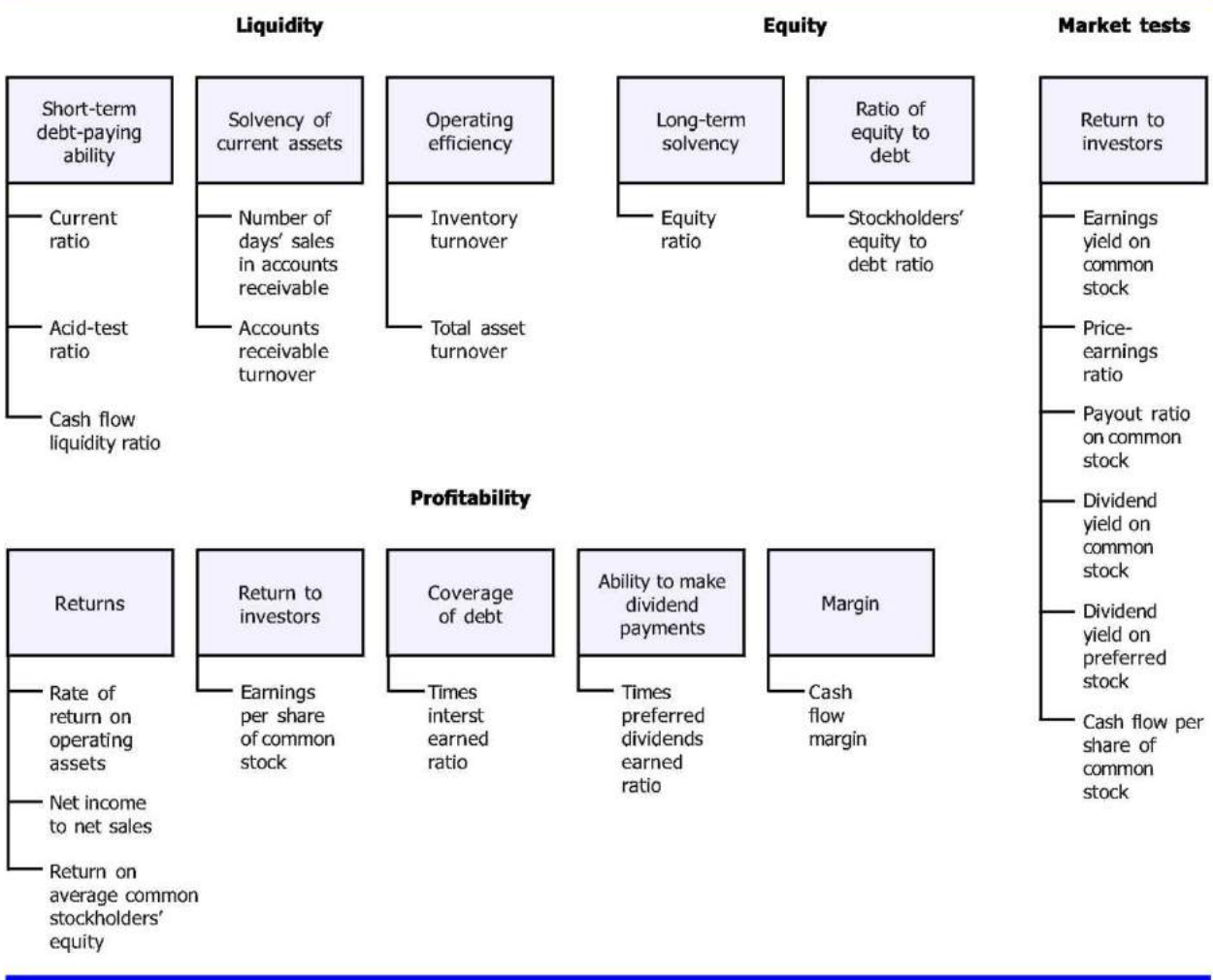


Exhibit 136: Graphic depiction of financial statement analysis utilizing financial ratios

The bankruptcies of companies like General Motors and Lehman Brothers, with the resulting significant losses to employees, stockholders, and other members of the general public, have caused important changes in corporate governance, standards of accounting, and auditing procedures and standards. These changes have come about as a result of self-regulation, oversight by the Public Company Accounting Oversight Board, regulation by the Securities and Exchange Commission, regulation by the stock exchanges, and legislation passed by Congress, and by some combination of these actions. Further changes are likely.

Financial statements are likely to become more "transparent". This means they will reveal more clearly the results of operations and the financial condition of the company. There is likely to be an increased focus on the balance sheet and on the quality and measurement of assets and the extent and nature of liabilities as well as on a

proper identification of other risks. The quality of earnings will continue to be of paramount importance. There have been too many situations where companies have had to restate their earnings for prior years because they did not properly disclose material facts or properly implement the revenue recognition and/or expense recognition principles that were covered in Chapter 5.

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### An accounting perspective:

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#### Business insight

The Enron situation was the focus of a massive investigation that led to significant changes in corporate governance, accounting rules, and auditing procedures. Enron was formed in 1985 and became a major player in the energy industry. Its stock reached a high of about USD 90 per share in August 2000. Top executives began selling stock shortly thereafter, while at least for a short period during the ensuing fall in the stock's price, employees were prevented from doing so. In October of 2001, the disclosure of off-balance sheet partnerships, with attendant liabilities for Enron, resulted in a USD 1.2 billion write-off in stockholder's equity. In November of 2001, Enron revealed that it had overstated earnings by USD 586 million since 1997. In December 2001, Enron filed for bankruptcy. Enron stock became almost worthless, selling for under USD 1. Employees of Enron not only lost their jobs, but many also lost their retirement savings because they consisted largely of Enron stock. Individual and pension fund investors as a group lost billions of dollars. The state of Florida's pension fund lost about USD 340 million. Enron's external auditor, Arthur Andersen & Co., was accused of shredding documents pertaining to Enron after the US Justice Department confirmed its investigation and was indicated in March of 2002 for that action. (For more information about the Enron situation see, for instance: U.S. News & World Report, March 18 2002, pp, 26-36)

External auditors, internal auditors, audit committee members, and members of Boards of Directors are likely to ask much tougher questions of management. They are also more likely to investigate questionable transactions. Audit committees may be required to publicly disclose their activities that were performed to carry out their duties.

Management's letter to the stockholders contained in the annual report, and usually signed by the CEO, contains the views of management regarding current operations, operating results, and plans for the future. This letter is likely to become even more important in the future than it is now. There could be financial penalties if this letter is purposely misleading in that its contents are not supported by the financial statements or they misrepresent significant facts. To the extent these letters are more conservative rather than being unrealistic, individuals analyzing financial statements will be able to rely on their content to a greater extent in the future. The Sarbanes-Oxley Act of 2002 in the US sets more stringent standards for financial reporting for public companies and their managers. Boards, and independent auditors, along with strict penalties for non-compliance.

Financial statement analysis is going to have increasing importance. There will be more focus on the cash flow statement, covered in Chapter 16, and its "cash flow from operating activities", since this amount is considered by some to be "cash earnings". Some consider this amount to be less susceptible to manipulation than is net income.

## 17. Analysis and interpretation of financial statements

Management may disclose in an accounting policy statement, its policies regarding their business practices and those accounting policies that were followed in preparing the financial statements. Conflicts of interest will be identified and discouraged.

Professional financial analysts, such as those working for stock brokerage firms and those employed to help evaluate possible merger and acquisition candidates, typically go "beyond the numbers" in analyzing a company. They usually visit the company, interview management, and assess the physical facilities and plans for the future. They are interested in evaluating such factors as the competence and integrity of management. Professional financial analysts form an overall impression of the company by giving all of the data and other information the "smell test". In other words, does everything seem legitimate or are there possible significant hidden factors that have not yet been identified which makes one think that something is not right.

The future looks bright. Needed changes will be made to maintain public confidence in financial reporting. Protecting the public interest should be paramount in the future.

This chapter concludes our coverage of financial accounting. It is likely you will continue on with studies in managerial accounting. It is important to realize that it is impossible to completely separate financial and managerial accounting information into neat packages. Managers use both the published financial statements and managerial accounting information in making decisions. Also, some of the concepts covered in managerial accounting (e.g. job costing and process costing) have a direct impact on the formal financial statements. Many accountants are attracted to managerial accounting because it is not constrained by having to conform to generally accepted accounting principles. Instead, management accountants can provide to management whatever information in whatever form management requests.

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### An accounting perspective:

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#### Uses of technology

The *Journal of Accountancy* periodically publishes articles on Internet resources to encourage greater use of technology by accountants. One of the best in this category is called "Smart Stops on the Web", a series authored by Megan Pinkston. (For example, see this one from 2007): <http://www.journalofaccountancy.com/Issues/2007/Jun/SmartStopsOnTheWebArticle>.

You may want to investigate this article and some of the others in the series and then visit some of the websites they list. There is no doubt that the Internet will only grow in importance in the future. The more you know about it, the more marketable you will be upon graduation.

#### Understanding the learning objectives

- A company's financial statements are analyzed internally by management and externally by investors, creditors, and regulatory agencies.
- Management's analysis of financial statements primarily relates to parts of the company. Management is able to obtain specific, special-purpose reports to aid in decision making.
- External users focus their analysis of financial statements on the company as a whole. They must rely on the general-purpose financial statements that companies publish.

- Financial statement analysis consists of applying analytical tools and techniques to financial statements and other relevant data to obtain useful information.
- This information is the significant relationships between data and trends in those data assessing the company's past performance and current financial position.
- The information is useful for making predictions that may have a direct effect on decisions made by many users of financial statements.
- Present and potential company investors use this information to assess the profitability of the firm.
- Outside parties and long-term creditors sometimes are interested in a company's solvency, and thus use the information in predicting the company's solvency.
- Published reports are one source of financial information. Published reports include financial statements, explanatory notes, letters to stockholders, reports of independent accountants, and management's discussion and analysis (MDA).
- Government reports are another source of financial information and include Form 10-K, Form 10-Q, and Form 8-K. These reports are available to the public for a small charge.
- Financial service information, business publications, newspapers, and periodicals offer meaningful financial information to external users. Moody's Investors Services; Standard & Poor's; Dun & Bradstreet, Inc.; and Robert Morris Associates all provide useful industry information. Business publications, such as *The Wall Street Journal* and *Forbes*, also report industry financial news.
- Horizontal analysis is the calculation of dollar changes or percentage changes in comparative statement items or totals. Use of this analysis helps detect changes in a company's performance and highlights trends.
- Vertical analysis consists of a study of a single financial statement in which each item is expressed as a percentage of a significant total. Use of this analysis is especially helpful in analyzing income statement data such as the percentage of cost of goods sold to sales or the percentage of gross margin to sales.
- Trend analysis compares financial information over time to a base year. The analysis is calculated by:
  - (a) Selecting a base year or period.
  - (b) Assigning a weight of 100 per cent to the amounts appearing on the base-year financial statements.
  - (c) Expressing the corresponding amounts shown on the other years' financial statements as a percentage of base-year or period amounts. The percentages are computed by dividing nonbase-year amounts by the corresponding base-year amounts and then multiplying the results by 100.

Trend analysis indicates changes that are taking place in an organization and highlights the direction of these changes.

- **Liquidity ratios** indicate a company's short-term debt-paying ability. These ratios include (1) current, or working capital, ratio; (2) acid-test (quick) ratio; (3) cash flow liquidity ratio; (4) accounts receivable turnover; (5) number of days' sales in accounts receivable; (6) inventory turnover; and (7) total assets turnover.
- **Equity, or long-term solvency, ratios** show the relationship between debt and equity financing in a company. These ratios include (1) equity (stockholders' equity) ratio and (2) stockholders' equity to debt ratio.
- **Profitability tests** are an important measure of a company's operating success. These tests include (1) rate of return on operating assets, (2) net income to net sales, (3) net income to average common stockholders' equity, (4) cash flow margin, (5) earnings per share of common stock, (6) times interest earned ratio, and (7) times preferred dividends earned ratio.



## 17. Analysis and interpretation of financial statements

- **Market tests** help investors and potential investors assess the relative merits of the various stocks in the marketplace. These tests include (1) earnings yield on common stock, (2) price-earnings ratio, (3) dividend yield on common stock, (4) payout ratio on common stock, (5) dividend yield on preferred stock, and (6) cash flow per share of common stock.

- For a complete summary and a graphic depiction of all liquidity, long-term solvency, profitability, and market test ratios, see Exhibit 135 and Exhibit 136.

- **Need for comparative data:** Analysts must be sure that their comparisons are valid—especially when the comparisons are of items for different periods or different companies.

- **Influence of external factors:** A single important event, such as the unexpected placing of a product on the market by a competitor, may affect the interpretation of the financial statements. Also, the general business conditions and the possible seasonal nature of the business must be taken into consideration, since these factors could have an impact on the financial statements.

- **Impact of inflation:** Since financial statements fail to reveal the impact of inflation on the reporting entity, one must make sure that the items being compared are all comparable; that is, the impact of inflation has been taken into consideration.

- **Need for comparative standards:** In financial statement analysis, remember that standards for comparison vary by industry, and financial analysis must be carried out with knowledge of specific industry characteristics.

### Demonstration problem

**Demonstration problem A** Comparative financial statements of Kellogg Company for 2003 and 2002 follow:

**Kellogg Company**  
**Comparative income statements**  
**For the years ended 2003 December 31, and 2002**  
**(USD millions)**

	2003	2002
Net revenues	\$6,954.7	\$6,984.2
Cost of goods sold	3,327.0	3,325.1
Gross margin	\$3,627.7	\$3,659.1
Operating expense	2,551.4	2,585.7
Nonoperating expense (interest)	137.5	118.8
Income before income taxes	\$ 938.8	\$ 954.6
Income taxes	280.0	198.4
Net earnings	\$ 658.8	\$ 756.2

**Kellogg Company**  
**Comparative Balance sheets**  
**2003 December 31, and 2002**  
**(USD millions)**

	2003	2002
<b>Assets</b>		
Cash and temporary investments	\$ 204.4	\$ 150.6
Accounts receivable, net	685.3	678.5
Inventories	443.8	503.8
Other current assets	273.3	236.3
Property, net	2,526.9	2,640.9
Other assets	762.6	589.6
Total assets	\$4,896.3	\$4,808.7
<b>Liabilities and stockholders' equity</b>		
Current liabilities	\$2,492.6	\$1,587.8
Long-term liabilities	1,506.2	2,407.7
Common stock	103.8	103.8
Capital in excess of par value	102.0	104.5
Retained earnings	1,501.0	1,317.2
Treasury stock	(374.0)	(380.9)

Currency translation adjustment	(435.3)	(331.4)
Total liabilities and stockholders' equity	\$4,896.3	\$4,808.7

- Prepare comparative common-size income statements for 2003 and 2002.
- Perform a horizontal analysis of the comparative balance sheets.

**Demonstration problem B** The balance sheet and supplementary data for Xerox Corporation follow:

**Xerox corporation**  
**Balance sheet with IOFS on an equity basis**  
**2003 December 31**  
**(USD millions)**

<b>Assets</b>	<b>2003</b>
Cash	\$ 1,741
Accounts receivable, net	2,281
Finance receivables, net	5,097
Inventories	1,932
Deferred taxes and other current assets	1,971
Total current assets	\$ 13,022
Finance receivables due after one year, net	7,957
Land, buildings, and equipment, net	2,495
Investments in affiliates, at equity	1,362
Goodwill	1,578
Other assets	3,061
Total assets	\$ 29,475
<b>Liabilities and stockholders' equity</b>	
Short-term debt and current portion of long-term debt	\$ 2,693
Accounts payable	1,033
Accrued compensation and benefit costs	662
Unearned income	250
Other current liabilities	1,630
Total current liabilities	\$ 6,268
Long-term debt	15,404
Liabilities for post-retirement medical benefits	1,197
Deferred taxes and other liabilities	1,876
Discontinued policyholders' deposits and other operations liabilities	670
Deferred ESOP benefits	(221)
Minorities' interests in equity of subsidiaries	141
Preferred stock	647
Common shareholders' equity (108.1 million)	3,493
Total liabilities and shareholders' equity	\$ 29,475

- Cost of goods sold, USD 6,197.
- Net sales, USD 18,701.
- Inventory, January 1, USD 2,290.
- Net interest expense, USD 1,031.
- Net income before interest and taxes, USD 647.
- Net accounts receivable on January 1, USD 2,633.
- Total assets on January 1, USD 28,531.

Compute the following ratios:

- Current ratio.
- Acid-test ratio.
- Accounts receivable turnover.
- Inventory turnover.
- Total assets turnover.
- Equity ratio.

## 17. Analysis and interpretation of financial statements

g. Times interest earned ratio.

### Solution to demonstration problem

#### Solution to demonstration problem A

a.

##### Kellogg Company

##### Common-size comparative income statements

For the year ended 2003 December 31, and 2002

	Per cent	
	2003	2002
Net revenues	100.00 %	100.00%
Cost of goods sold	47.84	47.61
Gross margin	52.16	52.39
Operating expenses	36.69	37.02
Nonoperating expense (interest)	1.98	1.70
Income before income taxes	13.49 %*	13.67 %
Income taxes	4.03	2.84
Net earnings	9.46 %*	10.83%

\*Difference due to rounding.

b.

##### Kellogg company Comparative balance sheets 2003 December 31, and 2002 (USD millions)

	2003	2002	Increase or 2003 amount	Decrease 2002 per cent
<b>Assets</b>				
Cash and temporary investments	\$204.4	\$150.6	\$ 53.8	35.72 %
Accounts receivable, net	685.3	678.5	6.8	1.00
Inventories	443.8	503.8	(60.0)	(11.91)
Other current assets	273.3	236.3	37.0	15.66
Property, net	2,526.9	2,640.9	(114.0)	(4.32)
Other assets	762.9	589.6	164.0	27.40
Total assets	\$4,896.3	\$4,808.7	\$ 87.6	1.82 %
<b>Liabilities and stockholders' equity</b>				
Current liabilities	\$2,492.6	\$ 1,587.8	\$ 904.8	56.98%
Long-term liabilities	1,506.2	2,407.7	(901.5)	(37.44)
Common stock	103.8	103.8	0.0	0.0
Capital in excess of par value	102.0	104.5	(2.5)	(2.39)
Retained earnings	1,501.0	1,317.2	183.8	13.95
Treasury stock	(374.0)	(380.9)	6.9	(1.81)
Currency translation adjustment	(435.3)	(331.4)	(103.9)	31.35
Total liabilities and stockholders' equity	\$4,896.3	\$4,808.7	\$ 87.6	1.82 %

#### Solution to demonstration problem B

a. Current ratio:

$$\frac{\text{Current assets}}{\text{Current liabilities}} = \frac{\text{USD } 13,022,000,000}{\text{USD } 6,268,000,000} = 2.08 : 1$$

b. Acid-test ratio:

$$\frac{\text{Quick assets}}{\text{Current liabilities}} = \frac{\text{USD } 9,119,000,000}{\text{USD } 6,268,000,000} = 1.45 : 1$$

c. Accounts receivable turnover:

$$\frac{\text{Net sales}}{\text{Average net accounts receivable}} = \frac{\text{USD } 18,701,000,000}{\text{USD } 2,457,000,000} = 7.61 \text{ time}$$

d. Inventory turnover:

$$\frac{\text{Cost of goods sold}}{\text{Average inventory}} = \frac{\text{USD } 6,197,000,000}{\text{USD } 2,111,000,000} = 2.94 \text{ time}$$

e. Total assets turnover:

$$\frac{\text{Net sales}}{\text{Average total assets}} = \frac{\text{USD } 18,701,000,000}{\text{USD } 29,003,000,000} = .64 \text{ time}$$

f. Equity ratio:

$$\frac{\text{Stockholders' equity}}{\text{Total assets}} = \frac{\text{USD } 4,140,000,000}{\text{USD } 29,475,000,000} = 14.05 \text{ per cent}$$

g. Times interest earned ratio:

$$\frac{\text{Income before interest also taxes}}{\text{Interest expense}} = \frac{\text{USD } 647,000,000}{\text{USD } 1,031,000,000} = .63 \text{ time}$$

## Key terms

**Accounts receivable turnover** Net credit sales (or net sales) divided by average net accounts receivable.

**Acid-test (quick) ratio** Ratio of quick assets (cash, marketable securities, and net receivables) to current liabilities.

**Cash flow liquidity ratio** Cash and marketable securities plus net cash provided by operating activities divided by current liabilities.

**Cash flow margin** Net cash provided by operating activities divided by net sales.

**Cash flow per share of common stock** Net cash provided by operating activities divided by the average number of shares of common stock outstanding.

**Common-size statements** Show only percentages and no absolute dollar amounts.

**Comparative financial statements** Present the same company's financial statements for two or more successive periods in side-by-side columns.

**Current ratio** Also called working capital ratio. Current assets divided by current liabilities.

**Debt to equity ratio** Total debt divided by stockholders' equity.

**Dividend yield on common stock** Dividend per share of common stock divided by current market price per share of common stock.

**Dividend yield on preferred stock** Dividend per share of preferred stock divided by current market price per share of preferred stock.

**Earnings per share (EPS)** The amount of earnings available to common stockholders (which equals net income less preferred dividends) divided by weighted-average number of shares of common stock outstanding.

**Earnings yield on common stock** Ratio of current EPS to current market price per share of common stock.

**Equity (stockholders' equity) ratio** The ratio of stockholders' equity to total assets (or total equities).

**Horizontal analysis** Analysis of a company's financial statements for two or more successive periods showing percentage and/or absolute changes from prior year. This type of analysis helps detect changes in a company's performance and highlights trends.

**Inventory turnover** Cost of goods sold divided by average inventory.

**Liquidity** Company's state of possessing liquid assets, such as (1) cash and (2) other assets that will soon be converted to cash.

**Net income to net sales** Net income divided by net sales.

**Net operating income** Income before interest and taxes.

**Nonoperating assets** Assets owned by a company but not used in producing operating revenues.

**Nonoperating income elements** Elements excluded from net operating income because they are not directly related to operations; includes such elements as extraordinary items, cumulative effect on prior year of changes in accounting principle, losses or gains from discontinued operations, interest revenue, and interest expense.

**Number of days' sales in accounts receivable** The number of days in a year (365) divided by the accounts receivable turnover. Also called the average collection period for accounts receivable.

## 17. Analysis and interpretation of financial statements

**Operating assets** All assets actively used in producing operating revenues.

**Operating margin** Net operating income divided by net sales.

**Payout ratio on common stock** The ratio of dividends per share of common stock divided by EPS.

**Price-earnings ratio** The ratio of current market price per share of common stock divided by the EPS of the stock.

**Rate of return on operating assets**  $\frac{\text{Net operating income}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Operating assets}}$  . Result is equal to net operating income divided by operating assets.

**Return on average common stockholders' equity** Net income divided by average common stockholders' equity; often called rate of return on average common stockholders' equity, or simply return on equity (ROE).

**Return on equity (ROE)** Net income divided by average common stockholders' equity.

**Stockholders' equity to debt ratio** Stockholders' equity divided by total debt; often used in inverted form and called the debt to equity ratio.

**Times interest earned ratio** A ratio computed by dividing income before interest and taxes by interest expense (also called interest coverage ratio).

**Times preferred dividends earned ratio** Net income divided by annual preferred dividends.

**Total assets turnover** Net sales divided by average total assets.

**Trend percentages** Similar to horizontal analysis except that a base year or period is selected, and comparisons are made to the base year or period.

**Turnover** The relationship between the amount of an asset and some measure of its use. See accounts receivable turnover, inventory turnover, and total assets turnover.

**Turnover of operating assets** Net sales divided by operating assets.

**Vertical analysis** The study of a single financial statement in which each item is expressed as a percentage of a significant total; for example, percentages of sales calculations.

**Yield (on stock)** The yield on a stock investment refers to either an earnings yield or a dividend yield. Also see Earnings yield on common stock and Dividend yield on common stock and preferred stock.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

An objective of financial statement analysis is to provide information about the company's past performance and current financial position.

Vertical analysis helps detect changes in a company's performance over several periods and highlights trends.

Common-size statements provide information about changes in dollar amounts relative to the previous periods.

Liquidity ratios show a company's capacity to pay maturing current liabilities.

A company that is quite profitable may find it difficult to pay its accounts payable.

Financial statement analysts must be sure that comparable data are used among companies to make the comparisons valid.

#### Multiple-choice

Select the best answer for each of the following questions.

The following data were abstracted from the 2007 December 31, balance sheet of Andrews Company (use for the first two questions questions):

Cash	\$136,000
Marketable securities	64,000
Accounts and notes receivable, net	184,000
Merchandise inventory	244,000
Prepaid expenses	12,000
Accounts and notes payable,	256,000

short-term	
Accrued liabilities	64,000
Bonds payable, long-term	400,000

The current ratio is:

- a. 1:2.
- b. 2:1.
- c. 1.2:1.
- d. 3:1.

The acid-test ratio is:

- a. 1:2.
- b. 2:1.
- c. 1.2:1.
- d. 3:1.

Benson Company shows the following data on its 2011 financial statements (use for the rest of the questions ):

Accounts receivable, January 1	\$720,000
Accounts receivable, December 31	960,000
Merchandise inventory, January 1	900,000
Merchandise inventory, December 31	1,020,000
Gross sales	4,800,000
Sales returns and allowances	180,000
Net sales	4,620,000
Cost of goods sold	3,360,000
Income before interest and taxes	720,000
Interest on bonds	192,000
Net income	384,000

The accounts receivable turnover is:

- a. 5.5 times per year.
- b. 5.714 times per year.
- c. 5 times per year.
- d. 6.667 times per year.

The inventory turnover is:

- a. 5 times per year.
- b. 4.8125 times per year.
- c. 3.5 times per year.
- d. 4 times per year.

The times interest earned ratio is:

- a. 4.75 times per year.
- b. 3.75 times per year.
- c. 2 times per year.
- d. 3 times per year.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- What are the major sources of financial information for publicly owned corporations?
- The higher the accounts receivable turnover rate, the better off the company is. Do you agree? Why?

## 17. Analysis and interpretation of financial statements

- Can you think of a situation where the current ratio is very misleading as an indicator of short-term, debt-paying ability? Does the acid-test ratio offer a remedy to the situation you have described? Describe a situation where the acid-test ratio does not suffice either.
- Before the Marvin Company issued USD 20,000 of long-term notes (due more than a year from the date of issue) in exchange for a like amount of accounts payable, its current ratio was 2:1 and its acid-test ratio was 1:1. Will this transaction increase, decrease, or have no effect on the current ratio and acid-test ratio? What would be the effect on the equity ratio?
- Through the use of turnover rates, explain why a firm might seek to increase the volume of its sales even though such an increase can be secured only at reduced prices.
- Indicate which of the relationships illustrated in the chapter would be best to judge:
  - The short-term debt-paying ability of the firm.
  - The overall efficiency of the firm without regard to the sources of assets.
  - The return to owners (stockholders) of a corporation.
  - The safety of long-term creditors' interest.
  - The safety of preferred stockholders' dividends.
- Indicate how each of the following ratios or measures is calculated:
  - Payout ratio.
  - Earnings per share of common stock.
  - Price-earnings ratio.
  - Earnings yield on common stock.
  - Dividend yield on preferred stock.
  - Times interest earned.
  - Times preferred dividends earned.
  - Return on average common stockholders' equity.
  - Cash flow margin.
- How is the rate of return on operating assets determined? Is it possible for two companies with operating margins of 5 per cent and 1 per cent, respectively, to both have a rate of return of 20 per cent on operating assets? How?
- Cite some of the possible deficiencies in accounting information, especially regarding its use in analyzing a particular company over a 10-year period.
- **Real world question** From the Consolidated Statements of Income of The Limited in the Annual report appendix, determine the percentage change in operating income from 2002 to 2003.
- **Real world question** From the Consolidated Statements of Income of The Limited in the Annual report appendix, determine the 2003 net income per common share.
- **Real world question** From the financial statements of The Limited in the Annual report appendix, determine the 2003 cash dividends per common share.
- **Real world question** From the financial statements of The Limited in the Annual report appendix, determine the 2003 cash flow margin.

## Exercises

**Exercise A** Income statement data for Boston Company for 2009 and 2010 follow:

	2009	2010
Net sales	\$2,610,000	\$1,936,000
Cost of goods sold	1,829,600	1,256,400
Selling expenses	396,800	350,000
Administrative expenses	234,800	198,400
Federal income taxes	57,600	54,000

Prepare a horizontal and vertical analysis of the income data in a form similar to Exhibit 134. Comment on the results of this analysis.

**Exercise B** A company engaged in the following three independent transactions:

- Merchandise purchased on account, USD 2,400,000.
- Machinery purchased for cash, USD 2,400,000.
- Capital stock issued for cash, USD 2,400,000.

a. Compute the current ratio after each of these transactions assuming current assets were USD 3,200,000 and the current ratio was 1:1 before the transactions occurred.

b. Repeat part (a) assuming the current ratio was 2:1.

c. Repeat part (a) assuming the current ratio was 1:2.

**Exercise C** A company has sales of USD 3,680,000 per year. Its average net accounts receivable balance is USD 920,000.

a. What is the average number of days accounts receivable are outstanding?

b. By how much would the capital invested in accounts receivable be reduced if the turnover could be increased to 6 without a loss of sales?

**Exercise D** Columbia Corporation had the following selected financial data for 2009 December 31: Net cash provided by operating activities

Net sales	\$1,800,000
Cost of goods sold	1,080,000
Operating expenses	315,000
Net income	195,000
Total assets	1,000,000
Net cash provided by operating activities	25,000

Compute the cash flow margin.

**Exercise E** From the following partial income statement, calculate the inventory turnover for the period.

Net sales		\$2,028,000
Cost of goods sold:		
Beginning inventory	\$ 234,000	
Purchases	1,236,000	
Cost of goods available for sale	\$1,560,000	
Less: Ending inventory	265,200	
Cost of goods sold		1,294,800
Gross margin		\$ 733,200
Operating expenses		327,600
Net operating income		\$ 405,600

**Exercise F** Eastern, Inc., had net sales of USD 3,520,000, gross margin of USD 1,496,000, and operating expenses of USD 904,000. Total assets (all operating) were USD 3,080,000. Compute Eastern's rate of return on operating assets.



## 17. Analysis and interpretation of financial statements

**Exercise G** Nelson Company began the year 2010 with total stockholders' equity of USD 2,400,000. Its net income for 2010 was USD 640,000, and USD 106,800 of dividends were declared. Compute the rate of return on average stockholders' equity for 2010. No preferred stock was outstanding.

**Exercise H** Rogers Company had 60,000 shares of common stock outstanding on 2010 January 1. On 2010 April 1, it issued 20,000 additional shares for cash. The amount of earnings available for common stockholders for 2010 was USD 600,000. What amount of EPS of common stock should the company report?

**Exercise I** Smith Company started 2011 with 800,000 shares of common stock outstanding. On March 31, it issued 96,000 shares for cash, and on September 30, it purchased 80,000 shares of its own stock for cash. Compute the weighted-average number of common shares outstanding for the year.

**Exercise J** A company reported EPS of USD 2 (or  $\frac{\text{USD } 2,400,000}{1,200,000 \text{ shares}}$ ) for 2009, ending the year with 1,200,000 shares outstanding. In 2010, the company earned net income of USD 7,680,000, issued 320,000 shares of common stock for cash on September 30, and distributed a 100 per cent stock dividend on 2010 December 31. Compute EPS for 2010, and compute the adjusted earnings per share for 2009 that would be shown in the 2010 annual report.

**Exercise K** A company paid interest of USD 32,000, incurred federal income taxes of USD 88,000, and had net income (after taxes) of USD 112,000. How many times was interest earned?

**Exercise L** John Company had 20,000 shares of USD 600 par value, 8 per cent preferred stock outstanding. Net income after taxes was USD 5,760,000. The market price per share was USD 720.

a. How many times were the preferred dividends earned?

b. What was the dividend yield on the preferred stock assuming the regular preferred dividends were declared and paid?

**Exercise M** A company had 80,000 weighted-average number of shares of USD 320 par value common stock outstanding. The amount of earnings available to common stockholders was USD 800,000. Current market price per share is USD 720. Compute the EPS and the price-earnings ratio.

### Problems

**Problem A** Loom's comparative statements of income and retained earnings for 2010 and 2009 are given below.

<b>Loom</b>		
<b>Consolidated statement of earnings</b>		
<b>For the years ended 2010 December 31, and 2009</b>		
<b>(USD thousands, except per data share)</b>		
	<b>December 31</b>	
	<b>(1)</b>	<b>(2)</b>
	<b>2010</b>	<b>2009</b>
Net sales	\$ 2,403,100	\$ 2,297,800
Cost of sales	1,885,700	1,651,300
Gross earnings	\$ 517,400	\$ 646,500
Selling, general and administrative expenses	429,700	376,300
Goodwill amortization	37,300	35,200
Impairment write down of goodwill	158,500	0
Operating earnings (loss)	\$ (108,100)	\$235,000
Interest expense	(116,900)	(95,400)
Other expense-net	(21,700)	(6,100)
Earnings (loss) before income tax (benefit)	\$ (246,700)	\$133,500
expense, extraordinary item and cumulative effect of change in accounting principles		
Income tax (benefit) expense	(19,400)	73,200
Earnings (loss) before cumulative effect of	\$ (227,300)	\$60,300

change in account principles		
Cumulative effect of change in accounting principles:		
Pre-operating costs	(5,200)	0
Net earnings (loss)	\$ (232,500)	\$60,300
Retained earnings, January 1	680,600	620,300
	\$ 448,100	\$680,600
Dividends	0	0
Retained earnings, December 31	\$ 448,100	\$680,600

**Loom**  
**consolidated balance sheet**  
**As of 2010 December 31, and 2009**

(USD thousands)

	<b>December 31</b>	
	<b>(1)</b>	<b>(2)</b>
	<b>2010</b>	<b>2009</b>
<b>Assets</b>		
Current assets		
Cash and cash equivalents	\$ 26,500	\$ 49,400
Notes and accounts receivable (less allowance for possible losses of \$26,600,000 and \$20,700,000, respectively)	261,000	295,600
Inventories		
Finished goods	522,300	496,200
Work in process	132,400	141,500
Materials and supplies	44,800	39,100
Other	72,800	54,800
Total current assets	\$ 1,059,800	\$ 1,076,600
Property, plant, and equipment		
Land	\$ 20,100	\$ 19,300
Buildings, structures and improvements	486,400	435,600
Machinery and equipment	1,076,600	1,041,300
Construction in progress	24,200	35,200
Total property, plant and equipment	\$ 1,607,300	\$ 1,531,400
Less accumulated depreciation	578,900	473,200
Net property, plant and equipment	\$ 1,028,400	\$ 1,058,200
Other assets		
Goodwill (less accumulated amortization of \$257,800,000 and \$242,400,000, respectively).	\$ 771,100	\$ 965,800
Other	60,200	62,900
Total other assets	\$831,300	\$ 1,028,700
Total assets	\$ 2,919,500	\$ 3,163,500
Liabilities and stockholders' equity		
Current liabilities		
Current maturities of long-term debt	\$ 14,600	\$ 23,100
Trade accounts payable	60,100	113,300
Accrued insurance obligations	38,800	23,600
Accrued advertising and promotion	23,800	23,400
Interest payable	16,000	18,300
Accrued payroll and vacation pay	15,300	33,100
Accrued pension	11,300	19,800
Other accounts payable and accrued expenses	123,900	77,200
Total current liabilities	\$ 303,800	\$ 331,800
Noncurrent liabilities		
Long-term debt	1,427,200	1,440,200
Net deferred income taxes	0	43,400
Other	292,900	222,300
Total noncurrent liabilities	\$ 1,720,000	\$ 1,705,900
Total liabilities	\$ 2,023,900	\$ 2,037,700
Common stockholders' equity		
Common stock and capital in excess of par value, \$.01 par value; authorized, Class A, 200,000,000 shares, Class B, 30,000,000 shares; issued and outstanding:		
Class A Common Stock, 69,268,701 and 69,160,349 shares, respectively	\$ 465,600	\$ 463,700
Class B Common Stock, 6,690,976 shares	4,400	4,400
Retained earnings	448,100	680,600

## 17. Analysis and interpretation of financial statements

Currency translation and minimum pension liability adjustments	(22,500)	(22,900)
Total common stockholders' equity	\$ 895,600	\$ 1,125,800
Total liabilities and stockholders' equity	\$ 2,919,500	\$ 3,163,500

Perform a horizontal and vertical analysis of Loom's financial statements in a manner similar to those illustrated in this chapter. Comment on the results of the analysis in (a).

**Problem B** Deere & Company manufactures, distributes, and finances a full range of agricultural equipment; a broad range of industrial equipment for construction, forestry, and public works; and a variety of lawn and grounds care equipment. The company also provides credit, health care, and insurance products for businesses and the general public. Consider the following information from the Deere & Company 2000 Annual Report:

(in millions)	1997	1998	1999	2000
Sales	\$12,791	\$13,822	\$11,751	\$13,137
Cost of goods sold	8,481	9,234	8,178	8,936
Gross margin	4,310	4,588	3,573	4,201
Operating expenses	2,694	2,841	3,021	3,236
Net operating income	\$ 1,616	\$ 1,747	\$ 552	\$ 965

- Prepare a statement showing the trend percentages for each item using 1997 as the base year.
- Comment on the trends noted in part (a).

**Problem C** The following data are for Toy Company:

	December 31	
	2011	2010
Allowance for uncollectible accounts	\$72,000	\$57,000
Prepaid expenses	34,500	45,000
Accrued liabilities	210,000	186,000
Cash in Bank A	1,095,000	975,000
Wages payable	-0-	37,500
Accounts payable	714,000	585,000
Merchandise inventory	1,342,500	1,437,000
Bonds payable, due in 2005	615,000	594,000
Marketable securities	217,500	147,000
Notes payable (due in six months)	300,000	195,000
Accounts receivable	907,500	870,000
Cash flow from operating activities	192,000	180,000

- Compute the amount of working capital at both year-end dates.
- Compute the current ratio at both year-end dates.
- Compute the acid-test ratio at both year-end dates.
- Compute the cash flow liquidity ratio at both year-end dates.
- Comment briefly on the company's short-term financial position.

**Problem D** On 2011 December 31, Energy Company's current ratio was 3:1 before the following transactions were completed:

- Purchased merchandise on account.
- Paid a cash dividend declared on 2011 November 15.
- Sold equipment for cash.
- Temporarily invested cash in trading securities.
- Sold obsolete merchandise for cash (at a loss).
- Issued 10-year bonds for cash.
- Wrote off goodwill to retained earnings.
- Paid cash for inventory.
- Purchased land for cash.

- Returned merchandise that had not been paid for.
- Wrote off an account receivable as uncollectible. Uncollectible amount is less than the balance in the Allowance for Uncollectible Accounts.
- Accepted a 90-day note from a customer in settlement of customer's account receivable.
- Declared a stock dividend on common stock.

Consider each transaction independently of all the others.

a. Indicate whether the amount of working capital will increase, decrease, or be unaffected by each of the transactions.

b. Indicate whether the current ratio will increase, decrease, or be unaffected by each of the transactions.

**Problem E** Digital Company has net operating income of USD 500,000 and operating assets of USD 2,000,000.

Its net sales are USD 4,000,000.

The accountant for the company computes the rate of return on operating assets after computing the operating margin and the turnover of operating assets.

a. Show the computations the accountant made.

b. Indicate whether the operating margin and turnover increase or decrease after each of the following changes.

Then determine what the actual rate of return on operating assets would be. The events are not interrelated; consider each separately, starting from the original earning power position. No other changes occurred.

(a) Sales increased by USD 160,000. There was no change in the amount of operating income and no change in operating assets.

(b) Management found some cost savings in the manufacturing process. The amount of reduction in operating expenses was USD 40,000. The savings resulted from the use of less materials to manufacture the same quantity of goods. As a result, average inventory was USD 16,000 lower than it otherwise would have been. Operating income was not affected by the reduction in inventory.

(c) The company invested USD 80,000 of cash (received on accounts receivable) in a plot of land it plans to use in the future (a nonoperating asset); income was not affected.

(d) The federal income tax rate increased and caused income tax expense to increase by USD 20,000. The taxes have not yet been paid.

(e) The company issued bonds and used the proceeds to buy USD 400,000 of machinery to be used in the business. Interest payments are USD 20,000 per year. Net operating income increased by USD 100,000 (net sales did not change).

**Problem F** Polaroid Corporation designs, manufactures, and markets worldwide instant photographic cameras and films, electronic imaging recording devices, conventional films, and light polarizing filters and lenses. The following information is for Polaroid:

(in millions)	2000	1999
Net sales	\$13,994	\$14,089
Income before interest and taxes	2,310	2,251
Net income	1,407	1,392
Interest expense	178	142
Stockholders' equity (on 1998 December 31, \$3,988)	3,428	3,912
Common stock, par value \$1, December 31	978	978

Compute the following for both 2000 and 1999. Then compare and comment.

## 17. Analysis and interpretation of financial statements

- EPS of common stock.
- Net income to net sales.
- Net income to average common stockholders' equity.
- Times interest earned ratio.

**Problem G** The Walt Disney Company operates several ranges of products from theme parks and resorts to broadcasting and other creative content. The following balance sheet and supplementary data are for The Walt Disney Company for 2000.

**The Walt Disney Company  
Consolidated balance sheet  
For 2000 September 30  
(USD millions)**

Assets		
Cash and cash equivalents		\$ 842
Receivables		3,599
Inventories		702
Film and television costs		1,162
Other		1,258
Total current costs		\$7,563
Film and television costs		5,339
Investments		2,270
Theme parks, resorts, and other property, at cost		
Attractions, buildings, and equipment	\$16,160	
Accumulated depreciation	(6,892)	
		9,718
Project in process		1,995
Land		597
Intangibles assets, net		16,117
Other assets		1,428
Total assets		\$25,027
Liabilities and stockholders' equity		
Accounts payable and accrued liabilities		\$ 5,161
Current portion of borrowing		2,502
Unearned royalties		739
Total current liabilities		\$ 8,402
Borrowings		6,959
Deferred income taxes		2,833
Other long-term liabilities		2,377
Minority interest		356
Common shareholders' equity		
Common shares (\$.01 par value)	\$12,101	
Retained earnings	12,767	
Cumulative translation and other adjustments	(28)	
Treasury shares	(740)	24,100
Total liabilities and stockholders' equity		\$45,027

- Net income, USD 920.
- Income before interest and taxes, USD 3,231.
- Cost of goods sold, USD 21,321.
- Net sales, USD 25,402.
- Inventory on 1999 September 30, USD 796.
- Total interest expense for the year, USD 598.

Calculate the following ratios and show your computations. For calculations normally involving averages, such as average stockholders' equity, use year-end amounts unless the necessary information is provided.

- Current ratio.
- Net income to average common stockholders' equity.
- Inventory turnover.

- d. Number of days' sales in accounts receivable (assume 365 days in 2000).
- e. EPS of common stock (ignore treasury stock).
- f. Times interest earned ratio.
- g. Equity ratio.
- h. Net income to net sales.
- i. Total assets turnover.
- j. Acid-test ratio.

**Problem H** Cooper Company currently uses the FIFO method to account for its inventory but is considering a switch to LIFO before the books are closed for the year. Selected data for the year are:

Merchandise inventory, January 1	\$1,430,000
Current assets	3,603,600
Total assets (operating)	5,720,000
Cost of goods sold (FIFO)	2,230,800
Merchandise inventory, December 31 (LIFO)	1,544,400
Merchandise inventory, December 31 (FIFO)	1,887,600
Current liabilities	1,144,000
Net sales	3,832,400
Operating expenses	915,200

- a. Compute the current ratio, inventory turnover ratio, and rate of return on operating assets assuming the company continues using FIFO.
- b. Repeat part (a) assuming the company adjusts its accounts to the LIFO inventory method.

### Alternate problems

**Alternate problem A** Steel Corporation's comparative statements of income and retained earnings and consolidated balance sheet for 2010 and 2009 follow:

**Steel Corporation**  
**Consolidated statement of Earnings**  
**For the years ended 2010 December 31, 2009**  
**(USD thousands)**

	<b>December 31</b>	
	<b>(1)</b>	<b>(2)</b>
	<b>2010</b>	<b>2009</b>
Net sales	\$4,876.5	\$4,819.4
Costs and expenses:		
Cost of sales	\$4,202.8	\$4,287.3
Depreciation	284.0	261.1
Estimated restructuring losses	111.8	137.4
Total costs	\$4,598.6	\$4,685.8
Income from operations	\$268.9	\$ 133.6
Financing income (expense):		
Interest and other income	7.7	7.1
Interest and other financing costs	(60.0)	(46.2)
Loss before income taxes and cumulative effect of changes in accounting	\$ 216.6	\$ 94.5
Benefit (provision) for income taxes	(37.0)	(14.0)
Net earning (loss)	\$ 179.6	\$ 80.5
Retained earnings, January 1	(859.4)	(939.9)
	\$ (679.8)	\$ (859.4)
Dividends	0.0	0.0
Retained earnings, December 31	\$ (679.8)	(859.4)

**Steel Corporation**  
**Consolidated balance sheet**  
**As of 2010 December 31, and 2009**

	<b>December 31</b>	
	<b>(1)</b>	<b>(2)</b>
	<b>2010</b>	<b>2009</b>

## 17. Analysis and interpretation of financial statements

<b>Assets</b>		
Current Assets		
Cash and cash equivalents	\$ 180.0	\$ 159.5
Receivables	374.6	519.5
Total	\$ 554.6	\$ 679.0
Inventories		
Raw materials and supplies	\$ 335.5	\$ 331.9
Finished and semifinished products	604.9	534.9
Contract work in process less billings of \$10.9 and \$2.3	17.8	16.1
Total inventories	\$ 958.2	\$ 882.9
Other current assets	\$ 13.0	\$ 7.2
Total current assets	\$ 1,525.8	\$ 1,569.1
Property, plant and equipment less accumulated depreciation of \$4329.5 and \$4167.8	\$ 2,714.2	\$ 2,759.3
Investments and miscellaneous assets	112.3	124.2
Deferred income tax asset – net	885.0	903.2
Intangible asset – Pensions	463.0	426.6
Total assets	\$ 5,700.3	\$ 5,782.4
Liabilities and stockholders' equity		
Current liabilities		
Accounts payable	\$ 381.4	\$ 387.0
Accrued employment costs	208.0	165.8
Postretirement benefits other than pensions	150.0	138.0
Accrued taxes	72.4	67.6
Debt and capital lease obligations	91.5	88.9
Other current liabilities	146.3	163.9
Total current liabilities	\$ 1,049.6	\$ 1,011.2
Pension liability	\$ 1,115.0	\$ 1,117.1
Postretirement benefits other than pensions	1,415.0	1,441.4
Long-term debt and capital lease obligations	546.8	668.4
Other	335.6	388.5
Total noncurrent liabilities	\$ 3,412.4	# 3,615.4
Total liabilities	\$ 4,462.0	\$ 4,626.6
Common stockholders' equity		
Preferred stock – at \$1 per share par value (aggregate liquidation preference of \$481.2); Authorized 20,000,000 shares	\$ 11.6	\$ 11.6
Preference stock – at \$1 per share par value (aggregate liquidation preference of \$88.2); Authorized 20,000,000 shares	2.6	2.6
Common stock – at \$1 per share par value/Authorized 250,000,000 and 150,000,000 shares; Issued 112,699,869 and 111,882,276 shares	112.7	111.9
Held in treasury, 1,992,189 and 1,996,715 shares at cost	(59.4)	(59.5)
Additional paid-in capital	1,850.6	1,948.6
Accumulated deficit	(679.8)	(859.4)
Total common stockholders' equity	\$ 1,238.3	\$ 1,155.8
Total liabilities and stockholders' equity	\$ 5,700.3	\$ 5,782.4

a. Perform a horizontal and vertical analysis of Steel's financial statements in a manner similar to Exhibit 133 and Exhibit 134.

b. Comment on the results obtained in part (a).

**Alternate problem B** Ford Motor Company is the world's second-largest producer of cars and trucks and ranks among the largest providers of financial services in the United States. The following information pertains to Ford: (in millions)

(in millions)	1998	1999	2000
Sales	\$118,017	\$135,073	\$141,230
Cost of goods sold	104,616	118,985	126,120
Gross margin	\$ 13,401	\$ 16,088	\$ 15,110
Operating expenses	7,834	8,874	9,884
Net operating income	\$ 5,567	\$ 7,214	\$ 5,226

- Prepare a statement showing the trend percentages for each item, using 1998 as the base year.
- Comment on the trends noted in part (a).

**Alternate problem C** The following data are for Clock Company: Allowance for uncollectible accounts

	<b>December 31</b>	
	<b>2011</b>	<b>2010</b>
Notes payable (due in 90 days)	\$75,200	\$60,000
Merchandise inventory	240,000	208,000
Cash	100,000	128,000
Marketable securities	49,600	30,000
Accrued liabilities	19,200	22,000
Accounts receivable	188,000	184,000
Accounts payable	112,000	72,000
Allowance for uncollectible accounts	24,000	15,200
Bonds payable, due 2008	156,000	160,000
Prepaid expenses	6,400	7,360
Cash flow from operating activities	60,000	40,000

- Compute the amount of working capital at both year-end dates.
- Compute the current ratio at both year-end dates.
- Compute the acid-test ratio at both year-end dates.
- Compute the cash flow liquidity ratio at both year-end dates.
- Comment briefly on the company's short-term financial position.

**Alternate problem D** Tulip Products, Inc., has a current ratio on 2010 December 31, of 2:1 before the following transactions were completed:

- Sold a building for cash.
- Exchanged old equipment for new equipment. (No cash was involved.)
- Declared a cash dividend on preferred stock.
- Sold merchandise on account (at a profit).
- Retired mortgage notes that would have matured in 2011.
- Issued a stock dividend to common stockholders.
- Paid cash for a patent.
- Temporarily invested cash in government bonds.
- Purchased inventory for cash.
- Wrote off an account receivable as uncollectible. Uncollectible amount is less than the balance of the Allowance for Uncollectible Accounts.
- Paid the cash dividend on preferred stock that was declared earlier.
- Purchased a computer and gave a two-year promissory note.
- Collected accounts receivable.
- Borrowed from the bank on a 120-day promissory note.
- Discounted a customer's note. Interest expense was involved.

Consider each transaction independently of all the others.

- Indicate whether the amount of working capital will increase, decrease, or be unaffected by each of the transactions.
- Indicate whether the current ratio will increase, decrease, or be unaffected by each of the transactions.

**Alternate problem E** The following selected data are for three companies:

<b>Operating</b>	<b>Net</b>	<b>Net</b>
------------------	------------	------------



## 17. Analysis and interpretation of financial statements

	<b>Assets</b>	<b>Operating Income</b>	<b>Sales</b>
Company 1	\$ 1,404,000	\$ 187,200	\$ 2,059,200
Company 2	8,424,000	608,400	18,720,000
Company 3	37,440,000	4,914,000	35,100,000

a. Determine the operating margin, turnover of operating assets, and rate of return on operating assets for each company.

b. In the subsequent year, the following changes took place (no other changes occurred):

Company 1 bought some new machinery at a cost of USD 156,000. Net operating income increased by USD 12,480 as a result of an increase in sales of USD 249,600.

Company 2 sold some equipment it was using that was relatively unproductive. The book value of the equipment sold was USD 624,000. As a result of the sale of the equipment, sales declined by USD 312,000, and operating income declined by USD 6,240.

Company 3 purchased some new retail outlets at a cost of USD 6,240,000. As a result, sales increased by USD 9,360,000, and operating income increased by USD 499,200.

- Which company has the largest absolute change in:

- Operating margin ratio?
- Turnover of operating assets?
- Rate of return on operating assets?

- Which one realized the largest dollar change in operating income? Explain this change in relation to the changes in the rate of return on operating assets.

**Alternate problem F** One of the largest spice companies in the world, McCormick & Company, Inc., produces a diverse array of specialty foods. The following information is for McCormick & Company, Inc.:

	<b>2000</b>	<b>1999</b>
(USD thousands)		
Net sales	\$2,123,500	\$2,006,900
Income before interest and taxes	225,700	174,700
Net income	137,500	98,500
Interest expense	39,700	32,400
Stockholders' equity	359,300	382,400
Common stock, no par value, November 30	175,300	173,800

Assume average common shares outstanding for 2000 and 1999 are 69,600 and 72,000 (in thousands), respectively.

Compute the following for both 2000 and 1999. Then compare and comment. Assume stockholders' equity for 1998 was USD 388,100.

- EPS of common stock.
- Net income to net sales.
- Return on average common stockholders' equity.
- Times interest earned ratio.

**Alternate problem G** Parametric Technology Corporation is in the CAD/CAM/CAE industry and is the top supplier of software tools used to automate a manufacturing company. The following consolidated balance sheet and supplementary data are for Parametric for 2003:

**Parametric Technology Corporation**  
**Consolidated balance sheet**  
**For 2003 September 30 (in thousands)**  
**Assets**

Current assets	
Cash and cash equivalents	\$ 325,872
Short-term investments	22,969
Accounts receivable, net of allowances for doubtful account of \$6,270	183,804
Other current assets	95,788
Total current assets	\$ 628,433
Marketable investments	26,300
Property and equipment, net	66,879
Other assets	203,271
Total assets	\$ 924,883

**Liabilities and stockholders' equity**

Current liabilities	
Accounts payable and accrued expenses	\$ 77,144
Accrued compensation	52,112
Deferred revenue	231,495
Income taxes	1,601
Total current liabilities	\$ 362,352
Other liabilities	33,989
Stockholders' equity	
Preferred stock, \$.01 par value; 5,000 shares authorized; none issued	
Common stock, \$.01 par value; 500,000 shares authorized; 276,053 (2000) and 272,277 (1999) shares issued	2,761
Additional paid-in capital	1,641,513
Foreign currency translation adjustment	(12,629)
Accumulated deficit	(1,036,456)
Treasury stock, at cost, 6,456 (2000) and 2,113 (1999) shares	(66,647)
Total liabilities and stockholders' equity	\$ 924,883

- Net loss, (USD 3,980).
- Loss before interest and taxes, (USD 4,700).
- Cost of goods sold, USD 244,984.
- Net sales, USD 928,414.
- Total interest expense for the year, USD 367.
- Weighted-average number of shares outstanding, 273,081.

Calculate the following ratios and show your computations. For calculations normally involving averages, such as average accounts receivable or average stockholders' equity, use year-end amounts if the information is not available to use averages.

- Current ratio.
- Net income to average common stockholders' equity.
- Number of days' sales in accounts receivable (assume 365 days in 2003).
- EPS of common stock.
- Times interest earned ratio.
- Equity ratio.
- Net income to net sales.
- Total assets turnover.
- Acid-test ratio.

**Alternate problem H** Paper Company is considering switching from the FIFO method to the LIFO method of accounting for its inventory before it closes its books for the year. The January 1 merchandise inventory was USD 864,000. Following are data compiled from the adjusted trial balance at the end of the year:

Merchandise inventory, December 31 (FIFO)	\$1,008,000
Current liabilities	720,000
Net sales	2,520,000
Operating expenses	774,000

## 17. Analysis and interpretation of financial statements

Current assets	1,890,000
Total assets (operating)	2,880,000
Cost of goods sold	1,458,000

If the switch to LIFO takes place, the December 31 merchandise inventory would be USD 900,000.

- Compute the current ratio, inventory turnover ratio, and rate of return on operating assets assuming the company continues using FIFO.
- Repeat (a) assuming the company adjusts its accounts to the LIFO inventory method.

### Beyond the numbers – Critical thinking

**Business decision case A** The comparative balance sheets of the Darling Corporation for 2011 December 31, and 2010 follow:

**Darling Corporation  
Comparative balance sheets  
2011 December 31, and 2010  
(USD millions)**

	2011	2010
Assets		
Cash	\$ 480,000	\$ 96,000
Accounts receivable, net	86,400	115,200
Merchandise inventory	384,000	403,200
Plant and equipment, net	268,800	288,000
Total assets	\$ 1,219,200	\$902,400
Liabilities and stockholders' equity		
Accounts payable	\$ 96,000	\$ 96,000
Common stock	672,000	672,000
Retained earnings	451,200	134,400
Total liabilities and stockholders' equity	\$1,219,200	\$902,400

Based on your review of the comparative balance sheets, determine the following:

- What was the net income for 2011 assuming there were no dividend payments?
- What was the primary source of the large increase in the cash balance from 2010 to 2011?
- What are the two main sources of assets for Darling Corporation?
- What other comparisons and procedures would you use to complete the analysis of the balance sheet?

**Business decision case B** As Miller Manufacturing Company's internal auditor, you are reviewing the company's credit policy. The following information is from Miller's annual reports for 2008, 2009, 2010, and 2011:

	2008	2009	2010	2011
Nets accounts receivable	\$ 1,080,000	\$ 2,160,000	\$ 2,700,000	\$ 3,600,000
Net sales	10,800,000	13,950,000	17,100,000	19,800,000

Management has asked you to calculate and analyze the following in your report:

- If cash sales account for 30 per cent of all sales and credit terms are always 1/10, n/60, determine all turnover ratios possible and the number of days' sales in accounts receivable at all possible dates. (The number of days' sales in accounts receivable should be based on year-end accounts receivable and net credit sales.)
- How effective is the company's credit policy?

**Business decision case C** Wendy Prince has consulted you about the possibility of investing in one of three companies (Apple, Inc., Baker Company, or Cookie Corp.) by buying its common stock. The companies' investment shares are selling at about the same price. The long-term capital structures of the companies alternatives are as follows:

	Apple, Inc.	Baker Company	Cookie Corp.
Bonds with a 10% interest rate			\$2,400,000
Preferred stock with an 8%		\$2,400,000	

dividend rate			
Common stock, \$10 par value	\$4,800,000	2,400,000	2,400,000
Retained earnings	384,000	384,000	384,000
Total long-term equity	\$5,184,000	\$5,184,000	\$5,184,000
Number of common shares outstanding	480,000	240,000	240,000

Prince has already consulted two investment advisers. One adviser believes that each of the companies will earn USD 300,000 per year before interest and taxes. The other adviser believes that each company will earn about USD 960,000 per year before interest and taxes. Prince has asked you to write a report covering these points:

- a. Compute each of the following, using the estimates made by the first and second advisers.
  - (a) Earnings available for common stockholders assuming a 40 per cent tax rate.
  - (b) EPS of common stock.
  - (c) Rate of return on total stockholders' equity.
- b. Which stock should Prince select if she believes the first adviser?
- c. Are the stockholders as a group (common and preferred) better off with or without the use of long-term debt in the companies?

**Annual Report analysis D** The following selected financial data excerpted from the annual report of Appliance Corporation represents the summary information which management presented for interested parties to review:

<b>Appliance Corporation</b>					
<b>Selected Financial Data</b>					
<b>(USD thousands except per share data)</b>					
	<b>2010</b>	<b>2009</b>	<b>2008</b>	<b>2007</b>	<b>2006</b>
Net sales	\$3,049,524	\$3,372,515	\$2,987,054	\$3,041,223	\$2,970,626
Cost of sales	2,250,616	2,496,065	2,262,942	2,339,406	2,254,221
Income taxes	74,800	90,200	38,600	15,900	44,400
Income (loss) from continuing operations	(14,996)	151,137	51,270	(8,254)	79,017
Per cent of income (loss) from continuing operations to net sales	(0.5%)	4.5%	1.7%	(0.3%)	2.7%
Income (loss) from continuing operations per share	\$ (0.14)	1.42	0.48	(0.08)	\$ 0.75
Dividends paid per share	0.515	0.50	0.50	0.50	0.50
Average shares outstanding (in thousands)	107,062	106,795	106,252	106,077	105,761
Working capital	\$ 543,431	\$ 595,703	\$ 406,181	\$452,626	\$ 509,025
Depreciation of property, plant and equipment	102,572	110,044	102,459	94,032	83,352
Additions to property, plant and equipment	152,912	84,136	99,300	129,891	143,372
Total assets	2,125,066	2,504,327	2,469,498	2,501,490	2,535,068
Long-term debt	536,579	663,205	724,65	789,232	809,480
Total debt to capitalization	45.9%	50.7%	60.0%	58.7%	45.9%
Shareowners' equity per share of common stock	\$ 6.05	\$ 6.82	\$ 5.50	\$ 9.50	

- a. As a creditor, what do you believe management's objectives should be? Which of the preceding items of information would assist a creditor in judging management's performance?
- b. As an investor, what do you believe management's objectives should be? Which of the preceding items of information would assist an investor in judging management's performance?
- c. What other information might be considered useful?

**Group project E** Choose a company the class wants to know more about and obtain its annual report. In groups of two or three students, calculate either the liquidity, equity, profitability, or market test ratios. Each group

## 17. Analysis and interpretation of financial statements

should select a spokesperson to tell the rest of the class the results of the group's calculations. Finally, the class should decide whether or not to invest in the corporation based on the ratios they calculated.

**Group project F** In a group of two or three students, go to the library and attempt to locate Dun & Bradstreet's Industry Norms and Key Business Ratios. You may have to ask the reference librarian for assistance to see if this item is available at your institution. If it is not available at your institution, ask if it is available through an interlibrary loan. (Obviously, if you cannot obtain this item, you cannot do this project.) Then select and obtain the latest annual report of a company of your choice. Determine the company's SIC Code (a code that indicates the industry in which that company operates). SIC Codes for specific companies are available on COMPACT DISCLOSURE, an electronic source that may be available at your library. As an alternative, you could call the company's home office to inquire about its SIC Code. The annual report often contains the company's phone number. From the annual report, determine various ratios for the company, such as the current ratio, debt to equity ratio, and net income to net sales. Then compare these ratios to the industry norms for the company's SIC Code as given in the Dun & Bradstreet source. Write a report to your instructor summarizing the results of your investigation.

**Group project G** In a group of two or three students, obtain the annual report of a company of your choice. Identify the major sections of the annual report and the order in which they appear. Would you recommend the order be changed to emphasize the most useful and important information? If so, how? Then describe some specific useful information in each section. Comment on your perceptions of the credibility that a reader of the annual report could reasonably assign to each section of the report. For instance, if such a discussion appears in the annual report you select, would you assign high credibility to everything that appears in the Letter to Stockholders regarding the company's future prospects? Write a report to your instructor summarizing the results of your investigation.

### Using the Internet—A view of the real world

Visit the following website for Eastman Kodak Company:

<http://www.kodak.com>

By following choices on the screen, locate the income statements and balance sheets for the latest two years. Calculate all of the ratios illustrated in the chapter for which the data are available. Compare the ratios to those shown for Synotech as presented in the chapter. Write a report to your instructor showing your calculations and comment on the results of your comparison of the two companies.

Visit the following website for General Electric Company:

<http://www.ge.com>

By following choices on the screen, locate the income statements and balance sheets for the latest two years. Calculate all of the ratios illustrated in the chapter for which the data are available. Compare the ratios to those shown for Synotech as presented in the chapter. Write a report to your instructor showing your calculations and comment on the results of your comparison of the two companies.

### Answers to self-test

#### True-false

**True.** Financial statement analysis consists of applying analytical tools and techniques to financial statements and other relevant data to obtain useful information.

**False.** Horizontal analysis provides useful information about the changes in a company's performance over several periods by analyzing comparative financial statements of the same company for two or more successive periods.

**False.** Common-size statements show only percentage figures, such as percentages of total assets and percentages of net sales.

**True.** Liquidity ratios such as the current ratio and acid-test ratio indicate a company's short-term debt-paying ability.

**True.** The accrual net income shown on the income statement is not cash basis income and does not indicate cash flows.

**True.** Analysts must use comparable data when making comparisons of items for different periods or different companies.

### Multiple-choice

**b.** Current assets: USD 136,000 + USD 64,000 + USD 184,000 + USD 244,000 + USD 12,000 = USD 640,000

Current liabilities: USD 256,000 + USD 64,000 = USD 320,000

Current ratio:  $\frac{\text{USD } 640,000}{\text{USD } 320,000} = 2:1$

**c.** Quick assets:

USD 136,000 + USD 64,000 + USD 184,000 = USD 384,000

Current liabilities:

256,000 + USD 64,000 = USD 320,000

Acid-test ratio:  $\frac{\text{USD } 384,000}{\text{USD } 320,000} = 1.2:1$

**a.** Net sales:

USD 4,620,000

Average accounts receivable:  $\frac{(\text{USD } 720,000 + \text{USD } 960,000)}{2} = \text{USD } 840,000$

Accounts receivable turnover:  $\frac{\text{USD } 4,620,000}{\text{USD } 840,000} = 5.5$

**c.** Cost of goods sold:

USD 3,360,000

Average inventory:

$\frac{\text{USD } 900,000 + \text{USD } 1,020,000}{2} = \text{USD } 960,000$

Inventory turnover:  $\frac{\text{USD } 3,360,000}{\text{USD } 960,000} = 3.5$

**b.** Income before interest and taxes, USD 720,000

Interest on bonds, 192,000

Times interest earned ratio: USD 720,000 / USD 192,000 = 3.75 times

# 18. Managerial accounting concepts/job costing

## Learning objectives

After studying this chapter, you should be able to:

- Compare and contrast managerial accounting and financial accounting.
- Describe the basic components of a products cost.
- Explain the difference between product costs and period costs.
- Compare financial reporting by a merchandiser to that of a manufacturer and prepare a statement of cost of goods manufactured, an income statement, and a balance sheet for a manufacturer.
- Explain the pattern of cost flows for a company.
- Compare and contrast different production methods and accounting systems.
- Describe job cost flows and determine the cost of jobs.
- Explain how and why predetermined overhead rates are computed.
- Describe the differences in net income under absorption costing and variable costing (appendix).

## A manager's perspective

### **Ann Francis**

*Manager, Consumer Affairs Administration*

*The Coca-Cola Company*

Regardless of the area of business in which they choose to make their careers, students, especially when they reach the management level, will inevitably have financial responsibilities. As a manager, I need to understand some basic accounting information in order to make decisions and to process the information flow in and out of my office.

For example, I manage a department budget, and it is my responsibility to track cash inflow and outflow on a regular basis to ensure that the budget is administered appropriately. I track all our invoices, then reconcile them with a "Deck" report, which we receive from accounting. I also order supplies for our department, and that needs to be managed within a budget as well.

Every year we review our department's past expenditures and our anticipated expenditures, then establish a budget for the next year. At this point, we also make decisions about capital expenditures such as purchasing new computer equipment, and those plans are worked into the capital budget.

Aside from general administration, I am also responsible for a program called "Coca-Cola Cares", an employee hotline set up in 1992 to provide a vehicle for employees to report any problems they notice in the marketplace such as broken vending machines or inappropriate use of our trademark. I receive weekly and monthly reports to assess improvements based on increases and decreases in the number of calls we receive.

## 18. Managerial accounting concepts/job costing

Another group under my management is telemarketing services, an internal service set up to help Coca-Cola associates with market research and customer service projects. Since independent telemarketing services can be very expensive, this system allows us to maintain high quality service to Coca-Cola customers in the most economically feasible way.

Have you ever considered starting or running a business, or know someone who has? Have you considered providing management skills to a nonprofit organization? If so, then you realize that good decisions are based on good information.

Managerial accounting helps managers make good decisions. Managerial accounting provides information about the cost of goods and services, whether a product is profitable, whether to invest in a new business venture, and how to budget. It compares actual performance to planned performance and facilitates many other important decisions critical to the success of organizations.

The remaining chapters in this book focus on managerial accounting. This chapter provides an overview of managerial accounting, defines cost terms, and shows how to determine the cost of a particular type of product known as a job.

### Compare managerial accounting with financial accounting

Whereas financial accounting provides financial information primarily for external use, **managerial accounting** information is for internal use. By reporting on the financial activities of the organization, financial accounting provides information needed by investors and creditors.

Most managerial decisions require more detailed information than that provided by external financial reports. For instance, in their external financial statements, large corporations such as General Electric Company show single amounts on their balance sheets for inventory. However, managers need more detailed information about the cost of each of several hundred products.

We show the fundamental differences between managerial and financial accounting in the chart.

<b>Financial accounting</b>	<b>Managerial accounting</b>
<b>Users</b> External users of information – usually shareholders, financial analysts, and creditors Compliance with generally accepted Accounting Principles Must comply with generally accepted accounting principles.	Internal users of information – usually managers.  Need not comply with generally accepted accounting principles. Internal cost/benefit evaluation determines how much information is enough.
<b>Future versus past</b> Uses historical data.	May use estimates of the future for budgeting and decision making.
<b>Detail presented</b> Presents summary data, costs, revenues, and profits.	More detailed data are presented about product.

Accountants currently face a big challenge: designing information systems that provide information for multiple purposes. Some people at lower levels in the organization need detailed information, but not the big picture provided by a company's income statement. However, managers at top levels need to see the big picture.

All of you will use accounting information in your careers. Therefore, you need to know enough about accounting to get the information you need for decision making.

Managerial accountants face many choices involving ethics. For example, managers are responsible for achieving financial targets such as net income. Managers who fail to achieve these targets may lose their jobs. If a



division or company is having trouble achieving financial performance targets, managers may be tempted to manipulate the accounting numbers.

In its Standards of Ethical Conduct for Management Accountants, the Institute of Management Accountants (IMA) states that management accountants have an obligation to maintain the highest levels of ethical conduct by maintaining professional competency, refraining from disclosing confidential information, and maintaining integrity and objectivity in their work.<sup>58</sup>

The standards recommend that people faced with ethical conflicts follow the company's established policies that deal with such conflicts. If the policies do not resolve the conflict, accountants should consider discussing the matter with their superiors, potentially going as high as the audit committee of the board of directors. In extreme cases, the accountants may have no alternative but to resign.

### **Merchandise and manufacturer accounting: Differences in cost concepts**

**Cost** is a financial measure of the resources used or given up to achieve a stated purpose. Product costs are the costs a company assigns to units produced. **Product costs** are the costs of making a product, such as an automobile; the cost of making and serving a meal in a restaurant; or the cost of teaching a class in a university.

Manufacturing companies use the most complex product costing methods. To ensure that you understand how and why product costing is done in manufacturing companies, we use many manufacturing company examples. However, since many of you could have careers in service or merchandising companies, we also use nonmanufacturing examples.

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#### **An ethical perspective: High pressure sales tactics and creative accounting**

The most common financial fraud is premature recording of revenues. For instance, a manager or accountant recorded a sale before the end of Year 1 when, in fact, the sale occurred in Year 2. That sale and its profits appear on the Year 1 financial statements, instead of the Year 2 financial statements. A company known as Comserv provides an example of this type of fraud.

Comserv was a software development company that installed specialized software for companies. Comserv recorded revenue for a software installation as follows: First, it recorded a portion of the revenue when the customer signed a contract. Second, it recorded the rest of the revenue when the installation was complete. This approach complied with generally accepted accounting principles for external reporting and with company policy for internal reporting.

Using this method, salespeople had incentives to pressure customers to sign contracts before the end of the fiscal year. Subsequent investigations by Comserv's external auditors and the Securities and Exchange Commission uncovered several fraudulent activities. For instance, employees backdated sales contracts by recording a contract signed on January 28 of Year 2 as being signed on December 28 of Year 1. (The end of the fiscal year was December 31.)

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<sup>58</sup> See Standards of Ethical Conduct for Management Accountants (Montvale, N.J.: Institute of Management Accountants, June 1, 1983.)

## 18. Managerial accounting concepts/job costing

Comserv salespeople also persuaded customers to sign contracts for software installations before the end of the fiscal year while providing a separate side agreement that allowed customers to withdraw from the deal at a later date. Because of this side agreement, the company should not have recorded revenue at the time the contract was signed. Comserv should have waited until customers could no longer withdraw from the contract. The accounting department, not knowing of the separate side agreement, recorded revenue at the time of the contract.

The Securities and Exchange Commission alleged many people at Comserv were involved in fraudulent activities, including salespeople and accountants who unwittingly supported these activities. In the end, several people were charged with committing fraud by the Securities and Exchange Commission, and the company was taken over by another company in the computer software industry.

Based on the authors' research of Securities and Exchange Commission files and court testimony.

In manufacturing companies, a product's cost is made up of three cost elements: direct material costs, direct labor costs, and manufacturing overhead costs.

**Direct materials** **Materials** are unprocessed items used in the manufacturing process. **Direct materials** are those materials used only in making the product and are clearly and easily traceable to a particular product. For example, iron ore is a direct material to a steel company because the iron ore is clearly traceable to the finished product, steel. In turn, steel becomes a direct material to an automobile manufacturer.

Some materials (such as glue and thread used in manufacturing furniture) may become part of the finished product, but tracing those materials to a particular product would require more effort than is sensible. Such materials, called indirect materials or supplies, are included in manufacturing overhead. **Indirect materials** are materials used in the manufacture of a product that cannot, or will not for practical reasons, be traced directly to the product being manufactured. Indirect materials are part of overhead, which we will discuss later.

**Direct labor** **Direct labor** costs include the labor costs of all employees actually working on materials to convert them into finished goods. As with direct material costs, direct labor costs of a product include only those labor costs clearly traceable to, or readily identifiable with, the finished product. The wages paid to a construction worker, a pizza delivery driver, and an assembler in an electronics company are examples of direct labor.

Many employees receive fringe benefits—employers pay for payroll taxes, pension costs, and paid vacations. These fringe benefit costs can significantly increase the direct labor hourly wage rate. Some companies treat fringe benefit costs as direct labor. Other companies include fringe benefit costs in overhead if they can be traced to the product only with great difficulty and effort.

Firms account for some labor costs (for example, wages of materials handlers, custodial workers, and supervisors) as indirect labor because the expense of tracing these costs to products would be too great. These indirect labor costs are part of overhead. **Indirect labor** consists of the cost of labor that cannot, or will not for practical reasons, be traced to the products being manufactured.

**Overhead** In a manufacturing company, overhead is generally called manufacturing overhead. (You may also see other names for manufacturing overhead, such as factory overhead, factory indirect costs, or factory burden.) Service companies use service overhead, and construction companies use construction overhead. Any of these

companies may just use the term overhead rather than specifying it as manufacturing overhead, service overhead, or construction overhead. Some people confuse overhead with selling and administrative costs. Overhead is part of making the good or providing the service, whereas selling costs result from sales activity and administrative costs result from running the business.

In general, **overhead** refers to all costs of making the product or providing the service except those classified as direct materials or direct labor. (Some service organizations have direct labor but not direct materials.) In manufacturing companies, **manufacturing overhead** includes all manufacturing costs except those accounted for as direct materials and direct labor. Manufacturing overhead costs are manufacturing costs that must be incurred but that cannot or will not be traced directly to specific units produced. In addition to indirect materials and indirect labor, manufacturing overhead includes depreciation and maintenance on machines and factory utility costs. Look at Exhibit 137 for more manufacturing overhead costs.

**Selling costs** **Selling costs** are costs incurred to obtain customer orders and get the finished product in the customers' possession. Advertising, market research, sales salaries and commissions, and delivery and storage of finished goods are selling costs. The costs of delivery and storage of finished goods are selling costs because they are incurred after production has been completed. Therefore, the costs of storing materials are part of manufacturing overhead, whereas the costs of storing finished goods are a part of selling costs. Remember that retailers, wholesalers, manufacturers, and service organizations all have selling costs.

**Administrative costs** **Administrative costs** are nonmanufacturing costs that include the costs of top administrative functions and various staff departments such as accounting, data processing, and personnel. Executive salaries, clerical salaries, office expenses, office rent, donations, research and development costs, and legal costs are administrative costs. As with selling costs, all organizations have administrative costs.

Companies also classify costs as product costs and period costs. **Product costs** are the costs incurred in making products. These costs include the costs of direct materials, direct labor, and manufacturing overhead.

**Period costs** are closely related to periods of time rather than units of products. For this reason, firms expense (deduct from revenues) period costs in the period in which they are incurred. Accountants treat all selling and administrative costs as period costs for external financial reporting.

Indirect labor:	Repairs and maintenance on factory buildings and equipment
Janitors in factory buildings	Payroll taxes and fringe benefits for manufacturing employees
Supervisors in factory buildings	Depreciation on factory buildings and equipment
Materials storeroom personnel	Insurance and taxes on factory property and inventories
Cost accountant	Utilities for factory buildings
Indirect materials:	
Oil	
Nails	

#### Exhibit 137: Manufacturing overhead costs

To illustrate, assume a company pays its sales manager a fixed salary. Even though the manager may be working on projects to benefit the company in future accounting periods, it expenses the sales manager's salary in the period incurred because the expense cannot be traced to the production of a specific product.

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### An accounting perspective:

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#### Business insight

Many service organizations have inventories. For example, consulting firms, public accounting firms, and law firms have inventories of work not yet billed to clients. The inventories in service companies are less tangible than the inventories in manufacturing companies. Inventories represent the time and talent that have gone into the job. In service companies, this includes working papers and documents or simply the ideas of the people doing the work.

#### Financial reporting by manufacturing companies

Many of you will work in manufacturing companies or provide services for them. Others will work in retail or service organizations that do business with manufacturers. This section will help you understand how manufacturing companies work and how to read both their internal and external financial statements.

Assume you own a bicycle store and purchase bicycles and accessories to sell to customers. To determine your profitability, you would subtract the cost of bicycles and accessories from your gross sales as cost of goods sold. However, if you owned the manufacturing company that made the bicycles, you would base your cost of goods sold on the cost of manufacturing those bicycles. Accounting for manufacturing costs is more complex than accounting for costs of merchandise purchased that is ready for sale.

Perhaps the most important accounting difference between merchandisers and manufacturers relates to the differences in the nature of their activities. A merchandiser purchases finished goods ready to be sold. On the other hand, a manufacturer must purchase raw materials and use production equipment and employee labor to transform the raw materials into finished products.

Thus, while a merchandiser has only one type of inventory—merchandise available for sale—a manufacturer has three types—unprocessed materials, partially complete work in process, and ready-for-sale finished goods. Instead of one inventory account, three different inventory accounts are necessary to show the cost of inventory in various stages of production. Looking at Exhibit 138, you can see how the inventory cost flows differ between manufacturing and merchandising companies.

We compare a manufacturer's cost of goods sold section of the income statement to that same section of the merchandiser's income statement in Exhibit 139. There are two major differences in these cost of goods sold sections: (1) goods ready to be sold are referred to as merchandise inventory by a merchandiser and finished goods inventory by a manufacturer, and (2) the net cost of purchases for a merchandiser is equivalent to the cost of goods manufactured by a manufacturer.

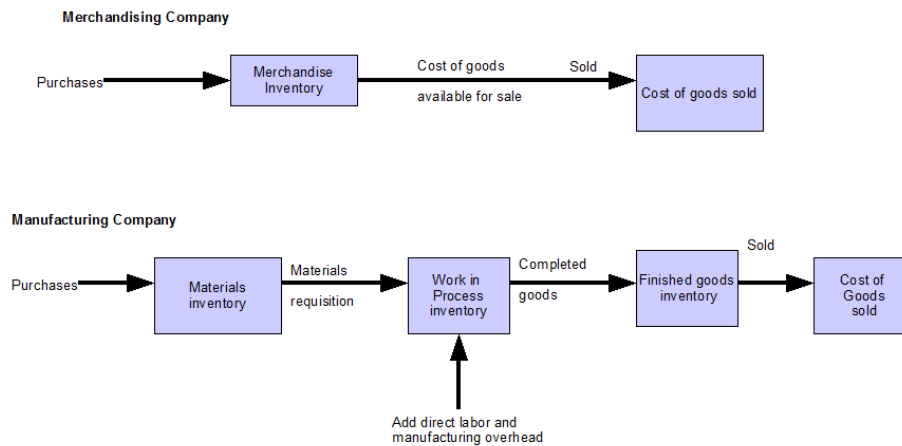


Exhibit 138: Comparison of inventory cost flows

Merchandiser		Manufacturer	
Cost of goods sold:		Cost of goods sold:	
Merchandise inventory, January 1	\$ 25,000	Finished goods inventory, January 1	\$ 50,000
Net cost of purchases	165,000	Cost of goods manufactured (from statement of cost of goods manufactured)	1,100,000
Cost of goods available for sale	\$ 190,000	Cost of goods available for sale	\$1,150,000
Merchandise inventory, December 31	30,000	Finished goods inventory, December 31	60,000
Cost of goods sold	\$ 160,000	Cost of goods sold	\$1,090,000

Exhibit 139: Cost of goods sold comparison

The **statement of cost of goods manufactured** supports the cost of goods sold figure on the income statement. (See the USD 1,100,000 cost of goods manufactured in Exhibit 139.) The two most important numbers on this statement are the cost to manufacture and the cost of goods manufactured. Be careful not to confuse the terms cost to manufacture and cost of goods manufactured with each other or with the cost of goods sold. We depict the relationship among these terms in Exhibit 140.

**Cost to manufacture** includes the costs of all resources put into production during the period. **Cost of goods manufactured** consists of the cost of all goods completed during the period. It includes cost to manufacture plus the beginning work in process inventory minus the ending work in process inventory. **Cost of goods sold** includes the cost of goods manufactured plus the beginning finished goods inventory minus the ending finished goods inventory.

Look at Exhibit 141, the statement of cost of goods manufactured for Farside Manufacturing Company for 2010. Farside Manufacturing makes calendars and books.

Note how the statement shows the costs incurred for direct materials, direct labor, and manufacturing overhead. The statement totals these three costs as cost to manufacture during the period. When adding beginning work in process inventory and deducting ending work in process inventory from the cost to manufacture, we obtain cost of goods manufactured or completed. Cost of goods sold does not appear on the cost of goods manufactured statement but on the income statement.

To make the manufacturer's income statement more understandable to readers of the financial statements, accountants do not show all of the details that appear in the cost of goods manufactured statement. In Exhibit 142

18. Managerial accounting concepts/job costing

on the next page, we show the income statement for Farside Manufacturing Company. Notice in Exhibit 142 the relationship of the statement of cost of goods manufactured to the income statement.

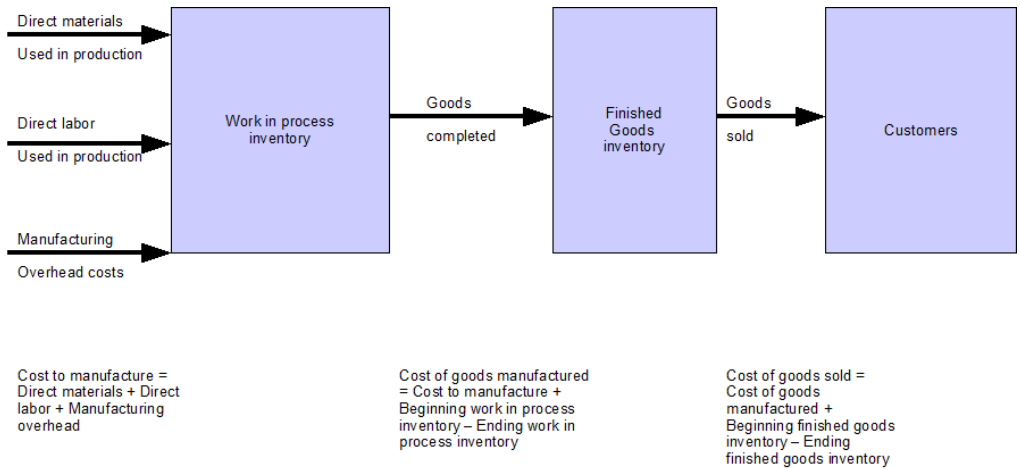


Exhibit 140: Relationship of cost to manufacture, cost of goods manufactured, and cost of goods sold

**Farside manufactured company**  
**Statement of cost of goods**  
**manufactured**  
**For the year ended 2010 December 31**

Direct materials	
Materials inventory, January 1	\$ 40,000
Materials purchases	480,000
Materials available for use	\$520,000
Less: Materials inventory, December 31	30,000
Materials used	\$490,000
Direct labor	380,000
Manufacturing overhead	
Indirect labor	\$ 120,000
Maintenance and repairs expense	60,000
Factory utilities expense	10,000
Depreciation expense - factory building	20,000
Depreciation expense - factory equipment	30,000
Other expense - factory	20,000
Total manufacturing overhead	260,000
Cost to manufacture	\$1,130,000
Add: Work in process inventory, January 1	30,000
	\$1,160,000
Less: Work in process inventory, December 31	60,000
Cost of goods manufactured	\$1,100,000

Exhibit 141: Statement of cost of goods manufactured

The cost of goods manufactured appears in the cost of goods sold section of the income statement. The cost of goods manufactured is in the same place that purchases would be presented on a merchandiser's income statement. We add cost of goods manufactured to beginning finished goods inventory to derive cost of goods available for sale. This is similar to the merchandiser who presents purchases added to beginning merchandise to derive goods available for sale.

Farside manufacturing company		
Income statement		
For the year ended 2010 December 31		
Sales		\$1,800,000
Cost of goods sold:		
Finished goods inventory, January 1	\$ 50,000	
Cost of goods manufactured (see statement of cost of goods manufactured in Exhibit 141)	1,100,000	
Cost of goods available for sale	\$1,150,000	
Less: Finished goods inventory, December 31	60,000	
Cost of goods sold		1,090,000
Gross margin		\$ 710,000
Operating expenses:		
Selling expenses	\$ 300,000	
Administrative expenses	200,000	
Total operating expenses		500,000
Income from operations		\$ 210,000

Note: Income statements presented in external financial statements also include nonoperating revenues and expenses and income taxes.

#### Exhibit 142: Income statement of a manufacturer

When financial statements are released to the public, it is common to further simplify the income statement. These simplified statements show only the items and amounts in the right column of Exhibit 142, not the details in the left column.

Unlike a merchandiser's balance sheet that reports a single inventory amount, the balance sheet for a manufacturer typically shows materials, work in process, and finished goods inventories separately. A manufacturer's balance sheet may also show greater detail in the property, plant, and equipment section because of the significant investment in plant assets.

### The general cost accumulation model

In general, companies match the flow of costs to the physical flow of products through the production process, as shown in Exhibit 143. They place materials received from suppliers in the materials storeroom. They also record the cost of those materials when purchasing them. As they are needed for production, the materials move from the materials storeroom to the production departments, and their cost is assigned to those production departments, as shown in Exhibit 143.

During production, the materials processed by workers and machines become partially manufactured products. At any time during production, these partially manufactured products are collectively known as **work in process**. For example, if accountants compute the inventory when the company has partially finished products at the end of the year, this inventory is work in process inventory.

Completed products are **finished goods**. When the products are completed and transferred to the finished goods storeroom, the company removes their costs from Work in Process Inventory and assigns them to Finished Goods Inventory. As the goods are sold, the company transfers related costs from Finished Goods Inventory to Cost of Goods Sold.

## 18. Managerial accounting concepts/job costing

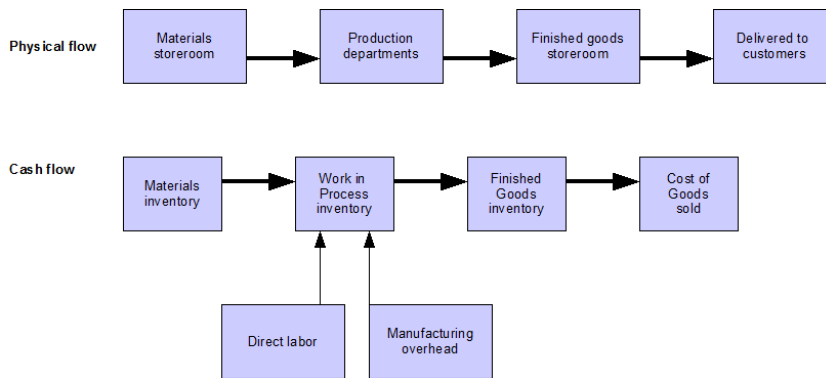


Exhibit 143: Product and cost flows

Type of production	Accounting system	Type of product
<b>Job shop</b> Hospital, custom home builder, consulting firm	Job costing	Customized
<b>Batch production</b> Furniture manufacturer, winery	Mostly job costing	Several different products
<b>Repetitive manufacturing</b> Computer manufacturer, bicycle manufacturer	Mostly process costing (operations)	Few new products
<b>Continuous flow processing</b> Oil refinery, paint manufacturer	Process costing	Standardized

Exhibit 144: Production activities and types of accounting systems

The accounting flow of costs follows the physical flow of the manufacturing process in most companies. Some companies use an alternative approach that we discuss in Chapter 20. In this chapter and the next, we assume costs follow the physical flow of products.

In discussing product costing, we described how accountants and managers assign costs to products. Recall that products can be either goods or services, so this discussion applies to service and merchandising companies as well as to manufacturing companies.

In Exhibit 144, we show how various companies choose different accounting systems, depending on their products. First, companies producing individual, unique products known as jobs use job costing (also called job order costing). Companies such as construction companies and consulting firms, produce jobs and use job costing.

Second, some companies, like furniture manufacturers, produce batches of products. They produce all of the components of a single product (e.g. coffee tables) in one batch. They would then produce the components of another product (e.g. dining room sets) in a new batch. (Some university food service companies prepare meals this way.) Companies such as these use job costing methods to accumulate the cost of each batch.

The last two types of production in Exhibit 144 use process costing methods described in Chapter 19, so we give just a brief overview here. Repetitive manufacturing lends itself to the use of automated equipment that minimizes the amount of manual material handling. Automobile assembly plants, bicycle assembly plants, and computer assembly plants use repetitive manufacturing.

Continuous flow processing is the opposite of job shops. Companies using this process continuously mass-produce a single, homogeneous product. Companies use process cost systems in manufacturing paint, grinding flour, and refining oil.



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## An accounting perspective:

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### Business insight

Engineers for automobile companies in the United States believe that Japanese manufacturers can build cars for considerably less than their US counterparts. Many hospitals that thrived when health care costs were reimbursed faced troubled financial times when they had to compete with health maintenance organizations. These organizations required a better understanding of their costs. It is simple. Companies with competitors have to know and control their costs to be competitive.

### Job costing

A **job cost system (job costing)** accumulates costs incurred according to the individual jobs. Companies generally use job cost systems when they can identify separate products or when they produce goods to meet a customer's particular needs.

Who uses job costing? Examples include home builders who design specific houses for each customer and accumulate the costs separately for each job, and caterers who accumulate the costs of each banquet separately. Consulting, law, and public accounting firms use job costing to measure the costs of serving each client. Motion pictures, printing, and other industries where unique jobs are produced use job costing. Hospitals also use job costing to determine the cost of each patient's care.

Assume Creative Printers is a company run by a group of students who use desktop publishing to produce specialty books and instruction manuals. Creative Printers uses job costing. Creative Printers keeps track of the time and materials (mostly paper) used on each job.

The company compares the cost of each job with the revenue received to be sure the jobs are profitable. Sometimes the company learns that certain jobs are too costly considering the prices they can charge. For example, Creative Printers recently learned that cookbooks were not profitable. On the other hand, printing instruction manuals was quite profitable, so the company has focused more on the instruction manual market. To illustrate a job costing system, this section describes the transactions for the month of July for Creative Printers.

On July 1, Creative Printers had these beginning inventories:

Materials inventory	\$20,000
Work in process inventory (Job No. 106: direct materials, \$4,200; direct labor, \$5,000; and overhead, \$4,000)	13,200
Finished goods inventory (Job No. 105)	5,500

Creative Printing had completed Job No. 105, a set of gardening books, but had not shipped them to the customer as of June 30. They had Job No. 106, a set of instruction manuals for computer software, in process at the beginning of July and completed it in July. They started Job No. 107, a travel guide for visitors to Southeast Asia, in July but had not completed it.

The transactions and the journal entries to record these transactions follow. In Exhibit 145, we show the flow of costs through accounts and the beginning balances just presented.

## 18. Managerial accounting concepts/job costing

Materials Inventory			Work in Process Inventory Job No. 106	Finished Goods Inventory
Beginning inventory (1)	20,000		Beginning inventory: Materials 4,200 Labor 5,000 Overhead 4,000 Total 13,200	Beginning inventory 5,500
Ending inventory	21,000	(2) 24,000	Current period: Mats. (2) 9,000 Labor (3) 4,000 Ovrhd. (4) 3,200 Total 16,200	Completed (5) 29,400
			Ending inventory -0-	Ending inventory 29,400
				<b>Cost of goods Sold</b> (6) 5,500
<b>Payroll Summary</b>				
Incurred	25,000	Distributed (3) 25,000		
<b>Overhead</b>				
Indirect materials	(2) 1,000	Applied to production (4) 16,000		
Indirect labor	(3) 5,000			
Other overhead	(7) 9,800			
		Overapplied 200 balance		
			Beginning inventory -0- Current period: Mats. (2) 14,000 Labor (3) 16,000 Ovrhd. (4) 12,800 Total 42,800	
			Ending inventory: Materials 14,000 Labor 16,000 Overhead 12,800 Total 42,800	

Note: Numbers in parentheses refer to journal entries in the text. We show only the entries or parts of entries that deal with cost flows.

### Exhibit 145: Job cost flows-Creative Printers

- During July, Creative Printers purchased USD 25,000 of materials on account. This purchase included both direct materials, such as paper, and indirect materials, such as printing supplies and computer supplies.

Materials inventory	25,000
Accounts payable	25,000
To record purchase of materials.	

- During July, Creative Printers sent direct materials from the materials storeroom to jobs as follows: USD 9,000 to Job No. 106, and USD 14,000 to Job No. 107. The company also sent indirect materials of USD 1,000 to jobs. It charged indirect materials to overhead, not to each job, because the company does not keep track of how much indirect materials it uses on each job. (Manufacturing companies often use Manufacturing Overhead for the Overhead account. We generally use the Overhead account for both manufacturing and non-manufacturing companies in this chapter.) Each job has a separate Work in Process Inventory account to keep track of the particular job's costs.

Work in process inventory – Job No. 106 (+A)	9,000
Work in process inventory – Job No. 107 (+A)	14,000
Overhead (or manufacturing overhead) (-SE)	1,000
Materials inventory (-A)	24,000
To record direct and indirect materials sent	

from the storeroom to jobs.

See Exhibit 145, for the flow of materials from Materials Inventory to the Work in Process and Overhead accounts.

- Production workers keep track of the time spent on each job at Creative Printers. Based on that information, the company assigned production-related labor costs to jobs and to Overhead as follows: USD 4,000 to Job No. 106, USD 16,000 to Job No. 107, and indirect labor of USD 5,000 to Overhead.

Work in process inventory – Job No. 106	4,000	
Work in process inventory – Job No. 107	16,000	
Overhead	5,000	
Payroll summary		25,000
To distribute labor costs to jobs and overhead		

The entry to record payroll incurred during the accounting period (not shown) includes a debit to Payroll Summary and a credit to liability accounts to show payables for fringe benefits, such as health insurance, payroll taxes, and employee wages. In entry (3) the payroll summary is distributed to the jobs and overhead. Look at Exhibit 145, to see the assignment of labor costs to the Work in Process and Overhead accounts.

- The company assigns overhead to each job in the following manner: Creative Printers charges indirect materials to jobs based on each job's usage of materials; it charges indirect labor to jobs based on each job's usage of labor; and it charges all other overhead to jobs on the basis of the machine-hours each job uses.

By definition, overhead cannot be traced directly to jobs. Instead, we use cost drivers to assign overhead to jobs. A **cost driver** is a measure of activities, such as machine-hours, that is the cause of costs. To assign overhead to jobs, the cost driver should be the cause of the overhead costs, or at least be reasonably associated with the overhead costs. Just as automobile mileage is a good cost driver for measuring the cause of gasoline consumption, machine-hours is a measure of what causes energy costs. By assigning energy costs to jobs based on the number of machine-minutes or hours the job uses, we have a pretty good idea of the energy costs required to produce the job.

Creative Printers assigns overhead (such as machine maintenance) to jobs on a machine-hour basis. This makes good sense if machine maintenance is based on hours of usage, similar to having car maintenance done every 6,000 miles.

Creative Printers also assigns overhead (such as building depreciation) to jobs on a machine-hour basis, which is less logical. However, Creative Printers' management does not believe the time and trouble of developing a more sophisticated method of assigning building depreciation to jobs is justified. For example, management did not believe better overhead allocation would sufficiently improve company profits to justify hiring another accountant to improve its overhead allocation method.

Creative Printers allocates overhead to each job as follows:

Materials basis: Overhead is assigned to a job at the rate of 5 per cent of the cost of materials used on the job.

Labor basis: Overhead is assigned at the rate of 25 per cent of the cost of labor used on the job.

Machine-hours basis: Overhead is assigned to a job at the rate of USD 2 per machine-hour used on the job.

For now, assume these overhead rates are correct. Later in the chapter we discuss how companies derive these overhead rates. Creative Printers assigned overhead to Jobs 106 and 107 as follows:

<b>Job 106</b>		<b>Overhead assigned to Job 106:</b>	
Materials	\$9,000	5% x \$9,000	\$ 450
Labor cost	\$4,000	25% x \$4,000	1,000
Machine-hours	875 hours	\$2 x 875 hours	1,750
		Total overhead assigned to Job 106	\$3,200
<b>Job 107</b>		<b>Overhead assigned to Job 107:</b>	

## 18. Managerial accounting concepts/job costing

Materials	\$14,000	5% x \$14,000	\$ 700
Labor cost	\$16,000	25% x \$16,000	4,000
Machine-hours	4,050 hours	\$2 x 4,050 hours	8,100
		Total overhead assigned to Job 107	\$12,800

Here is the journal entry to assign overhead to jobs:

Work in process inventory – Job No. 106	3,200	
Work in process inventory – Job No. 107	12,800	
Overhead		16,000

To record application of overhead to jobs.

See Exhibit 145 for the application of overhead to jobs.

- Job No. 106 was completed. Job 106 cost USD 29,400 for the total work done on the job, including costs in beginning Work in Process Inventory on July 1 and costs added during July. This entry records the completion of Job 106:

Finished goods inventory (+A)	29,400	
Work in process inventory – Job No. 106 (-)		29,400

A)  
To record completed production for July.

See Exhibit 145 for the flow of costs from Work in Process Inventory to Finished Goods Inventory.

- Job No. 105 was sold on account in July for USD 9,000. These entries record the sale and the related cost of goods sold:

Accounts receivable (+A)	9,000	
Sales (+SE)		9,000

To record sales on account for July.

Cost of goods sold (-SE)	5,500	
Finished goods inventory (-A)		5,500

To record cost of goods sold in July  
(Job 105).

- The company applied overhead to the jobs in entry (4) based on a predetermined overhead rate. Many of the actual overhead costs are not known until the end of the month or later. For example, the company would not receive its utility bill for July until sometime in August. In addition to the indirect materials and indirect labor recorded in entries (2) and (3), Creative Printers incurred these other overhead costs for July:

Machinery repairs and maintenance	\$4,500
Utilities, including energy costs to run machines	1,000
Depreciation of building and machines	2,500
Other overhead	1,800
Total overhead incurred in July other than indirect materials and indirect labor	\$9,800

To prepare the journal entry, we debit the Overhead account for the actual costs. Then we credit Accounts Payable for the machinery repairs and maintenance, utilities, and other overhead. (We assume an outside contractor does the maintenance and repairs.) The amount is USD 7,300 (USD 4,500 + USD 1,000 + USD 1,800). And, finally we credit Accumulated Depreciation for USD 2,500. Here is the journal entry:

Overhead	9,800	
Accounts payable		7,300
Accumulated depreciation		2,500

To record actual overhead costs for July.

<b>Overhead</b>		<b>Cost of goods Sold</b>	
1,000*	16,000*	5,500*	
5,000*			
9,800*			Transfer from overhead (8)
	Overapplied balance 200*	Cost of goods sold for July 5,300	200
Transfer to cost of goods sold (8) 200			
-0-			

\*These amounts are from Exhibit 145

#### Exhibit 146: Transfer overapplied overhead to cost of goods sold

At this point, you may want to review the flow of costs through the inventory accounts in Exhibit 145. Note that Exhibit 145, shows only the inventory accounts, Payroll Summary, Overhead, and Cost of Goods Sold, not all of the accounts in the preceding entries.

- At the end of the month, the Overhead account contains **overapplied overhead** of USD 200 as shown in Exhibit 145. Companies generally transfer the balance of the Overhead account to Cost of Goods Sold at the end of the accounting period. Some companies do this monthly; others do it quarterly or annually. The journal entry to transfer Creative Printers' overhead balance to Cost of Goods Sold for the month of July is as follows:

Overhead (-SE)	200	
Cost of goods sold (+SE)		200
To transfer the overhead balance to Cost of goods sold.		

See the adjusted Cost of Goods Sold and the Overhead accounts in Exhibit 146.

Why does the previous entry reduce the Cost of Goods Sold by USD 200? The overhead applied to the jobs was too high—it was overapplied. Thus, the cost of jobs was overstated. Although those jobs are still in Work in Process or Finished Goods Inventory, companies usually adjust the Cost of Goods Sold account instead of each inventory account. Adjusting each inventory account for a small overhead adjustment is usually not a good use of managerial and accounting time and effort. All jobs appear in Cost of Goods Sold sooner or later, so companies simply adjust Cost of Goods Sold instead of the inventory accounts.

In this book, we assume companies transfer overhead balances to Cost of Goods Sold. We leave the more complicated procedure of allocating overhead balances to inventory accounts to textbooks on cost accounting.

Although Creative Printers had overapplied overhead, it could just as easily have had **underapplied overhead**. If overhead had been underapplied, the company would have debited Cost of Goods Sold and credited Overhead to transfer the overhead balance.

## 18. Managerial accounting concepts/job costing

<b>Creative Printers</b>		
<b>Income statement</b>		
<b>For the month ended 2010 July 31</b>		
Sales		\$9,000
Cost of goods sold:		
Finished goods inventory, July 1	\$ 5,500	
Cost of goods manufactured	29,400	
Cost of goods available for sale	\$34,900	
Less: Finished goods inventory, July 31	29,400	
Cost of goods sold before transfer of overapplied overhead	\$ 5,500	
Less: Overapplied overhead	200	
Cost of goods sold		5,300
Gross margin		\$3,700
Selling and administrative expenses		3,000
Net income		\$ 700

### Exhibit 147: Creative Printers-Income statement

Sometime in July or August, Creative Printers would collect its receivables in cash and pay its payables. The accounts payable for July amount to USD 32,300 (USD 25,000 for the materials purchase + USD 7,300 payables for overhead costs). The payroll liabilities amount to USD 25,000. Here are the entries recording Creative Printers' payment of payables and payroll liabilities, and the collection of its receivables of USD 9,000:

Accounts payable (-L)	32,300	
Cash (-A)		32,300
Payroll liabilities (-L)	25,000	
Cash (-A)		25,000
Cash (+A)	9,000	
Accounts receivable (-A)		9,000

Note that in Exhibit 147 we present the income statement for Creative Printers. Assume the selling and administrative expenses for July are USD 3,000.

Managers would use the preceding cost information for several purposes: First, they would compare the actual costs of the job with expected costs, both as the work is being done and after the job has been completed. Later chapters discuss the role of managerial accounting in performance evaluation. Second, managers would assess the profitability of jobs. For example, Job 105 had revenue of USD 9,000 and costs of USD 5,500.

Third, managers would compare actual overhead on the left side of the Overhead account, with the overhead applied to jobs on the right side. If the actual overhead exceeds the applied overhead, they may wish to learn why the actual overhead is so high. Also, they may ask the accountants to increase the overhead applied to jobs to give them a better idea of the cost of jobs. If the actual is less than the applied overhead, they may ask the accountants to reduce the overhead applied to jobs.

### Predetermined overhead rates

Creative Printers used predetermined rates to apply overhead to jobs. For example, they determined the 5 per cent rate used to apply materials-related overhead to jobs before the month of July. Most manufacturing and service organizations use predetermined rates.

To calculate a **predetermined overhead rate**, a company divides the estimated total overhead costs for a period by an expected level of activity. This activity could be total expected machine-hours, total expected direct labor-hours, or total expected direct labor cost for the period. Companies set predetermined overhead rates at the beginning of the year in which they will use them. Thus, the rates for July may have been computed in November or December of the previous year. This formula computes a predetermined rate:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Expected level of activity (such as machine-hours)}}$$

To demonstrate, assume the accountants at Creative Printers estimated overhead related to machine usage to be USD 120,000 for the year and estimated the machine usage for the year to be 60,000 machine-hours. Thus, the predetermined overhead rate would be USD 2 per hour, calculated as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Expected machine-hours}}$$

$$\text{Predetermined overhead rate} = \frac{\text{USD } 120,000}{60,000} = \text{USD } 2 \text{ per machine-hour}$$

Some companies compute the overhead rate after the fact; that is, after the jobs are done and the overhead costs are known. The formula to calculate an **actual overhead rate** is:

$$\text{Actual overhead rate} = \frac{\text{Total actual overhead costs}}{\text{Total actual manufacturing activity}}$$

Recall that we measure manufacturing activity using machine-hours, labor-hours, labor costs, materials costs, or some other cost driver.

**Reasons for using predetermined rates** Most companies use predetermined overhead rates instead of actual overhead rates for the following reasons:

- A company usually does not incur overhead costs uniformly throughout the year. For example, heating costs are greater during winter months. However, allocating more overhead costs to a job produced in the winter compared to one produced in the summer may serve no useful purpose.
- Some overhead costs, like factory building depreciation, are fixed costs. If the volume of goods produced varies from month to month, the actual rate varies from month to month, even though the total cost is constant from month to month. The predetermined rate, on the other hand, is constant from month to month.
- Predetermined rates make it possible for companies to estimate job costs sooner. Using a predetermined rate, companies can assign overhead costs to production when they assign direct materials and direct labor costs. Without a predetermined rate, companies do not know the costs of production until the end of the month or even later when bills arrive. For example, the electric bill for July will probably not arrive until August. If Creative Printers had used actual overhead, the company would not have determined the costs of its July work until August. It is better to have a good estimate of costs when doing the work instead of waiting a long time for only a slightly more accurate number.

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### An accounting perspective:

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#### Uses of technology

Recently, many high-tech companies have installed computer-assisted methods of manufacturing, merchandising, or providing services. These new technologies have had a major impact on managerial accounting. For example, where robots and computer-assisted manufacturing methods have replaced people, labor costs have shrunk from 20 per cent to 40 per cent of product costs to less than 5 per cent. Accounting in traditional settings required much more work to keep track of labor costs than is necessary in current systems. On the other hand, in highly automated

## 18. Managerial accounting concepts/job costing

environments, accountants have had to become more sophisticated in finding the sources of overhead costs, which have become a larger part of total product cost.

### Understanding the learning objectives

- Financial accounting refers to providing financial information primarily for external use. Managerial accounting information is intended for internal use to provide more detailed information to managers.
- In manufacturing companies, a product's cost is made up of three cost elements: direct materials costs, direct labor costs, and manufacturing overhead costs.
- Direct materials costs are clearly and easily traceable to the product.
- Direct labor costs include only those labor costs clearly traceable to, or readily identifiable with, the finished product.
- Overhead costs (1) include all costs of making the product except direct materials and direct labor costs; (2) are costs that must be incurred in making the product but cannot or will not be traced directly to specific units produced; and (3) include a number of costs related to the production process, such as depreciation and maintenance on machines, supervisors' salaries, and utility costs for production facilities.
- Product costs are costs incurred in making products. These costs include costs of direct materials, direct labor, and overhead.
- Period costs are not assigned to units of a product but are related more closely to periods of time. For this reason, period costs are expensed (deducted from revenues) in the period in which they are incurred.
- The major difference between a merchandiser and a manufacturer is in the types of inventories carried.
- The statement of cost of goods manufactured supports the cost of goods sold figure on the income statement and has two important calculations: (1) Cost to manufacture, which includes the costs of all resources put into production during the period and (2) Cost of goods manufactured, which consists of the cost of all goods completed during the period.
- The manufacturer's balance sheet shows materials, work in process, and finished goods inventories separately.
- The accounting flow of costs follows the physical flow of the manufacturing process.
- Accountants record the flow of direct materials costs from Materials Inventory into Work in Process Inventory. They add the costs of direct labor and overhead to Work in Process Inventory. When the products are completed and transferred to the finished goods storeroom, accountants transfer their costs from Work in Process Inventory to Finished Goods Inventory. As the goods are sold, the related costs are transferred from Finished Goods Inventory to Cost of Goods Sold.
- Companies producing individual, unique products known as jobs use job costing (also called job order costing).
- Companies such as furniture manufacturers produce batches of products and use job costing methods to accumulate the cost of each batch.
- Repetitive manufacturing companies (automobile assembly plants) and companies producing in a continuous flow (oil refineries) use process costing, discussed in the next chapter.



- A job cost system (job costing) is a cost system that accumulates costs incurred according to the individual jobs. Each job has its own Work in Process Inventory account.
- The formula for the predetermined overhead rate is:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Expected level of activity (such as machine-hours)}}$$

- Under variable costing, all the fixed manufacturing overhead costs are charged off (as period costs) during the period rather than being deferred and carried forward (as product costs) to the next period as part of inventory cost.
- Under absorption costing, all manufacturing costs are treated as product costs, including fixed manufacturing overhead.

#### Appendix: Variable versus absorption costing

Under **absorption costing**, companies treat all manufacturing costs, including both fixed and variable manufacturing costs, as product costs. Under variable costing, companies treat only variable manufacturing costs as product costs. Total variable costs change proportionately with changes in total activity, while fixed costs do not change as activity levels change. These variable manufacturing costs are usually made up of direct materials, variable manufacturing overhead, and direct labor. (Direct labor can be a fixed cost if the company chooses not to decrease or increase its direct labor force as volume changes. Unless otherwise stated, we treat direct labor as a variable cost.)

**Variable costing** (also known as direct costing) treats all fixed manufacturing costs as period costs to be charged to expense in the period received. The logic behind this expensing of fixed manufacturing costs is that the company would incur such costs whether a plant was in production or idle. Therefore, these fixed costs do not specifically relate to the manufacture of products.

Look at Exhibit 148, Bradley Company's income statements for May 2010 using absorption costing on top and variable costing on the bottom. Notice that Bradley's variable costing income statement carries the goods in inventory at USD 3.30 per unit rather than at the USD 3.90 full cost. The statement shows all variable costs as deductions from sales to disclose the contribution margin for the month. It classifies all fixed costs as period costs no matter what the source of the cost (manufacturing, selling, or administrative).

#### Income statement under Absorption costing

<b>Bradley Company</b>		
<b>Income statement</b>		
<b>For the period ending 2010 May 31</b>		
Sales (9,000 units at \$8)		\$72,000
Cost of goods sold:		
Variable costs of production (10,000 units at \$3.30)	\$33,000	
Fixed overhead costs	6,000	
Total costs of producing 10,000 units	\$39,000	
Less: Ending inventory (1,000 units at \$3.90)	3,900	35,100
Gross margin on sales		\$36,900
Operating expenses:		
Selling expenses (\$15,000 fixed plus 9,000 at \$0.20 each)	\$16,800	
Administrative expenses	12,000	28,800
Income before income taxes		\$ 8,100

18. Managerial accounting concepts/job costing

**Contribution margin income statement under variable costing**  
**Bradley Company**  
**Income statement**  
**For the period ending 2010 May 31**

Sales (9,000 units at \$8)		\$72,000	
Variable costs:			
Variable production costs incurred (10,000 units at \$3.30)	\$33,000		
Less: Ending inventory (1,000 units at \$3.30)	3,300	29,700	
Manufacturing margin			\$42,300
Variable selling expenses (9,000 units at \$0.20)		1,800	
Contribution margin			\$40,500
Fixed costs:			
Manufacturing overhead	\$ 6,000		
Selling expenses	15,000		
Administrative expenses	12,000	33,000	
Income before income taxes			\$ 7,500

Exhibit 148: Comparative income statements

In comparing the two income statements in Exhibit 148, notice the USD 600 difference in net income for the month and a USD 600 difference in ending inventory valuation, as shown in Exhibit 149, on the next page. These differences are due to the treatment of fixed manufacturing costs. Under absorption costing, each unit in ending inventory carries USD 0.60 of fixed overhead cost as part of product cost. At the end of the month, Bradley has 1,000 units in inventory. Therefore, ending inventory under absorption costing includes USD 600 of fixed manufacturing overhead costs (USD 0.60 X 1,000 units) and is valued at USD 600 more than under variable costing.

Under variable costing, companies charge off, or expense, all the fixed manufacturing costs during the period rather than deferring their expense and carrying them forward to the next period as part of inventory cost. Therefore, USD 6,000 of fixed manufacturing costs appear on the variable costing income statement as an expense, rather than USD 5,400 (USD 6,000 fixed overhead costs - USD 600 fixed manufacturing included in inventory) under absorption costing. Consequently, income before income taxes under variable costing is USD 600 less than under absorption costing because more costs are expensed during the period.

**Illustration 18.13 Comparison of Results under Absorption and Variable Costing**

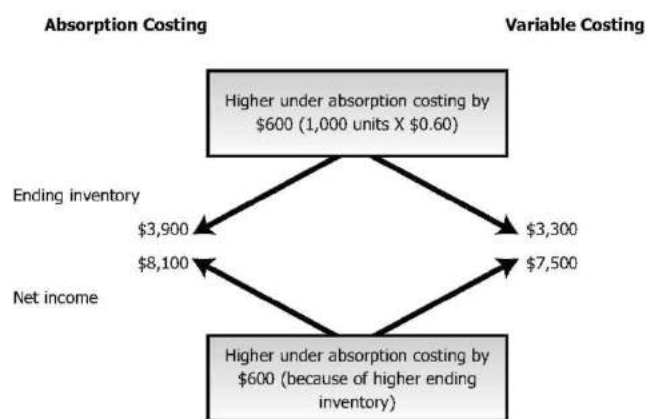


Exhibit 149: Comparison of results under absorption and variable costing

Finally, remember that the difference between the absorption costing and variable costing methods is solely in the treatment of fixed manufacturing overhead costs and income statement presentation. Both methods treat

selling and administrative expenses as period costs. Regarding selling and administrative expenses, the only difference is their placement on the income statement and the segregation of variable and fixed selling and administrative expenses. Variable selling and administrative expenses are not part of product cost under either method.

As a general rule, relate the difference in net income under absorption costing and variable costing to the change in inventories. Assuming a relatively constant level of production, if inventories increase during the year, production exceeded sales and reported income before federal income taxes is less under variable costing than under absorption costing. Conversely, if inventories decreased, then sales exceeded production, and income before income taxes is larger under variable costing than under absorption costing.

Variable costing is not currently acceptable for income measurement or inventory valuation in external financial statements that must comply with generally accepted accounting principles (GAAP) in the United States. However, managers often use variable costing for internal company reports.

### Demonstration problem

**Demonstration problem A** Good Earth Construction Company uses a job cost system to account for the houses it builds. Each house is a separate job. As of 2010 January 1, its records showed:

Inventories:

Materials and supplies	\$ 48,000
Work in process (Job No. 212 and 213)	103,200
Finished goods (Job No. 211)	120,000

The work in process inventory consists of two jobs:

Job No.	Direct materials	Direct Labor	Construction Overhead*	Total
212	\$18,000	\$24,000	\$12,000	\$ 54,000
213	20,400	19,200	9,600	49,200
	\$38,400	\$43,200	\$21,600	\$103,200

\*Construction overhead is treated just like overhead in the text examples.

Cost and sales data for 2010:

- Materials purchased on account, USD 198,000.
- Labor costs: Direct labor assigned to jobs—Job No. 212, USD 48,000; Job No. 213, USD 96,000; Job No. 214 (started in 2010), USD 144,000; supervision and other indirect labor, USD 120,000.
- Materials used: Job No. 212, USD 31,200; Job No. 213, USD 57,600; Job No. 214, USD 96,000; and indirect materials, USD 4,800.
- Overhead is assigned to jobs at the rate of 50 per cent of the actual direct labor costs incurred on each job.
- Job No. 212 and 213 were completed.
- Jobs 211 and 212 were sold for USD 540,000.
- Construction overhead costs incurred, other than indirect materials and indirect labor: depreciation, USD 12,000; heat, light, power, and miscellaneous, USD 12,000.

Prepare journal entries to record the preceding data and close any underapplied or overapplied overhead to Cost of Goods Sold.

**Demonstration problem B** Companies use different bases in computing their predetermined overhead rates. From the following estimated data, compute the predetermined rate used by each company.

	Company		
	A	B	C
Machine-hours	103,000	212,000	125,000

## 18. Managerial accounting concepts/job costing

Direct labor-hours	52,000	48,000	39,000
Direct labor cost	\$650,000	\$735,000	\$420,000
Overhead costs	\$845,000	\$864,000	\$750,000

Basis for predetermined overhead rate:

Company	Basis
A	Direct labor cost
B	Direct labor-hours
C	Machine-hours

### Solution to demonstration problem

#### Solution to demonstration problem A

##### Good Earth Construction Company General Journal

<b>1.</b>	Materials inventory	198,000	
	Accounts payable		198,000
	To record materials purchased on account.		
<b>2.</b>	Work in process inventory – Job No. 212	48,000	
	Work in process inventory – Job No. 213	96,000	
	Work in process inventory – Job No. 214	144,000	
	Construction overhead	120,000	
	Payroll summary		408,000
	To distribute labor costs to jobs and overhead.		
<b>3.</b>	Work in process inventory – Job No. 212	31,200	
	Work in process inventory – Job No. 213	57,600	
	Work in process inventory – Job No. 214	96,000	
	Construction overhead	4,800	
	Materials inventory		189,600
	To record direct and indirect materials sent from storeroom to jobs.		
<b>4.</b>	Work in process inventory – Job No. 212	24,000	
	Work in process inventory – Job No. 213	48,000	
	Work in process inventory – Job No. 214	72,000	
	Construction overhead		144,000
	To record overhead applied to jobs using the predetermined rate 50% of direct labor cost: Job No. 212, \$24,000 (50% x \$48,000); Job No. 213, \$48,000 (50% x \$96,000); and Job No. 214, \$72,000 (50% x \$144,000).		
<b>5.</b>	Finished goods inventory	408,000	
	Work in process inventory – Job No. 212		157,200
	Work in process inventory – Job No. 213		250,800
	To record completion of Jobs 212 and 213.		

The following amounts were computed by adding beginning Work in Process balances to the current month's debits to Work in Process for direct materials, direct labor, and construction overhead:

Job No. 212: USD 157,200 (USD 54,000 + USD 31,200 + USD 48,000 + USD 24,000)

Job No. 213: USD 250,800 (USD 49,200 + USD 57,600 + USD 96,000 + USD 48,000)

USD 408,000

<b>6.</b>	Accounts receivable	540,000	
	Sales		540,000
	To record sales on account.		
	Cost of goods sold	277,200	
	Finished goods inventory		277,200
	To record cost of goods sold (\$120,000 + \$157,200 = \$277,200).		
<b>7.</b>	Construction overhead	24,000	
	Accumulated depreciation		12,000
	Various accounts (Accounts payable, accrued liabilities payable, cash, etc)		12,000
	To record various construction overhead costs incurred.		

8.	Cost of goods sold	4,8000	
	Construction overhead		4,800
	To close underapplied construction overhead (actual = \$148,800, applied = \$144,000).		

**Solution to demonstration problem B** Company A:

$$\text{Predetermined overhead rate} = \frac{\text{USD } 845,000}{\text{USD } 650,000} = 130 \text{ per cent of direct labor cost}$$

Company B:

$$\text{Predetermined overhead rate} = \frac{\text{USD } 864,000}{48,000 \text{ hours}} = \text{USD } 18 \text{ per direct labor – hour}$$

Company C:

$$\text{Predetermined overhead rate} = \frac{\text{USD } 750,000}{125,000 \text{ hours}} = \text{USD } 6 \text{ per machine – hour}$$

**Key terms**

**Absorption costing** (Appendix) A concept of costing under which all manufacturing costs, including both fixed and variable manufacturing costs, are accounted for as product costs.

**Actual overhead rate** Total actual manufacturing overhead divided by total actual manufacturing activity.

**Administrative costs** Costs of managing the organization, including the costs of top administrative functions and various staff departments such as accounting, data processing, and personnel.

**Cost** A financial measure of the resources used or given up to achieve a stated purpose.

**Cost driver** Activity or transaction that causes costs to be incurred. Machine-hours can be a cost driver for costs of energy to run machines, for example.

**Cost of goods manufactured** Consists of the total costs of all goods completed during the period; includes cost to manufacture plus beginning work in process inventory minus ending work in process inventory

**Cost of goods sold** Cost of goods manufactured plus the beginning finished goods inventory minus the ending finished goods inventory.

**Cost to manufacture** Includes the direct materials, direct labor, and manufacturing overhead incurred during the period.

**Direct labor** Labor costs of all employees actually working on materials to convert them to finished goods. Direct labor costs are directly traced to particular products in contrast to indirect labor costs.

**Direct materials** Materials that are used only in making the product and are clearly and easily traceable to a particular product.

**Finished goods** Completed manufactured products ready to be sold. Finished Goods Inventory is the title of an inventory account maintained for such products.

**Indirect labor** The cost of labor that cannot, or will not for practical reasons, be traced to the goods being produced or the services being provided.

**Indirect materials** Materials used in making a product that cannot, or will not for practical reasons, be traced directly to particular products.

**Job cost system (job costing)** A manufacturing cost system that accumulates costs incurred to produce a product according to individual jobs, such as a building, a consulting job, or a batch of 100 computer desks.

**Managerial accounting** Managerial accounting information is intended for internal use. The purpose is to generate information managers can use to make good decisions.

**Manufacturing overhead** All manufacturing costs except for those costs accounted for as direct materials and direct labor.

**Materials** Unprocessed items used in the manufacturing process.

**Overapplied (overabsorbed) overhead** The amount by which the overhead applied to production exceeds the actual overhead costs incurred in that same period.

**Overhead** All costs of making goods or providing services except for those costs classified as direct materials and direct labor. See manufacturing overhead for overhead in manufacturing companies.

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**Period costs** Costs related more closely to periods of time than to products produced. Period costs cannot be traced directly to the manufacture of a specific product; they are expensed in the period in which they are incurred.

**Predetermined overhead rate** Calculated by dividing estimated total overhead costs for a period by the expected level of activity, such as total expected machine-hours or total expected direct labor-hours for the period.

**Product costs** Costs a company assigns to units produced. In manufacturing companies, these costs are direct materials, direct labor, and manufacturing overhead. In service companies that have no materials, these costs are direct labor and overhead.

**Selling costs** Costs incurred to obtain customer orders and distribute the finished product to the customer.

**Statement of cost of goods manufactured** An accounting report showing the cost to manufacture and the cost of goods manufactured.

**Underapplied (underabsorbed) overhead** The amount by which actual overhead costs incurred in a period exceed the overhead applied to production in that period.

**Variable costing (also called direct costing)** (Appendix) A concept of costing under which only variable manufacturing costs are accounted for as product costs and charged to the units produced during a period. All fixed manufacturing costs are charged to expense in the period in which they are incurred.

**Work in process** Partially manufactured products; a Work in Process Inventory account is maintained for such products.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

Managerial accounting is for external use and gives less detailed information than financial accounting.

A manufacturer produces speedboats, and each one requires a motor. The motors are considered direct materials and are product costs.

A Pepsi-Cola bottling plant is an example of a company that would use a job cost system.

A predetermined overhead rate is calculated by dividing the expected level of activity by the estimated total overhead cost.

Overhead cannot be entered in Work in Process Inventory when using a predetermined overhead rate. Only when the actual overhead costs are determined is the overhead entered.

Selling and administrative expenses are part of period costs under both absorption and variable costing methods.

#### Multiple-choice

Select the best answer for each of the following questions.

Under which cost category are indirect material costs included?

- a. Direct materials.
- b. Overhead.
- c. Direct labor.
- d. None of the above.

For financial accounting and external reporting purposes, all selling and administrative expenses are treated as:

- a. Period costs.
- b. Selling costs.
- c. Manufacturing overhead costs.
- d. Product costs.

What are the differences between the cost of goods sold sections in a manufacturer's and a merchandiser's income statements?

- a. A merchandiser uses Merchandise Inventory and Direct Labor, whereas a manufacturer uses Finished Goods Inventory and Cost of Goods Manufactured.
- b. A merchandiser uses Merchandise Inventory and Cost of Goods Available for Sale, whereas a manufacturer uses Finished Goods Inventory and Cost of Goods Available for Sale.
- c. A merchandiser uses Work in Process Inventory and Cost of Goods Sold, whereas a manufacturer uses Finished Goods Inventory and Cost of Goods Sold.
- d. None of the above.

A job cost system is used:

- a. When there are dissimilar products.
- b. By manufacturers and service companies.
- c. When goods are produced to meet a customer's particular needs.
- d. All of the above.

Which of the following best describes the advantages of using a predetermined overhead rate?.

- a. Overhead costs are applied evenly throughout the year rather than fluctuating from month to month.
- b. Predetermined rates require managers to wait until long after the accounting period to get an estimate of product costs.
- c. Total unit costs of production are known sooner than using actual overhead rates, and overhead costs are evenly distributed throughout the year.
- d. Both (a) and (c) above.

The expected level of activity in a production center is 30,000 machine-hours. Estimated overhead costs are indirect materials and indirect labor, USD 360,000; other overhead, USD 90,000. Which of the following is the predetermined overhead rate per machine-hour?

- a. USD 3.
- b. USD 12.
- c. USD 15.
- d. USD 20.

You are given the following data relating to a company:

Estimated manufacturing overhead per year	USD 24,000
Expected level of activity per year	40,000 machine-hours
Predetermined overhead rate	USD 0.60 per machine-hour
Actual overhead costs incurred during year	USD 22,500
Actual machine-hours	35,000

Which of the following are the correct journal entries for the preceding data?

- a. 

Manufacturing overhead	22,500	
Various accounts		22,500
Work in process inventory	21,000	
Manufacturing overhead		21,000
- b. 

Manufacturing overhead	22,500	
Various accounts		22,500
Work in process inventory	15,428	
Manufacturing overhead		15,428

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c. Manufacturing overhead	24,000	
Various accounts		24,000
Work in process inventory	15,428	
Manufacturing overhead		15,428
d. Various accounts	22,500	
Manufacturing overhead		22,500
Manufacturing overhead	15,428	
Work in process inventory		15,428

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- What are the major differences between managerial and financial accounting?
- Identify the three elements of cost incurred in manufacturing a product and indicate the distinguishing characteristics of each.
- Why might a company claim that the total cost of employing a person is USD 15.30 per hour when the employee's wage rate is USD 10.50 per hour? How should this difference be classified and why?
- Why are certain costs referred to as period costs? What are the major types of period costs incurred by a manufacturer?
- Explain why the income statement of a manufacturing company differs from the income statement of a merchandising company.
- What is the general content of a statement of cost of goods manufactured? What is its relationship to the income statement?
- What is the relationship between cost flows in the accounts and the flow of physical products through a factory?
- Define a job cost system and give an example of a situation in which it can be used.
- What are the major reasons for using predetermined manufacturing overhead rates?
- What is the formula for computing a predetermined overhead rate? If the expected level of activity in a production center is 50,000 machine-hours and the estimated overhead costs are USD 750,000, what is the predetermined overhead rate? Show the calculation.
- What is underapplied and overapplied overhead? What type of balance does each have in the Overhead account?
- Direct materials were issued to the following jobs: Material A was issued to Job No. 101, USD 2,000; Job No. 102, USD 1,000; and Job No. 103, USD 5,000. Material B was issued to Job No. 101, USD 5,000; Job No. 102, USD 2,000; and Job No. 103, USD 3,000. A total of USD 3,000 in indirect materials was issued to all jobs.
- Record the direct and indirect materials issued in journal entry form.
- **Real world question** Assume Domino's Pizza is considering offering a new product—a 6-inch (15.24 cm) pizza. Why would it matter if Domino's Pizza knows how much it costs to produce and deliver this 6-inch (15.24 cm) pizza?
- **Real world question** Why is it becoming more important that the managers of hospitals understand their product costs?



- **Real world question** Besides law firms and public accounting firms, name three service organizations that produce individual jobs and would use job costing.
- (Appendix) Under what specific circumstances would you expect net income to be larger under variable costing than under absorption costing? What is the reason for this difference?

### Exercises

**Exercise A** The following costs are incurred by an electrical appliance manufacturer. Classify these costs as direct materials, direct labor, manufacturing overhead, selling, or administrative.

- a. President's salary.
- b. Cost of electrical wire used in making appliances.
- c. Cost of janitorial supplies (the janitors work in the factory).
- d. Wages of assembly-line workers.
- e. Cost of promotional displays.
- f. Assembly-line supervisor's salary.
- g. Cost accountant's salary (the accountant works in the factory).
- h. Cost of cleaner used to clean appliances when they are completed.
- i. Cost of aluminum used for toasters.
- j. Cost of market research survey.

**Exercise B** Classify the costs listed in the previous exercise as either product costs or period costs.

**Exercise C** Gore Company makes products for sporting events. The following data are for the year ended 2010 December 31:

Materials inventory, 2010 January 1	\$ 45,000
Materials inventory, 2010 December 31	65,000
Materials purchases	175,000
Direct labor	225,000
Work in process inventory, 2010 January 1	30,000
Work in process inventory, 2010 December 31	40,000
Manufacturing overhead	130,000
Finished goods inventory, 2010 January 1	80,000
Finished goods inventory, 2010 December 31	140,000

Prepare a Cost of Goods Manufactured Statement and compute the cost of goods sold.

**Exercise D** In June, Sierra Company worked only on Job No. 100 and completed it on June 30. There were no prior costs accumulated on Job No. 100 before June 1. During the month, the company purchased and used USD 10,800 of direct materials, used 2,000 machine-hours, and incurred USD 19,200 of direct labor costs. Assuming manufacturing overhead is applied at the rate of USD 12 per machine-hour, what is the total cost of Job No. 100? Prepare journal entries to assign the materials, labor, and manufacturing overhead costs to production and to record the transfer of Job No. 100 to Finished Goods Inventory.

**Exercise E** At the end of the second week in March, Job No. 710 has an accumulated total cost of USD 37,800. In the third week, USD 9,000 of direct materials were used on Job 710, 300 hours of direct labor were charged to the job at USD 40 per hour, and manufacturing overhead was applied on the basis of USD 40 per machine-hour for overhead. Job No. 710 was the only job worked on in the third week. It was also completed in the third week. Job No. 710 used 160 machine-hours during the third week in March. Compute the cost of Job No. 710, and give the journal entry required to record its completion and transfer to Finished Goods Inventory.

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**Exercise F** Different companies use different bases in computing their predetermined overhead rates. From the following estimated data, compute the predetermined rate to be used by each company:

	Company		
	Paper	Rock	Scissors
Machine-hours	100,000	210,000	125,000
Direct labor-hours	50,000	48,000	39,000
Direct labor cost	\$800,000	\$735,000	\$410,000
Manufacturing overhead cost	\$400,000	\$432,000	\$375,000

Basis for determining predetermined overhead rate:

Company	Basis
Paper	Direct labor cost
Rock	Direct labor-hours
Scissors	Machine-hours

**Exercise G** Refer to the previous exercise. Assume the actual hours and cost data were:

Actual	Paper	Rock	Scissors
Manufacturing overhead	\$450,000	\$400,000	\$375,000
Direct labor cost	\$850,000	\$700,000	\$400,000
Direct labor-hours	45,000	46,000	38,000
Machine-hours	105,000	200,000	130,000

- Compute overapplied or underapplied overhead for each company.
- Prepare journal entries to transfer overapplied or underapplied overhead to Cost of Goods Sold for each company.

**Exercise H** Ernest Peat Consultants uses a job cost system and had the following activity during December:

There were no jobs in beginning Work in Process or Finished Goods Inventory.

Three jobs were started: No. 222, 223, and 224. Job No. 222 was completed and the customer was billed for USD 10,000 on account. Job No. 223 was completed and in Finished Goods Inventory awaiting billing to the client at the end of the month. Job No. 224 was still in process at month-end.

Direct labor costs incurred for:

Job No. 222	200 hours @ \$21/hour
Job No. 223	300 hours @ \$18/hour
Job No. 224	120 hours @ \$17/hour

Assume overhead is applied at the rate of USD 10 per labor-hour.

Actual overhead was USD 6,400. (The credit part of the journal entry is to Accounts Payable.)

Prepare journal entries to record the preceding data, as well as the transfer of underapplied or overapplied overhead to Cost of Goods Sold.

**Exercise I** The following data relate to Socks Company for the year ended 2010 December 31:

Cost of production:	
Direct materials (variable)	\$360,000
Direct labor (variable)	504,000
Manufacturing overhead:	
Variable	180,000
Fixed	360,000
Sales commissions (variable)	108,000
Sales salaries (fixed)	72,000
Administrative expenses (fixed)	144,000
Units produced	150,000
Units sold (at \$18 each)	120,000
Beginning inventory, 2010 January 1	-0-

There were no beginning inventories. Assume direct materials and direct labor are variable costs. Prepare two income statements—a variable costing income statement and an absorption costing income statement.

## Problems

**Problem A** Total Block, Inc., is considering a new sunscreen packet that contains a skin wipe with sunscreen on it. These would be particularly useful for people who do not want to carry a bottle of sunscreen, according to Sunspot's marketing manager. Classify the following costs of this new product as direct materials, direct labor, manufacturing overhead, selling, or administrative.

- a. President's salary.
- b. Packages used to hold the skin wipes.
- c. Cleaning materials used to clean the skin wipe packages.
- d. Wages of workers who package the product.
- e. Cost of advertising the product.
- f. The salary of the supervisor of the workers who package the product.
- g. Cost accountant's salary (the accountant works in the factory).
- h. Cost of a market research survey.
- i. Sales commissions paid as a percent of sales.
- j. Depreciation of administrative office building.

**Problem B** Classify the costs listed in the previous problem as either product costs or period costs.

**Problem C** Good Vibrations, Inc., produces videotapes of musical performances. A newly hired executive of the company has asked you to sort through the records and prepare a statement of the company's cost of goods manufactured. You find the following data from records prepared by Good Vibrations, Inc., for the year ended 2009 December 31:

Inventories:	
Beginning direct materials inventory, 2009 January 1	\$ 6,000
Ending direct materials inventory, 2009 December 31	10,500
Beginning work in process inventory, 2009 January 1	10,000
Ending work in process inventory, 2009 December 31	9,500
Materials purchases	50,000
Direct labor	40,000
Indirect labor	15,000
Factory utilities expense	7,000
Factory supplies expense	5,000
Depreciation expense – factory building	14,000
Depreciation expense – Factory Equipment	10,500
Other manufacturing overhead	25,000

You also learn that beginning Finished Goods Inventory on 2009 January 1, was USD 20,000 and ending Finished Goods Inventory on 2009 December 31, was USD 5,000. Sales for the year were USD 400,000. Selling expenses were USD 50,000 and administrative expenses were USD 75,000.

- a. Prepare a statement of cost of goods manufactured for Good Vibrations, Inc., for the year ended 2009 December 31.
- b. Prepare an income statement for Good Vibrations, Inc., for the year ended 2009 December 31.

**Problem D** Log Cabin Homes, Inc., uses a job cost system to account for its jobs, which are prefabricated houses. As of 2010 January 1, its records showed inventories as follows:

Materials and supplies	\$100,000
Work in process (Job Nos. 22 and 23)	180,000

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Finished goods (Job No. 21) 140,000

The work in process inventory consisted of two jobs:

Job No.	Direct materials	Direct labor	Manufacturing overhead	Total
22	\$36,000	\$40,000	\$20,000	\$ 96,000
23	40,000	28,000	16,000	84,000
		\$76,000	\$68,000	\$180,000

Cost and sales data for 2010:

Materials purchased on account, USD 400,000.

Direct materials used: Job No. 22, USD 60,000; Job No. 23, USD 120,000; Job No. 24, USD 180,000.

Indirect materials used, USD 10,000.

Direct labor costs: Job No. 22, USD 100,000; Job No. 23, USD 200,000; and Job No. 24, USD 80,000.

Indirect labor costs, USD 80,000.

Overhead is assigned to jobs at USD 100 per machine-hour. Job No. 22 used 500 machine-hours, Job No. 23 used 1,000 machine-hours, and Job No. 24 used 300 machine-hours in January.

Job No. 22 and 23 were completed and transferred to Finished Goods Inventory.

Job No. 21 and 22 were sold on account for USD 1,200,000, total.

Manufacturing overhead costs incurred, other than indirect materials and indirect labor, were depreciation, USD 80,000, and heat, light, power, miscellaneous, USD 40,000.

a. Prepare journal entries to assign the preceding costs to jobs. Show the appropriate entries debiting Finished Goods Inventory and Cost of Goods Sold. Transfer overapplied or underapplied overhead to Cost of Goods Sold.

b. Assuming selling and administrative expenses were USD 100,000, prepare an income statement for 2010.

**Problem E** Green Thumb Landscaping Company uses a job cost system. As of 2010 January 1, its records showed the following inventory balances:

Materials (shrubs, trees, etc.)	\$ 13,500
Work in process	25,800
Finished goods (Job No. 211)	30,000

The work in process inventory consisted of two jobs:

Job No.	Direct Materials	Direct Labor	Manufacturing Overhead	Total
212 10 Downing St.	\$4,500	\$ 6,000	\$2,400	\$12,900
213 1010 Wilshire Blvd.	5,100	4,800	3,000	12,900
	\$9,600	\$10,800	\$5,400	\$25,800

Here are data for the company for January:

Materials purchased, USD 48,000.

Landscaping direct labor costs: direct labor to Job No. 212, USD 12,000; to Job No. 213, USD 24,000; and to Job No. 214, USD 36,000. Indirect labor, USD 30,000.

Direct materials used: direct materials for Job No. 212, USD 7,800; for Job No. 213, USD 14,400; and for Job No. 214, USD 24,000. Supplies (indirect materials) used amounted to USD 1,200.

Overhead is assigned to jobs at USD 3 per labor-hour, with 8,000 labor-hours to Job 212 and 2,000 labor-hours each to Jobs 213 and 214.

Jobs 212 and 213 were completed and in Finished Goods Inventory at the end of January.

Sales revenues for January were USD 45,000; cost of goods sold was USD 30,000 for Job No. 211 that was in Finished Goods Inventory on 2010 January 1.

Overhead costs incurred other than indirect labor and indirect materials were depreciation, USD 3,000, and utilities, fuel, and miscellaneous, USD 3,000.

a. Prepare journal entries to record the preceding transactions, including the transfer of underapplied or overapplied overhead to Cost of Goods Sold.

b. Assuming selling and administrative expenses were USD 10,000, prepare an income statement for January.

**Problem F** Speedy Delivery, Inc., transports computer equipment for various computer manufacturers. Speedy applies overhead to jobs using a predetermined overhead rate based on truck miles. Estimated data for 2010 are:

Estimated truck miles	20 million
Estimated overhead for hauling operations (equivalent to manufacturing overhead)	\$12 million

a. Compute the predetermined overhead rate per mile.

b. Assume that in 2010, actual manufacturing overhead for hauling operations amounted to USD 15 million, and 24 million truck miles were driven. Compute the amount of underapplied or overapplied manufacturing overhead for 2010.

c. Prepare the journal entry to transfer underapplied or overapplied overhead to Cost of Goods Sold.

**Problem G** Costner Company uses an absorption costing system in accounting for the single product it manufactures. The following selected data are for the year 2009:

Sales (10,000 units)	\$360,000
Direct materials used (variable cost)	129,600
Direct labor costs (variable cost)	43,200
Variable manufacturing overhead	12,960
Fixed manufacturing overhead	17,280
Variable selling and administrative expenses	21,600
Fixed selling and administrative expenses	72,000

The company produced 12,000 units and sold 10,000 units. Direct materials and direct labor are variable costs. One unit of direct material goes into each unit of finished goods. Overhead rates are based on a volume of 12,000 units and are USD 1.08 and USD 1.44 per unit for variable and fixed overhead, respectively. The ending inventory is the 2,000 units of finished goods on hand at the end of 2009. There was no inventory at the beginning of 2009.

a. Prepare an income statement for 2009 under variable costing.

b. Prepare an income statement for 2009 under absorption costing.

c. Explain the reason for the difference in net income between a and b.

#### Alternate problems

**Alternate problem A** Pocket Umbrella, Inc., is considering producing a new type of umbrella. This new pocket-sized umbrella would fit into a coat pocket or purse. Classify the following costs of this new product as direct materials, direct labor, manufacturing overhead, selling, or administrative.

a. Cost of advertising the product.

b. Fabric used to make the umbrellas.

c. Maintenance of cutting machines used to cut the umbrella fabric so it will fit the umbrella frame.

d. Wages of workers who assemble the product.

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- e. President's salary.
- f. The salary of the supervisor of the people who assemble the product.
- g. Wages of the product tester who stands in a shower to make sure the umbrellas do not leak.
- h. Cost of market research survey.
- i. Salary of the company's sales managers.
- j. Depreciation of administrative office building.

**Alternate problem B** Classify the costs listed in Alternate problem A as either product costs or period costs.

**Alternate problem C** Presley Manufacturing Company is a producer of music compact discs (CDs) and tapes.

The following account balances are for the year ended 2009 December 31

Administrative expenses	\$ 60,000
Depreciation expense – Manufacturing equipment	50,000
Direct labor	468,000
Manufacturing supplies expense	40,000
Indirect labor	36,000
Beginning inventories, 2009 January 1:	
Direct materials	14,000
Work in process	20,000
Finished goods	128,000
Ending inventories, 2009 December 31	
Direct materials	44,000
Work in process	56,000
Finished goods	92,000
Direct materials purchases	216,000
Rent expense – Factory	28,000
Sales	1,400,000
Selling expense	72,000
Other manufacturing overhead	126,000

- a. Prepare a statement of cost of goods manufactured for Presley Manufacturing Company for 2009.
- b. Prepare an income statement for the year ended 2009 December 31.

**Alternate problem D** Cathy's Catering Company uses a job cost system. Its activities in November 2010, the first month of operations, were as follows:

	<b>Job</b>		
	<b>First-rate</b>	<b>Active life</b>	<b>Precocious</b>
	<b>University</b>	<b>home</b>	<b>School</b>
Direct materials cost (food)	\$54,000	\$36,000	\$81,000
Direct labor cost	\$45,000	\$40,500	\$54,000
Labor-hours	2,900	3,500	3,800

The company applies overhead at a rate of USD 16 per labor-hour. It completed all jobs in November. The total revenue for the three jobs was USD 400,000. The actual overhead for the month was USD 160,000, of which USD 120,000 should be credited to Accounts Payable and USD 40,000 should be credited to Accumulated Depreciation.

Prepare journal entries to record the costs of jobs and to record the transfer of completed jobs to Finished Goods Inventory and to Cost of Goods Sold. Transfer any underapplied or overapplied overhead to Cost of Goods Sold. The company had no beginning or ending inventories.

**Alternate problem E** Sullivan Company applied overhead to production using a predetermined overhead rate based on machine-hours. Budgeted data for 2010 are:

Budgeted machine-hours	75,000
Budgeted manufacturing overhead	\$870,000

- a. Compute the predetermined overhead rate.
- b. Assume that in 2010, actual manufacturing overhead amounted to USD 997,500, and 86,000 machine-hours were used. Compute the amount of underapplied or overapplied manufacturing overhead for 2010.

c. Prepare the journal entry to transfer underapplied or overapplied overhead to Cost of Goods Sold.

**Beyond the numbers—Critical thinking**

**Business decision case A** Companies often do work on a cost-reimbursement basis. That is, Company B reimburses Company A for the cost of doing work for Company B. Suppose your company has a contract that calls for reimbursement of direct materials and direct labor, but not overhead. Following are costs that various organizations incur; they fall into three categories: direct materials (DM), direct labor (DL), or overhead (OH).

Glue used to attach labels to bottles containing a patented medicine.

Compressed air used in operating paint sprayers for Student Painters, a company that paints houses and apartments.

Insurance on a factory building and equipment.

A production department supervisor's salary.

Rent on factory machinery.

Iron ore in a steel mill.

Oil, gasoline, and grease for forklift trucks in a manufacturing company's warehouse.

Services of painters in building construction.

Cutting oils used in machining operations.

Cost of paper towels in a factory employees' washroom.

Payroll taxes and fringe benefits related to direct labor.

The plant electricians' salaries.

Crude oil to an oil refinery.

Copy editor's salary in a book publishing company.

a. Classify each of these items as direct materials, direct labor, or overhead.

b. Assume your classifications could be challenged in a court case. Indicate to your attorneys which of your answers for part a might be successfully disputed by the opposing attorneys. In which answers are you completely confident?

**Business decision case B** Quality Painters, Inc., uses a job cost system. As of 2010 January 1, its records showed the following inventory balances:

Materials	\$ 7,000
Work in process	50,000
Finished goods	0

The work in process inventory consisted of two jobs:

Job No.	Direct Materials	Direct Labor	Overhead	Total
100 Community housing	\$ 9,000	\$12,000	\$ 4,000	\$25,000
101 Regal apartments	10,000	9,000	6,000	25,000
	\$19,000	\$21,000	\$10,00	\$50,000

Here are data for the company for January:

Materials purchased, USD 90,000.

Direct labor costs: direct labor to Job No. 100, USD 20,000; to Job No. 101, USD 48,000; and to Job No. 102 (a new job), USD 50,000. Indirect labor, USD 10,000.

Direct materials used: direct materials for Job No. 100, USD 15,600; for Job No. 101, USD 28,800; and for Job No. 102, USD 48,000. Supplies (indirect materials) used amounted to USD 4,000.

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Overhead is assigned to jobs at USD 5 per labor-hour, with 1,000 labor-hours to Job 100 and 2,000 labor-hours each to Jobs 101 and 102.

All three jobs were completed in January.

Sales revenues for January were USD 350,000 for the three jobs.

Overhead costs incurred other than indirect labor and indirect materials were depreciation, USD 6,000, and utilities, fuel, and miscellaneous, USD 6,000.

Management is concerned about the relationship between costs incurred on jobs and the costs expected to be incurred, and has asked for your help. Here are the expected total costs (direct materials, direct labor, and overhead) for the three jobs:

Job 100	\$ 60,000
Job 101	120,000
Job 102	130,000

These cost estimates cover the entire job, including both costs in beginning Work in Process Inventory and costs incurred during January.

a. Compare the costs incurred on each job, including the costs in beginning Work in Process Inventory and costs incurred during January with the expected costs. Is the company keeping its costs below the expected costs for each job?

b. Prepare an income statement for January 2010 assuming selling and administrative expenses for January were USD 50,000. Don't forget to transfer any underapplied or overapplied overhead balance to Cost of Goods Sold.

c. Is the company profitable (that is, showing net income greater than zero)? What suggestions can you make for management to help increase the company's net income?

**Writing assignment C** Refer to Presley Manufacturing company, Problem C. Assume the newly hired executive is a whiz at marketing, but a person whose eyes glaze over at the sight of a number. The executive wants you to explain the financial results for the year in words. Essentially, assume the executive has not seen the financial statements prepared. What would you say to convey the message in the financial statements? Keep it short—less than 100 words.

**Ethics case – Writing experience D** Refer to the Ethical Perspective discussion of Comserv's activities entitled "High pressure sales tactics and creative accounting". As a salesperson, how would you respond if your boss asked you to backdate contracts from 2010 January 3, to 2009 December 28? What if you were asked to backdate the contracts from 2010 February 1, to 2009 December 28? Assume December 31 is the company's fiscal year-end.

**Ethics case E** Suzie Garcia, an accountant for a consulting firm, had just received the monthly cost reports for the two jobs she supervises: one for Arrow Space, Inc., and one for the US government. She immediately called her boss after reading the figures for the Arrow Space job.

"We are going to be way over budget on the Arrow Space contract," she informed her boss. "The job is only about three-fourths complete, but we have spent all the money that we had budgeted for the entire job."

"You had better watch these job costs more carefully in the future," her boss advised. "Meanwhile, charge the rest of the costs needed to complete the Arrow Space job to your US government job. The government will not notice the extra costs. Besides, we get reimbursed for costs on the government job, so we will not lose any money on this problem you have with the Arrow Space contract."



What should Suzie do? Does it matter that Suzie's company is reimbursed for costs on the US government contract? Explain.

**Group project – Ethical perspective F** Refer to the “An ethical perspective” discussion of Comserv's activities. As a salesperson, suppose your boss asked you to write a side agreement that allowed a customer to back out of a contract, and insisted that you not reveal the side contract to anyone else in your organization. You like your job a lot, and you will probably lose it if you do not comply with your boss's wish. In groups of three, discuss how you would respond to your boss. Try to develop a creative way to handle this situation. Choose a group spokesperson to report to the class.

**Group project G** In teams of two or three students, interview in person or by speakerphone, a businessperson in your community who uses job costing (for example, businesses that produce custom products such as homes, signs, or landscape design, or business consultants). Ask how this person assigns costs to products and how this information affects business decisions. Keep in mind that many businesspeople use terms other than job costing and manufacturing overhead. Be flexible with your use of accounting terminology in this interview. Each team should write a memorandum to the instructor summarizing the results of the interview. Information contained in the memo should include:

Date:

To:

From:

Subject:

Content of the memo must include the name and title of the person interviewed, name of the company, date of the interview, examples of the use of accounting information for decision making, and any other pertinent information.

**Group project H** In teams of two or three students, interview the manager of a campus print shop or a print shop in the area about how the company bids on prospective jobs. Does it use cost information from former jobs that are similar to prospective ones, for example? Does it have a specialist in cost estimation who estimates the costs of prospective jobs? Each team should write a memorandum to the instructor summarizing the results of the interview. Information contained in the memo should include:

Date:

To:

From:

Subject:

Content of the memo must include the name and title of the person interviewed, name of the company, date of the interview, and information responding to the questions above.

#### **Using the Internet—A view of the real world**

Visit the website for a high technology company, such as HP, Intel Corporation, or IBM, and locate its annual report. Review the annual report to gain a general understanding of the company's primary business segments and products. Write a report addressing the following questions based on your research. What products or services are provided by the company? How does the financial information provided in the annual report (focus on the income statement) differ from financial information used for managerial accounting purposes? As a manager making

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business decisions within the company, what additional information would you need? (Remember that the income statement may be referred to using different terminology such as statement of earnings or statement of operations.)

<b>Company</b>	<b>Website</b>
Hewlett Packard	<a href="http://www.hp.com">Http://www.hp.com</a>
Intel Corporation	<a href="http://www.intel.com">Http://www.intel.com</a>
IBM	<a href="http://www.ibm.com">Http://www.ibm.com</a>

Visit the following website for Wells Fargo (a financial institution) and locate its annual report:

<http://www.wellsfargo.com>

Review the annual report to gain a general understanding of the company's primary business segments and products. Write a report addressing the following questions based on your research. What products or services are provided by the company? How does the financial information provided in the annual report (focus on the income statement) differ from financial information used for managerial accounting purposes? As a manager making business decisions within the company, what additional information would you need? (Remember that the income statement may be referred to using different terminology such as statement of earnings or statement of operations.)

Visit the following website for Home Depot (a retail organization) and locate its annual report:

<http://www.homedepot.com>

Review the annual report to gain a general understanding of the company's primary business segments and products. Write a report addressing the following questions based on your research. What products or services are provided by the company? How does the financial information provided in the annual report (focus on the income statement) differ from financial information used for managerial accounting purposes? As a manager making business decisions within the company, what additional information would you need? (Remember that the income statement may be referred to using different terminology such as statement of earnings or statement of operations.)

### [Answers to self-test](#)

#### **True-false**

**False.** Managerial accounting is for internal use by managers, not external use, and gives more detailed information than financial accounting.

**True.** The motors are direct materials, and they are product costs.

**False.** Because bottling soft drinks is a process, the plant would not use job costing.

**False.** The answer is the opposite. The estimated total overhead is the numerator, and the expected level of activity is the denominator.

**False.** Overhead can be applied to jobs during the period.

**True.** Selling and administrative expenses are part of period costs under both absorption and variable costing methods.

#### **Multiple-choice**

**b.** Indirect materials are included under overhead.

**a.** Selling and administrative expenses are period costs for financial accounting purposes.

**b.** A merchandiser uses Merchandise Inventory and Cost of Goods Available for Sale, whereas a manufacturer uses Finished Goods Inventory and Cost of Goods Available for Sale.

**d.** All of the answers are true.

**d.** Both (a) and (c) are advantages of using a predetermined overhead rate.

**c.** 
$$\text{USD } 15 = \frac{(\text{USD } 360,000 + \text{USD } 90,000)}{30,000 \text{ machine-hours}}$$

**a.**

Manufacturing overhead	22,500	
Various accounts		22,500
Work in process inventory	21,000	
Manufacturing overhead		21,000

Note the predetermined overhead rate times the actual activity is  $\text{USD } 0.60 \times 35,000 \text{ machine-hours} = \text{USD } 21,000$ .

# 19. Process: Cost systems

## Learning objectives

After studying this chapter, you should be able to:

- Describe the types of operations that require a process cost system.
- Distinguish between process and job costing systems.
- Discuss the concept of equivalent units in a process cost system.
- Compute equivalent units of production and unit costs under the average cost procedure.
- Prepare a production cost report for a process cost system and discuss its relationship to the Work in Process Inventory account.
- Distinguish between normal and abnormal spoilage.
- Compute equivalent units of production and unit costs under the first-in first-out (FIFO) system (Appendix 19-A).
- Discuss how joint costs are allocated to joint products (Appendix 19-B).

This chapter continues the discussion of cost accumulation systems. In Chapter 18, we explained and illustrated job costing. The **job cost system (job costing)** accumulates costs incurred to produce a product according to individual jobs. For example, construction companies use job costing to keep track of the costs of each construction job.

This chapter discusses another cost accumulation system, process costing. The chapter begins with a discussion of the nature of a process cost system. We review the similarities and differences between job costing and process costing. We also present an extended illustration of process costing that includes a discussion of equivalent units of production and the production cost report. In the chapter appendixes, we discuss and illustrate FIFO process costing and the allocation of joint product costs.

## Nature of a process cost system

Many businesses produce large quantities of a single product or similar products. Pepsi-Cola makes soft drinks, Exxon Mobil produces oil, and Kellogg Company produces breakfast cereals on a continuous basis over long periods. For these kinds of products, companies do not have separate jobs. Instead, production is an ongoing process.

A **process cost system (process costing)** accumulates costs incurred to produce a product according to the processes or departments a product goes through on its way to completion. Companies making paint, gasoline, steel, rubber, plastic, and similar products using process costing. In these types of operations, accountants must accumulate costs for each process or department involved in making the product. Accountants compute the cost per unit by first accumulating costs for the entire period (usually a month) for each process or department. Second, they divide the accumulated costs by the number of units produced (tons, pounds, gallons, or feet) in that process or department.

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In "A broader perspective: Producing cans of Coca-Cola", we describe production in bottling and canning plants that use a process cost system. Job costing and process costing have important similarities:

- Both job and process cost systems have the same goal: to determine the cost of products.
- Both job and process cost systems have the same cost flows. Accountants record production in separate accounts for materials inventory, labor, and overhead. Then, they transfer the costs to a Work in Process Inventory account.
- Both job and process cost systems use predetermined overhead rates (defined in Chapter 18) to apply overhead.

Job costing and process costing systems also have their significant differences:

- Types of products produced. Companies that use job costing work on many different jobs with different production requirements during each period. Companies that use process costing produce a single product, either on a continuous basis or for long periods. All the products that the company produces under process costing are the same.
- Cost accumulation procedures. Job costing accumulates costs by individual jobs. Process costing accumulates costs by process or department.
- Work in Process Inventory accounts. Job cost systems have one Work in Process Inventory account for each job. Process cost systems have a Work in Process Inventory account for each department or process.

Exhibit 150 shows the cost flows in a process cost system that processes the products in a specified sequential order. That is, the production and processing of products begin in Department A. From Department A, products go to Department B. Department B inputs direct materials and further processes the products. Then Department B transfers the products to Finished Goods Inventory. For illustration purposes, we assume that all the process cost systems in this chapter are sequential. There are many production flow combinations; Exhibit 151 presents three possible production flow combinations.

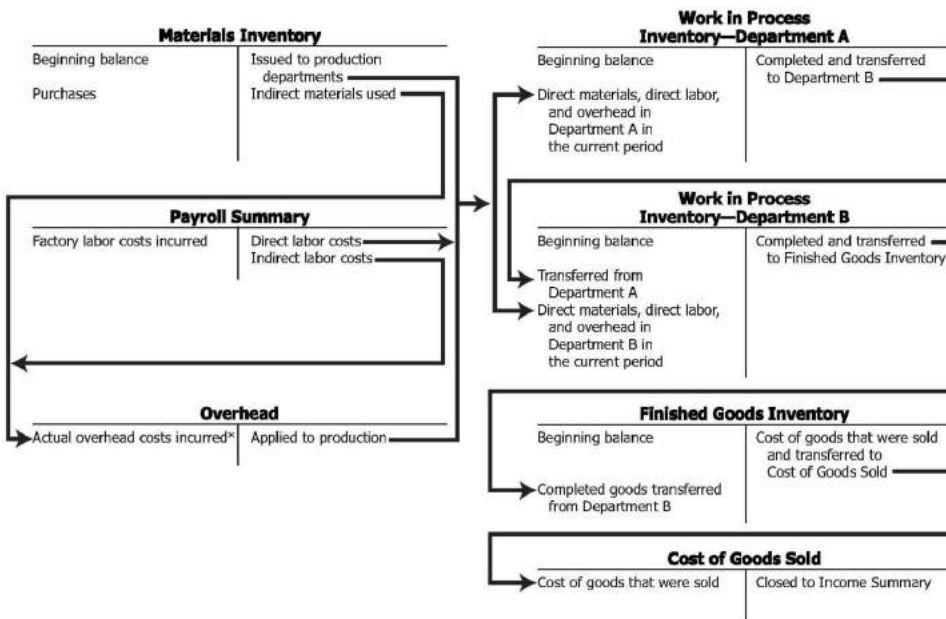
### Process costing illustration

Assume that Jax Company manufactures and sells a chemical product used to clean kitchen counters and sinks. The company processes the product in two departments. Department A crushes powders and blends the basic materials. Department B packages the product and transfers it to finished goods. Exhibit 151 shows this manufacturing process.

The June production and cost data for Jax Company are:

	<b>Department A</b>	<b>Department B</b>
Beginning inventory	-0-	-0-
Units started, completed, and transferred	11,000	9,000
Units on hand June 30, partially completed	-0-	2,000
Direct materials	\$16,500	\$1,100
Direct labor	2,500	2,880
Actual overhead	7,500	8,600
Applied overhead	7,400	8,880

**Illustration 19.1** Cost Flows in a Process Cost System



\*Includes indirect materials, indirect labor, and other overhead.

**Exhibit 150:** Cost flows in a process cost system

(Jax's accountant applies manufacturing overhead in Departments A and B based on the machine-hours used in production.) From these data, we can construct and summarize the Work in Process Inventory—Department A account below.

Work in process inventory – Department A		
Direct materials	16,500	Transferred to department B: 26,400
Direct labor	2,500	11,000 units @ \$2.40
Applied overhead	7,400	
Balance	-0-	

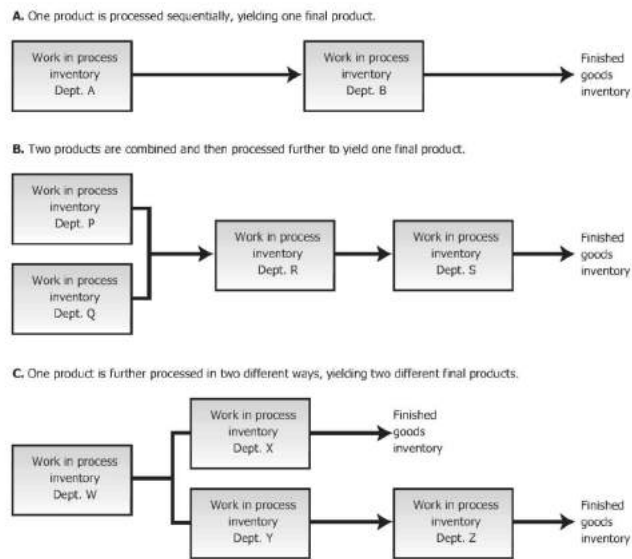
Department A completed all the units it started in June and transferred them to Department B. So all the costs assigned to these units were transferred to Department B. Jax's accountant computed the unit costs in Department A by dividing the USD 26,400 total costs by the 11,000 units completed and transferred. The result is USD 2.40, the average unit cost of 11,000 units.

Computations are seldom this simple; one complication is partially completed inventories. Consider Department B, for example. Before Department B transfers the cost of completed units, its Work in Process Inventory account for June is as follows:

Work in process inventory – Department B	
Transferred in from department A	26,400
Costs added in Dept. B:	
Direct materials	1,100
Direct labor	2,880
Applied overhead	8,880
Balance	39,260

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**Illustration 19.2 Possible Production Flow Combinations**



**Illustration 19.3 Product Flows in a Process Cost System (Jax Company example)**

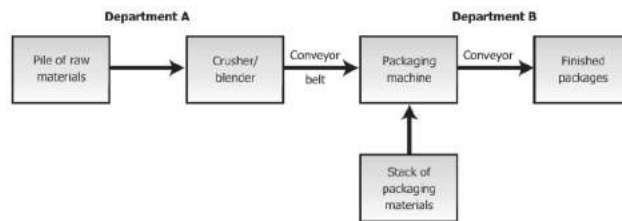


Exhibit 151: Possible production flow combinations

**A broader perspective:**

**Producing cans of Coca-Cola®**

How was the Diet Coke® I just finished drinking produced? A Coca-Cola bottling plant purchased cola syrup or a concentrate from The Coca-Cola Company, combined it with carbonated water, put it in cans, and sealed the cans. (Although these plants are usually called bottling plants, they also produce cans of Coke®.)

In a bottling plant, the first process combines the syrup or concentrate with carbonated water to make cola. In a second process, empty cans are rinsed and inspected. A third process combines these two materials by pouring the cola into the cans. Next, tops are placed on the cans. Finally, the cans are combined into packages. This completes the work in process stage.

The product enters finished goods inventory when it is sent to the warehouse. The product becomes cost of goods sold to the bottling plants when it is shipped to distributors or retail outlets.

Source: Based on the authors' research and documents provided by The Coca-Cola Company. Coca-Cola, Diet Coke, and Coke are registered trademarks of The Coca-Cola Company.

Recall that direct materials, direct labor, and applied overhead are product costs; that is, the costs attach to the product. Thus, Transferred in from Department A in the T-account represents the direct materials, direct labor, and applied overhead costs assigned to products in Department A. These costs have followed the physical units to Department B.

Now, Jax's accountant must divide the USD 39,260 total costs charged to Department B in June between the units transferred out and those remaining on hand in the department. The accountant cannot divide USD 39,260 by 11,000 units to get an average unit cost because the 11,000 units are not alike. Department B has 9,000 finished units and has 2,000 partially finished units. To solve this problem, the accountant uses the concept of equivalent units of production, which we discuss next.

Essentially, the concept of **equivalent units** involves expressing a given number of partially completed units as a smaller number of fully completed units. For example, if we bring 1,000 units to a 40 per cent state of completion, this is equivalent to 400 units that are 100 per cent complete. Accountants base this concept on the supposition that a company must incur approximately the same amount of costs to bring 1,000 units to a 40 per cent level of completion as it would to complete 400 units.

On the next page look at Exhibit 152, a diagram of the concept of equivalent units. As you examine the diagram, think of the amount of water in the glasses as costs that the company has already incurred.

The beginning step in computing Department B's equivalent units for Jax Company is determining the stage of completion of the 2,000 unfinished units. These units are 100 per cent complete as to **transferred-in costs**; if they were not, Department A would not have transferred them to Department B. In Department B, however, the units may be in different stages of completion regarding the materials, labor, and overhead costs. Assume that Department B adds all materials at the beginning of the production process. Then both ending inventory and units transferred out would be 100 per cent complete as to materials. Therefore, equivalent production for materials would be 11,000 units.

Accountants often assume that units are at the same stage of completion for both labor and overhead. Accountants call the combined labor and overhead costs conversion costs. **Conversion costs** are those costs incurred to convert raw materials into the final product.

Let us assume that, on average, the 2,000 units in ending inventory are 40 per cent complete as to conversion costs. This means that Department B transferred out 9,000 units fully completed and brought 2,000 units to a 40 per cent completion state. Department B now has an equivalent of 800 fully completed units remaining in inventory ( $800 = 2,000 \times 40$  per cent). The equivalent units for labor and overhead would therefore be 9,800 units.



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**Illustration 19.4** The Concept of Equivalent Units

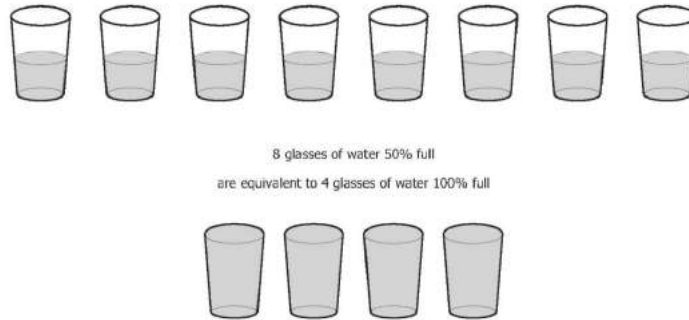


Exhibit 152: The concept of equivalent units

The formula for equivalent units for each cost element (transferred-in, materials, and conversion) is:

$$\text{Equivalent units} = \text{Units completed} + (\text{Units in ending inventory} \times \text{per cent complete})$$

When we know the equivalent units of production, we can compute unit costs for transferred-in, materials, and conversion elements. The average unit cost formulas for each cost element are:

$$\text{Unit cost for transferred} = \frac{\text{Total transferred costs}}{\text{Equivalent units for transferred costs}}$$

$$\text{Unit cost for materials} = \frac{\text{Total materials costs}}{\text{Equivalent units for conversion costs}}$$

$$\text{Unit cost for conversion} = \frac{\text{Total conversion costs}}{\text{Equivalent units for conversion costs}}$$

Now we can compute unit costs for each element in Department B as follows:

	<b>Transferred-in</b>	<b>Materials</b>	<b>Conversion</b>	<b>Total</b>
Costs to be accounted for:				
Charged to Department B	\$26,000	\$1,100	\$11,760*	\$39,260
Equivalent units	11,000	11,000	9,800†	
Unit costs	\$ 2.40	\$ 0.10	\$ 1.20	\$ 4.70

\*Conversion costs consist of direct labor + overhead (\$2,880 + \$8,880).

†Units transferred out (9,000) + equivalent units in ending inventory (800).

We can use the USD 3.70 computed unit costs to divide Department B's USD 39,260 June costs between the units completed and transferred out and the units remaining in the department's ending inventory. We do this in the following table:

	<b>Transferred-in (@ \$2.40)</b>	<b>Materials (@ \$0.10)</b>	<b>Conversion (@ \$1.20)</b>	<b>Total</b>
Costs accounted for:				
Units completed and transferred out (9,000 units)	\$21,600	\$900	\$10,800	\$33,300
Units remaining in ending inventory (2,000 units)	4,800	200	960*	5,960
Costs accounted for	\$26,400	\$1,100	\$11,760	\$39,260

\*Equivalent units = 800 units

The USD 33,300 total costs transferred out of Department B consist of USD 21,600 transferred in from Department A (9,000 X USD 2.40), USD 900 of materials costs (9,000 X USD 0.10), and USD 10,800 of conversion costs (9,000 X USD 1.20), or a total cost of USD 3.70 per unit. The 2,000 units of ending inventory in

Department B are fully complete as to costs transferred in from Department A and materials and 40 per cent complete as to conversion. We calculate the ending inventory cost as follows:

Costs from Department A (2,000 x \$2.40)			\$4,500
Costs added by Department B:			
Materials (2,000 x \$0.10)	\$200		
Conversion (800 equivalent units x \$1.20)	960	1160	
Total cost of ending inventory			\$5,960

Jax carries units transferred out of Department B in finished goods inventory at a cost of USD 3.70 each until they are sold. Then, Jax charges the cost of units sold to Cost of Goods Sold.

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### An ethical perspective: Rynco Scientific Corporation

Rynco Scientific Corporation was a manufacturer of contact lenses that the Securities and Exchange Commission (SEC) investigated concerning the way it computed equivalent units of production. According to the SEC, Rynco made errors in calculating the equivalent units of production that materially overstated its ending inventory, and understated its losses. As a result of the SEC's investigation, Rynco agreed to hire an accounting firm to conduct a thorough study of its financial statements for a five-year period, and it agreed to restate its financial statements to conform to generally accepted accounting principles.

We have discussed how to determine the costs of each cost element placed in production, transferred to finished goods inventory, and charged to cost of goods sold. Now let us look at the summary of the journal entries for these activities for the month of June.

1.	Work in process inventory – Department A (+A)	16,500	
	Work in process inventory – Department B (+A)	1,100	
	Materials inventory (-A)		17,600
	To record materials placed in production in June.		
2.	Work in process inventory – Department A (+A)	2,500	
	Work in process inventory – Department B (+A)	2,880	
	Payroll summary (+L)		5,380
	To assign labor costs to departments.		
3.	Work in process inventory – Department A (+A)	7,400	
	Work in process inventory – Department B (+A)	8,880	
	Overhead (or manufacturing overhead) (+SE)		16,280
	To apply overhead to production.		
4.	Work in process inventory – Department B (+A)	26,400	
	Work in process inventory – Department A (-A)		26,400
	To record transfer of goods from Department A to Department B.		
5.	Overhead (of Manufacturing Overhead) (-SE)	16,100	
	Various accounts – Cash, Accounts payable, accruals, and accumulated depreciation (varies)		16,100
	To record actual overhead costs incurred in June.		
6.	Finished goods inventory (+A)	33,300	
	Work in process inventory – Department B (-A)		33,300
	To record transfer of completed goods from Department B to finished goods.		

If Jax Company sold 6,000 of these completed units in June at USD 10 per unit on account, it would make the following entries:

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7. Accounts receivable (+A)	60,000	
Sales (+SE)		60,000
To record sales on account.		
8. Cost of goods sold (-SE)	22,200	
Finished goods inventory (-A)		22,200
To record cost of goods sold in June, 6,000 units @ \$3.70.		

The key document in a process costing system is the production cost report. A **production cost report** shows both the flow of units and the flow of costs through a processing center. It also shows how accountants divide these costs between the cost of units completed and transferred out and the cost of units still in the processing center's ending inventory. This report makes the equivalent unit and unit cost computations easier.

To illustrate the preparation of a production cost report with partially completed beginning and ending inventories, assume the following June 2011 data for Department 3 of a different company, Storey Company:

<b>Units</b>	
Units in beginning inventory, complete as to materials, 60% complete as to conversion costs	6,000
Units transferred in from Department 2	18,000
Units completed and transferred out	16,000
Units in ending inventory, completed as to materials, 50% complete as to conversion costs	8,000

<b>Costs</b>		
Cost of beginning inventory:		
Costs transferred in from Department 2 in May	\$12,000	
Materials added in May in Department 3	6,000	
Conversion costs (labor and overhead)	3,000	\$21,000
Costs transferred in from Department 2 in June	37,200	
Costs added in Department 3 in June:		
Materials	\$18,480	
Conversion (equal amounts of labor and overhead)	18,000	36,480
Total costs in beginning inventory and placed in production in Department 3 in June	\$94,680	

The preparation of the production cost report includes the following four steps:

- Trace the physical flow of the units through the production department.
- Convert actual units to equivalent units.
- Compute unit costs for each cost element.
- Distribute the total cost between the units completed and transferred out and the units remaining in the ending inventory.

Using the June data, Storey developed the production cost report for Department 3 shown in Exhibit 154.

The first step in the preparation of a production cost report is to trace the physical flow of actual units in and out of Department 3. The units section in Exhibit 154 shows that Department 3 had 6,000 units in the June beginning inventory. Department 3 also had 18,000 units transferred in from Department 2. This makes a total of 24,000 units for which Department 3 must account.

Of these 24,000 units, Department 3 completed and transferred out 16,000 units (either to the next processing department or to finished goods). At the end of the month, Department 3 had 8,000 partially completed units. These 8,000 units are the June ending inventory. Now we are ready for the second step in the preparation of the production cost report—to convert actual units to equivalent units.

Storey Company's cost of production report uses the average cost procedure. Under the **average cost procedure**, the number of equivalent units for each cost element equals the number of units transferred out plus the number of equivalent units of that cost element in the ending inventory. The average cost procedure does not consider the number of units in the beginning inventory and the degree of completion of the beginning inventory. Alternatively, Storey could use First-in, First-out (FIFO) or Last-in, First-out (LIFO). We use the average cost procedure in this chapter because it is simpler and commonly used in practice.

<b>Storey Company Production Cost Report - For the month of June 2011</b>					
<b>Units</b>	<b>Actual units</b>	<b>Department 3 Transferred- in</b>	<b>Equivalent units Materials</b>	<b>Conversion</b>	
Units in beginning inventory	6,000				
Units transferred in from Department 2	18,000				
Units to be accounted for	24,000				
Units completed and transferred out	16,000	16,000	16,000	16,000	
Units in ending inventory*	8,000	8,000	8,000	4,000	
Units accounted for	24,000	24,000	24,000	20,000	
<b>Costs</b>		<b>Transferred- in</b>	<b>Materials</b>	<b>Conversion</b>	<b>Total</b>
Costs to be accounted for:					
Costs in beginning inventory		\$12,000	\$6,000	\$3,000	\$21,000
Costs transferred in from Department 2 in June		37,200			37,200
Costs added in Department 3			18,480	18,000	36,480
Costs to be accounted for		\$49,200	\$24,480	\$21,000	\$94,680
Equivalent units (from above)		24,000	24,000	20,000	
Unit cost (per equivalent unit)†		\$2.05	\$1.02	\$1.05	\$4.12
Costs accounted for:					
Units completed and transferred out (16,000 units)		\$32,800	\$16,320	\$16,800	\$65,920
Units remaining in ending inventory (8,000 units)*		16,400	8,160	4,200	28,760
Costs accounted for		\$49,200	\$24,480	\$21,000	\$94,680

\*Inventory is complete as to materials added, 50% complete as to conversion.

† Unit cost equals costs to be accounted to divided for divided by equivalent units.

#### Exhibit 153: Production cost report

Storey's units in the ending inventory are fully complete as to costs transferred in and materials cost. Therefore, the number of equivalent units for each of these cost elements is 24,000 (16,000 units completed and transferred

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out + [8,000 units in the ending inventory X 100 per cent complete for transferred-in costs and materials costs]). The 8,000 units remaining in ending inventory are 50 per cent complete as to conversion. Therefore, there are 20,000 equivalent units with regards to conversion—16,000 units transferred out plus 8,000 units in ending inventory that were 50 per cent complete.

Once a company has computed its equivalent units, it must calculate the unit costs. This is the third step in preparing the production cost report. Each cost element of production—costs transferred in, materials, and conversion—has accumulated costs. Notice in Exhibit 153 that for each cost element, we total the costs of beginning inventory and costs of the current month. We refer to the total costs charged to a department as costs to be accounted for. These costs must either be transferred out or appear in the ending inventory of Department 3.

To determine the cost per equivalent unit for each cost element, divide the total cost for each cost element by the equivalent units of production related to that cost element. (Since we totaled all costs for each cost element before the division, we can average the computed unit costs across the current and prior period.) Exhibit 153 shows the average per unit costs for June as transferred-in costs, USD 2.05; materials costs, USD 1.02; and conversion costs, USD 1.05. In monitoring these costs closely for cost control purposes, management watches for extreme fluctuations from one month to the next.

The last step in preparing the production cost report is to allocate costs between the units completed and transferred out and the units remaining in ending inventory. The units transferred out were fully complete as to all elements of production. Therefore, we can multiply the 16,000 units by USD 4.12, the total cost per unit. The result, USD 65,920, is the amount Storey assigns to the next department as cost transferred in or to finished goods as the cost of completed current period production. We now compute the cost of ending inventory as follows:

8,000 equivalent units transferred in @ \$2.05  
8,000 equivalent units of materials costs @ \$1.02  
4,000 equivalent units of conversion costs @ \$1.05  
Total cost of ending inventory

The sum of the ending inventory cost and the cost of the units transferred out must equal the total costs to be accounted for. This built-in check determines whether the company has properly followed the procedures of cost allocation. As shown in the production cost report, Department 3 adds the USD 65,920 costs transferred out to the USD 28,760 ending inventory cost. The total equals the USD 94,680 for which Department 3 must account.

Some companies replace the production cost report with three schedules. The first schedule is the schedule of equivalent production. This schedule computes the equivalent units of production for the period for transferred-in, materials, and conversion costs. The second schedule is the unit cost analysis schedule. This schedule sums all the costs charged to the Work in Process Inventory account of each production process department. Then it calculates the cost per equivalent unit for transferred-in, materials, and conversion costs. The third schedule is the cost summary schedule. This schedule uses the results of the preceding two schedules to distribute the total costs accumulated during the period among all the units of output. Companies generally show these three schedules in a process cost analysis report.

Companies that use a process cost system may use the **first-in, first-out (FIFO) method** instead of the average cost procedure. Generally, under FIFO, the equivalent number of units for each cost element consists of:

- Work needed to complete the units in beginning inventory.
- Work done on units started and completed during the period.
- Work done on partially completed units in ending inventory.

Appendix 19-A, at the end of this chapter, illustrates this method.

Now that you have studied both job costing in Chapter 18 and process costing in this chapter, you can appreciate why manufacturing companies must accurately account for product unit costs. Without accurate cost accounting information, a manufacturing company cannot determine the cost of its products for managerial decision making or prepare accurate financial statements.

### Process costing in service organizations

Service organizations that provide similar services to a variety of customers are potential users of process costing. For example, a clinic dispensing flu shots, a delicatessen selling only pastrami sandwiches, and a photo shop that processes pictures could use process costing. In manufacturing, the difficult task is to match period costs with the units produced that period, which is why companies compute equivalent units of production. (And that is what most people find difficult about process costing.)

Generally, service companies complete the service by the end of the period and have no work in process at the end of the period. Nurses do not leave for home halfway through giving a flu shot, and the delicatessen does not partially serve a sandwich one month and complete it the next. Consequently, there is no need to compute equivalent units, which simplifies process costing.

Note that some service companies do have partially completed work at the end of the period. Certain types of dry cleaning and photo processing may still be in process at the end of a period. You could apply the methods described in this chapter for manufacturing to those service companies. For materials, you could substitute any significant supplies, and for conversion costs, service labor and overhead.

### Spoilage

If you have ever tried to make something that did not work out, you know the concept of spoilage. **Spoilage** refers to the loss of goods during production. For example, suppose some of the cans are dented during the canning of tuna fish. Accountants would treat the cost of the dented cans of tuna fish as spoilage.

Accountants treat spoilage either as normal spoilage or abnormal spoilage. **Normal spoilage** occurs in the normal production process. Accountants generally assign normal spoilage costs to the good units produced. According to one method found in practice, accountants divide the total cost of production by the good units produced.

For example, suppose the total cost of producing tuna fish for one day is USD 100,000. The company produced 220,000 cans of tuna fish, but 20,000 cans of tuna fish did not meet quality inspection requirements. Consequently, these 20,000 units were considered to be spoiled in the normal production process. One way accountants deal with the cost of such normal spoilage is to compute the cost per good unit by dividing total production costs by the number of good cans of tuna fish produced. That is:

$$\text{Cost per good unit} = \frac{\text{USD } 100,000}{200,000 \text{ good units produced}}$$

$$= \text{USD } 0.50 \text{ per good unit produced}$$

**Abnormal spoilage** refers to spoilage that exceeds the amount expected under normal operating conditions. For example, if denting the tuna fish cans is unusual, accountants would treat the cost of those dented cans of tuna fish as abnormal spoilage. Whereas normal spoilage costs are assigned to good products, abnormal spoilage costs

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are typically expensed. Thus, accountants treat normal spoilage as a product cost and abnormal spoilage as a period cost.

Advocates of total quality management may prefer to classify all spoilage as abnormal. Normal spoilage costs are buried in the costs of the good products. Unless management personnel ask for a special analysis of spoilage costs, they will not know whether the spoilage costs are a small per cent or a large per cent of product costs. For example, management could see a report on tuna fish production costs stating the cost is USD 0.50 per can, but they do not know how much of the USD 0.50 was the cost of spoilage.

We recommend that accountants report spoilage costs to management, whether normal spoilage or abnormal spoilage, so management can make informed decisions to reduce spoilage.

### Understanding the learning objectives

- Process cost systems are used for businesses that produce products on a continuous basis over long periods.
- Paint, paper, chemicals, gasoline, beverages, and food products should be accounted for under a process cost system.
- Types of products produced under each system: Companies that use job costing work on many different jobs with different production requirements during each period. Companies that use process costing produce a single product, either on a continuous basis or for long periods.
- Cost accumulation procedures used under each system: Job costing accumulates costs by individual jobs. Process costing accumulates costs by process or department.
- Work in Process accounts: Job cost systems have a Work in Process Inventory account for each job. Process cost systems have a Work in Process Inventory account for each department or process.
- Whenever partially completed inventories are present, the number of equivalent units of production must be computed. Basically, the concept of equivalent units involves expressing a given number of partially completed units as a smaller number of fully completed units.
- As a simple example of equivalent units, two apples that are half eaten are equivalent to one whole apple eaten. In manufacturing, we estimate the degree of completion for a group of products with respect to transferred-in, materials, and conversion (direct labor and overhead). Accountants base the concept of equivalent units on the supposition that a company must incur approximately the same costs to partially complete a large number of units as to totally complete a smaller number of units.
- Accountants compute equivalent units of production for transferred-in units, materials, and conversion. For each of these categories, the number of units transferred out is added to the equivalent units remaining in ending work in process in the department.
- Unit costs for the three categories—transferred-in units, materials, and conversion—are determined by dividing the equivalent units into the cost in beginning inventory plus the costs transferred in or added in the department during this period.
- A production cost report shows both the flow of units and the flow of costs through a processing center. The report is divided into two parts. The first part traces the physical flow of the units through the production department and converts actual units to equivalent units. The second part shows the costs to be accounted for, computes unit costs based on equivalent units as determined in the first part, and shows how the costs were

accounted for by adding the costs completed and transferred out with the costs remaining in ending inventory. The costs to be accounted for and the costs accounted for must balance.

- The production cost report provides a check on the Work in Process Inventory account. Each processing department normally has its own Work in Process Inventory account and related production cost report. The separate items that make up work in process inventory—direct labor, direct materials, applied overhead, and cost of units transferred in and out—can be traced from the production cost report to the Work in Process Inventory account (and vice versa) during a given period.
- Normal spoilage occurs in the normal course of production and is treated as a product cost. Abnormal spoilage exceeds the spoilage that occurs in the normal course of production and is treated as a period cost.
- Under FIFO equivalent units of production are computed by taking the equivalent units of work done to complete the beginning inventory, plus units started and completed during the current period, plus equivalent units of work done on the ending inventory. As is true under the average cost method, the equivalent units usually differ between materials and conversion.
- Unit costs for the three categories—transferred-in units, materials, and conversion—are determined by dividing cost to be accounted for during the period by units produced during the period.
- The physical measures method allocates joint product costs based on physical measures, such as units, pounds, or liters.
- The relative sales value method is the most commonly used method to allocate joint product costs. It is based on the relative sales values of the products at the split-off point.

#### Appendix 19A: The FIFO process cost method

In this chapter, the discussion assumed the use of the average cost method for determining unit costs under process costing. Another acceptable method for determining unit cost under process costing is the first-in, first-out (FIFO) cost method. This appendix presents a detailed illustration of the FIFO process costing system.

The following table shows how the computation of equivalent units differs between the average cost method and the FIFO cost method:

<b>Average cost method</b>	<b>FIFO cost method</b>
Equivalent units of production = Units completed this period + Equivalent units of work done on the ending inventory	Equivalent units of production = equivalent units of work done to complete the beginning inventory + units started and completed this period + Equivalent units of work done on the ending inventory

To illustrate the computation of equivalent units under the FIFO method, assume the following facts:

Beginning inventory, 3,000 units, 40% complete

Units started this period, 10,000 units

Ending inventory, 5,000 units, 20% complete

The equivalent production for the period would be:

Equivalent units of work done to complete the beginning inventory (3,000 × 0.60)	1,800
Units started and completed this period (10,000 – 5,000 in ending inventory)	5,000
Equivalent units of work done to partially complete the ending inventory (5,000 × 0.20)	1,000
Equivalent units of production	7,800

As is true under the average cost method, the number of equivalent units usually differs between materials and conversion.



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### FIFO process costing—An illustration

To illustrate more completely the operation of the FIFO process cost method, we use an example of the month of June production costs for a company having Departments A and B. Both departments add materials only at the beginning of processing. Department A has no May 31 inventory. The May 31 inventory in Department B consists of 2,000 units that are fully complete as to materials and 50 per cent complete as to conversion. This inventory has accumulated costs of USD 6,180.

The following transactions and additional data summarize manufacturing operations in both departments for June:

Raw materials purchased on account, USD 25,000.

Direct materials issued: Department A (14,000 units at USD 1.50), USD 21,000; and Department B (10,000 units at USD 0.13), USD 1,300.

Indirect materials issued: Department A, USD 400; and Department B, USD 200.

Labor costs: direct labor, Department A, USD 6,600, Department B, USD 5,400; and indirect labor, USD 3,000.

Manufacturing overhead is applied as follows: USD 5,280 in Department A and USD 5,400 in Department B.

Other manufacturing overhead incurred:

Repairs (on account)	\$2,100
Depreciation	3,000
Utilities (on account)	3,000
	\$8,100

- Production reports show the following for June:

	<b>Department A</b>	<b>Department B</b>
Beginning inventory	-0-	2,000
Units started	14,000	10,000
Units completed and transferred out	10,000	9,000
Units in inventory, June 30	4,000	3,000
Estimated percentage	50	33 1/3

- Sales for the month on account, 15,000 units at USD 6 per unit.
- The company computed cost of goods sold at USD 55,866 on a FIFO basis.

The general journal entries and their explanation follow:

1.	Materials inventory (+A)	25,000	
	Accounts payable (+L)		25,000
	To record materials purchased on account.		
2.	Work in process – Department A (+A)	21,000	
	Work in process – Department B (+A)	1,300	
	Manufacturing overhead (-SE)	600	
	Materials inventory (+L)		22,900
	To record direct and indirect materials used.		
3.	Work in process – Department A (+A)	6,600	
	Work in process – Department B (+A)	5,400	
	Manufacturing overhead (+SE)	3,000	
	Payroll summary (-SE)		15,000
	To distribute labor.		
4.	Work in process – Department A (+L)	5,280	
	Work in process – Department B (-A)	5,400	
	Manufacturing overhead (+A)		10,680
	To record assignment of overhead to production.		
5.	Manufacturing overhead (-A)	8,100	

Accounts payable (+A)	5,100	
Accumulated depreciation – Plant and equipment (-A)	3,000	
To record various overhead costs incurred.		
6. Work in process – Department B (+A)	24,900	
Work in process – Department A (+SE)		24,900
To record transfer of completed production from Department A to Department B. (For details of computation, see production cost report of Department A in Exhibit 155).		
7. Accounts receivable (-SE)	90,000	
Sales (-A)		90,000
To record sales for the month.		
8. Cost of goods sold	55,866	
Finished goods		55,866
To record cost of goods sold.		

As noted in the journal entries for June's manufacturing operations, the production cost report provided the dollar amounts of certain entries. For product costing purposes, the production cost report is the primary report in a process cost system. The chapter illustration of the production cost report shows the units and costs charged to a department, the disposition of these units and costs, and, typically, some of the supporting details and computations.

**Production cost report—Department A** To illustrate flexibility in format, Exhibit 154 shows the production cost report for Department A in a format different from the one in the chapter. Note that Department A placed 14,000 units into production. Then, Department A completed and transferred out 10,000 units. Department A retained the remaining 4,000 partially completed units in the department. The footnote in the illustration shows the computation of equivalent units.

<b>Department A</b>			
<b>Production cost report</b>			
<b>For the month ended 2011 June 30</b>			
Units in beginning inventory	-0-		
Units started during period	14,000		
Units to be accounted for	14,000		
Units completed and transferred out	10,000		
Units in ending inventory	4,000		
Units accounted for	14,000		
<b>Costs</b>	<b>Equivalent units</b>	<b>Total cost</b>	<b>Current unit cost</b>
Costs to be accounted for:			
Costs added during the month:			
Direct materials	14,000*	\$21,000	\$1.50
Conversion	12,000*	11,880	0.99
Costs added in month and costs to be accounted for		\$32,880	\$2.49
Costs accounted for:			
Cost of ending inventory:			
Direct materials (4,000 x 100% x \$1.50)		\$6,000	
Conversion (4,000 x 50% x \$0.99)		1,980	
Total cost of ending inventory		\$7,980	
Cost of 10,000 units transferred out		24,900	\$2.49
Costs accounted for		\$32,880	
*Supporting computations and data:			
		<b>Materials</b>	<b>Conversion</b>
Computations of equivalent units:			
Equivalent units to complete beginning inventory	-0-		-0-
Units started and completed	10,000		10,000

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Equivalent units in partially completed ending inventory	4,000	2,000
Equivalent units of production for month	14,000	12,000

	Materials	Conversion
Computations of equivalent units:		
Equivalent units to complete beginning inventory	-0-	-0-
Units started and completed	10,000	10,000
Equivalent units in partially completed ending inventory	4,000	2,000
Equivalent units of production for month	14,000	12,000

### Exhibit 154: Production cost report—Department A

The costs section of the report shows that the only costs to be accounted for were those added in the department in June. These costs include USD 21,000 for materials and USD 11,880 for conversion, totaling USD 32,880. Department A had no beginning inventory and no transfers in. Note how Department A determines its unit costs for each of the two elements of manufacturing costs (USD 1.50 for materials and USD 0.99 for conversion). The total current unit cost is USD 2.49. The report shows the disposition of the costs—the cost of the units transferred to Department B (USD 24,900) and the amount of ending inventory remaining in Department A (USD 7,980 based on current unit costs). The units transferred to Department B have the same unit cost as the unit cost in Department A for the month. The current unit cost and the cost of the transferred units is not always the same, as we will show for Department B in Exhibit 155.

### Department B Production cost report For the month ended 2011 June 30

Units			
Units in beginning inventory		2,000	
Units started during period		10,000	
Units to be accounted for		12,000	
Units completed and transferred out		9,000	
Units in ending inventory		3,000	
Units accounted for		12,000	
<b>Costs</b>	<b>Equivalent units</b>	<b>Total cost</b>	<b>Current unit cost</b>
Costs to be accounted for:			
Costs added during the month:			
Direct materials	10,000*	\$ 1,300	\$ 0.13
Conversion	9,000*	10,800	1.20
Costs added during the month		\$12,100	\$ 1.33
Costs in beginning inventory		6,180	
Costs transferred in from Department A		24,900	
Total costs to be accounted for		\$43,180	
Costs accounted for:			
Cost of ending inventory:			
Transferred in from Department A (3,000 units at \$2.49)		\$ 7,340	
Direct materials (3,000 x 100% x \$0.13)		390	
Conversion (3,000 x 1/3 x \$1.20)		1,200	
Total cost of ending inventory		\$ 9,060	
Cost of 9,000 units transferred out		34,120	\$3.791
Costs accounted for		\$43,180	
*Supporting computations and data:			

	<b>Materials</b>	<b>Conversion</b>
Computations of equivalent units:		
Equivalent units to complete beginning inventory	-0-	1,000
Units started and completed	7,000	7,000
Equivalent units in partially completed ending inventory	3,000	1,000
Equivalent units of production for the month	10,000	9,000

Beginning and ending inventories are complete as to materials. Beginning inventory is 50% complete and ending inventory 33 1/2% complete as to processing.

#### Exhibit 155: Production cost report—Department B

**Production cost report—Department B** The production cost report for Department B (Exhibit 155) is similar to that of Department A. Note how the report highlights the current unit cost of the operations performed in the department. Note also that Department B must account for the costs in the beginning inventory and the cost of the units transferred in from Department A. Department B determines the cost of the ending inventory through the use of the current month's unit cost (USD 1.33). All of Department B's other costs are included in the costs of the 9,000 units transferred to Finished Goods.

In the production cost report in Exhibit 155, we determine the cost of units transferred out by subtracting the cost of the ending inventory from the total costs to be accounted for (USD 43,180 - USD 9,060 = USD 34,120). We can compute average unit cost of USD 3.791 by dividing USD 34,120 by the 9,000 units transferred out.

#### Appendix 19B: Allocation of joint costs

A company incurs **joint costs** when it produces two or more products through the same production process or from a common raw material. The company produces these products simultaneously. The products are not identifiable as different individual products until a particular point in the manufacturing process known as the split-off point.

The **split-off point** is a certain stage of production at which the separate products become identifiable from a common processing unit. We refer to any costs beyond the split-off point as separable costs because they can be directly traced to individual products. Examples of joint products are petroleum products, lumber, flour milling, dairy products, and chemicals. In Exhibit 156, we show the joint production process.

By definition, joint costs are not identified with individual products. Any allocation of joint costs to one of the products is inherently arbitrary. Many companies do not allocate joint costs to particular products for managerial decision making because the allocated numbers could be misleading to decision makers.<sup>57</sup> The accounting problem we face is how to allocate the joint costs that a company incurred before the products become separately identified. Commonly used methods to allocate joint costs are the physical measures method and the relative sales value method.

The **physical measures method** allocates joint costs on the basis of physical measures such as units, pounds, or liters.

To illustrate, assume that Roy Company produces two grades of oil, product A and product B, through a joint process. The cost and production data of Roy Company for July are:

	<b>Product A</b>	<b>Product B</b>	<b>Total</b>
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<sup>57</sup> For example, a survey of oil refineries indicated that seven of the nine companies did not allocate joint costs. See K. Slater and C. Wooton, *A Study of Joint and By-Product Costing in the U.K.* (Reprint, London: Chartered Institute of Management Accountants, 1988), p. 110.

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Units (barrels) produced	15,000	25,000	40,000
Unit selling price at split-off	\$ 15	\$ 6	
Revenue at split-off	\$225,000	\$150,000	
Joint product costs:			
Direct materials			\$125,000
Direct labor			105,000
Manufacturing overhead			70,000
			\$300,000

**Illustration 19.8** Production Cost Report—Department B



Exhibit 156: Production cost report-Department B

The physical measures method uses a ratio of the physical volume of each product to total volume as a basis for allocation of joint costs. We compute the allocation of joint costs to each product as follows:

	<b>Total barrels</b>	<b>Ratio</b>	<b>Joint costs</b>	<b>Allocated joint costs</b>
Product A	15,000	$\frac{15,000}{40,000}$	$15,000 \times \$300,000$	\$112,500
Product B	25,000	$\frac{25,000}{40,000}$	$25,000 \times \$300,000$	187,500
	40,000			\$300,000

If Roy Company sells both products without further processing, the gross margin for product A is USD 112,500, or USD 225,000 less USD 112,500. Product B incurs a loss of USD 37,500, or USD 150,000 less USD 112,500. Even though the physical measures method is easy to use, it often has no relationship to the revenue-generating power of each product. In this instance, product B suffers a loss of USD 37,500 because the company allocated a high portion of joint costs based on product B's high volume of physical units even though its selling price is less than that of product A.

Keep in mind that the joint costs cannot be directly assigned to one product because joint costs are inseparable between the products. Thus, because any allocation of joint costs to one product is arbitrary, the resulting measures of each product's income are arbitrary.

The **relative sales value method** is a commonly used basis to allocate joint costs at the split-off point. Accountants use the relative sales value method because it matches joint costs with revenue much like the matching concept.

Using the relative sales value method, Roy Company would allocate the joint costs as follows:

	<b>Sales value at split-off</b>	<b>Ratio</b>	<b>Joint costs</b>	<b>Allocated joint costs</b>
Product A:	\$225,000	$\frac{225,000}{375,000}$	$225,000 \times \$300,000$	\$180,000
(\$15 x 15,000)			\$375,000	
Product B:	150,000	$\frac{150,000}{375,000}$	$150,000 \times \$300,000$	120,000
(\$6 x 25,000)			\$375,000	
	\$375,000			\$300,000

The allocation ratios of 60 per cent and 40 per cent, respectively, for product A and product B result in allocated joint costs of USD 180,000 to product A, and USD 120,000 to product B.

To compare the physical measures method and the relative sales value method, assume Roy Company has no inventory at the end of July. A partial July income statement would appear as shown:

	<b>Product A</b>		<b>Product B</b>	
	<b>Physical Measures Method</b>	<b>Relative Sales Value Method</b>	<b>Physical Measures Method</b>	<b>Relative Sales Value Method</b>
Sales	\$225,000	\$225,000	\$150,000	\$150,000
Cost of goods sold	112,500	180,000	187,500	120,000
Gross margin	\$112,500	\$ 45,000	\$(37,500)	\$ 30,000

### Demonstration problem

Zarro, Inc., uses a process cost system to accumulate the costs it incurs to produce aluminum awning stabilizers from recycled aluminum cans. The May 1 inventory in the finishing department consisted of 36,000 units, fully complete as to materials and 80 per cent complete as to conversion. The beginning inventory cost of USD 288,000 consisted of USD 216,000 of costs transferred in from the molding department, USD 30,000 of finishing department materials costs, and USD 42,000 of finishing department conversion costs (conversion costs are direct labor and overhead). The costs incurred in the finishing department for May appear as follows:

Costs transferred in from molding department (excluding costs in beginning inventory)	\$720,000
Costs added in finishing department in May (excluding costs in beginning inventory):	\$63,600
Materials	131,376
Conversion costs	194,976
	\$914,976

The finishing department received 120,000 units from the molding department in May. During May, 127,200 units were completed by the finishing department and transferred out. As of May 31, 28,800 units, complete as to materials and 60 per cent complete as to conversion, were left in inventory of the finishing department.

- Using the average cost procedure, prepare a production cost report for the finishing department for May.
- Compute the average unit cost for conversion in the finishing department in April.

### Solution to demonstration problem

a.

<b>Zarbo, Inc.</b>				
<b>Finishing department</b>				
<b>Production cost report</b>				
<b>For the month ending</b>				
<b>May 31</b>				
<b>Units</b>	<b>Actual units</b>	<b>Transferred -in</b>	<b>Equivalent units</b>	<b>Conversion</b>
Units in May 1 inventory	36,000			
Units transferred in	120,000			
Units to be accounted for	156,000			
Units completed and transferred out	127,000	127,200	127,200	127,200*
Units in May 31 inventory*	28,800	28,800	28,800	17,280†
Units accounted for	156,000	156,000	156,000	144,480

\*Inventory is complete as to materials, 60% complete as to conversion.

†(28,800 x 60% = 17,280).

<b>Costs</b>	<b>Transferred -in</b>	<b>Materials</b>	<b>Conversion</b>	<b>Total</b>
Costs to be accounted for:				
Costs in May 1 inventory	\$216,000	\$30,000	\$42,000*	\$288,000
Costs transferred in	720,000			720,000
Costs added in department		63,600	131,376	194,976
Costs to be accounted for	\$936,000	\$93,600	\$ 173,376	\$1,202,976
Equivalent units (from above)	156,000	156,000	144,480	

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Unit costs	\$ 6.00	\$ 0.60	\$ 1.20	\$7.80
Costs accounted for:				
Units completed and transferred out (127,200 units)	\$763,200	\$76,320	\$ 152,640*	\$992,160
Units remaining in May 31 inventory (28,800 units)	172,800	17,280	20,736*	210,816
Costs accounted for	\$936,000	\$93,600	\$173,376	\$1,202,976

\*17,280 equivalent units x \$1.20 = \$20,736.

b. The average unit cost for conversion in the finishing department in April was USD 1.46, calculated as  $\frac{\text{USD}42,000}{(0.8 \times 36,000)}$ .

### Key terms

**Abnormal spoilage** Spoilage that exceeds the amount expected under normal operating conditions.

**Average cost procedure** A method of computing equivalent units where the number of equivalent units for each cost element equals the number of units transferred out plus the number of equivalent units of that cost element in the ending inventory.

**Conversion costs** Costs of converting raw materials into the final product. Direct labor plus overhead.

**Equivalent units** A method of expressing a given number of partially completed units as a smaller number of fully completed units; for example, bringing 1,000 units to a 75 per cent level of completion is the equivalent of bringing 750 units to a 100 per cent level of completion.

**First-in, first-out (FIFO) method** A method of determining unit cost. This method computes equivalent units by adding equivalent units of work needed to complete the units in beginning inventory, work done on units started and completed during the period, and work done on partially completed units in ending inventory.

**Job cost system (job costing)** A manufacturing cost system that accumulates costs incurred to produce a product according to individual jobs.

**Joint costs** Those production costs incurred up to the point where the joint products split off from each other.

**Normal spoilage** Spoilage that occurs in the normal production process.

**Physical measures method** A method of allocating joint product costs on the basis of physical measures such as units, pounds, or liters.

**Process cost system (process costing)** A manufacturing cost system that accumulates costs incurred to produce a product according to the processes or departments a product goes through on its way to completion.

**Production cost report** A report that shows both the flow of units and the flow of costs through a processing center. It also shows how accountants divide these costs between the cost of units completed and transferred out and the cost of units still in the processing center's ending inventory.

**Relative sales value method** A method of allocating joint product costs on the basis of the relative market value at the split-off point.

**Split-off point** A certain stage of production at which the separate products become identifiable from a common processing unit.

**Spoilage** The loss of goods during production.

**Transferred-in costs** Costs associated with physical units that were accumulated in previous processing centers.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

In process costing, costs are accumulated by process or department.

Both job and process cost systems can only have one Work in Process Inventory account.

The first step in computing equivalent units is to determine the amount of materials being used.

Abnormal spoilage is treated as a product cost.

(Based on Appendix 19-B.) A commonly used basis to allocate joint costs is the relative sales value of the products at the split-off point.

### Multiple choice

Select the best answer for each of the following questions.

Which of the following does not apply to process costing?

- a. Uses the equivalent unit concept.
- b. Includes overhead in product costs.
- c. Costs of production are first recorded in Work in Process Inventory accounts then transferred to Finished Goods Inventory and Cost of Goods Sold.
- d. Keeps track of the actual cost of each individual unit produced.

Which of the following formulas is the correct formula for equivalent units of production under the average cost procedure?

- a.  $\text{Units completed} - [\text{Units in ending inventory} \times \text{Percentage complete}] = \text{Equivalent production}$
- b.  $\text{Units completed} - [\text{Units in beginning inventory} \times \text{Percentage complete}] = \text{Equivalent production}$
- c.  $\text{Units completed} + [\text{Units in ending inventory} \times \text{Percentage complete}] = \text{Equivalent production}$
- d. None of the above.

Using the following data, compute the ending inventory cost:

1,000 units are in ending inventory in Department B. The 1,000 units are fully complete as to materials and 20 per cent complete as to conversion. The unit cost for materials is USD 0.05, and conversion unit cost equals USD 0.60. The unit cost of goods transferred in from Department A is USD 1.20.

- a. USD 1,370.
- b. USD 1,170.
- c. USD 1,320.
- d. USD 1,250.

A production cost report reports which of the following:

- a. Units in a production department.
- b. Costs related to production.
- c. Unit costs.
- d. Equivalent units.
- e. All of the above are included in the production cost report.

(Based on Appendix 19-A) Compute the equivalent units of production under the FIFO method using this data:

Beginning inventory, 1,500 units—40 per cent complete

Units started this period, 5,000 units

Ending inventory, 2,500 units—20 per cent complete

- a. 3,000.
- b. 3,900.
- c. 3,400.
- d. 3,600.

Now refer to “Answers to self-test” at the end of the chapter to check your answers.



## 19. Process: Cost systems

### Questions

- Define process costing and describe the types of companies that use process costing.
- How does a process cost system differ from a job costing system?
- Would a lumber mill use process or job costing?
- What is meant by the term equivalent units? Of what use is the computation of the numbers of equivalent units of production?
- Distinguish between the number of units completed and transferred during a period and the equivalent units for the same period.
- Under what circumstances would the number of equivalent units of materials differ from the number of equivalent units of labor and overhead in the same department in the same period? Under what circumstances would they be the same?
- When transferring goods from one department to another, which accounts require journal entries?
- Units are usually assumed to be at the same stage of completion for both labor and overhead. What is the reason for this assumption?
- What is the basic information conveyed by a production cost report?
- What are the four steps in preparing a production cost report?
- What is meant by average cost procedure? What other two cost flow assumptions could be used?
- Would an automobile plant that makes specialty race cars use job costing or process costing? Would an automobile plant that makes all terrain vehicles use job costing or process costing? Explain your answer.
- What is the difference between normal and abnormal spoilage?
- Why might an advocate of total quality management prefer to see all spoilage labeled as abnormal?
- Show the differences between computing equivalent units of production using the average cost method and FIFO cost method (Appendix 19A).
- Describe the relative sales value method and show how it is used (Appendix 19B).
- **Real world question** Refer to "A broader perspective: Producing cans of Coca-Cola". Describe the different processes used in a cola bottling plant.
- **Real world question** Does The Coca-Cola Company use a process cost system or a job costing system in its bottling plants? Why?
- **Real world question** Name five companies that probably use process costing.

### Exercises

**Exercise A** Using the average cost method, compute the equivalent units of production in each of the following cases:

- a. Units started in production during the month, 72,000; units completed and transferred, 52,800; and units in process at the end of the month (100 per cent complete as to materials; 60 per cent complete as to conversion), 19,200. (There was no beginning inventory.)
- b. Units in process at the beginning of the month (100 per cent complete as to materials; 30 per cent complete as to conversion), 12,000; units started during the month, 48,000; and units in process at the end of the month (100 per cent complete as to materials; 40 per cent complete as to conversion), 24,000.

**Exercise B** In Department C, materials are added at the beginning of the process. There were 1,000 units in beginning inventory, 10,000 units were started during the month, and 7,000 units were completed and transferred to finished goods inventory. The ending inventory in Department C in June was 40 per cent complete as to conversion costs. Under the average cost method, what are the equivalent units of production for materials and conversion?

**Exercise C** In Department D, materials are added uniformly throughout processing. The beginning inventory was considered 80 per cent complete, as was the ending inventory. Assume that there were 6,000 units in the beginning inventory and 20,000 in the ending inventory, and that 80,000 units were completed and transferred out of Department D. What are the equivalent units for the period using the average cost method?

**Exercise D** If in the previous exercise the total costs charged to the department amounted to USD 960,000, including the USD 48,000 cost of the beginning inventory, what is the cost of the units completed and transferred out?

**Exercise E** The following data relate to Work in Process—Department C, in which all materials are added at the start of processing:

**Work in process – Department C:**

**Inventory, March 1:**

Materials cost (1,200 pounds; 100% complete)	\$7,020
Conversion cost (20% complete)	1,804
Costs incurred this period:	
Direct materials used (9,000 pounds)	\$36,330
Direct labor	10,880
Overhead	17,820
Inventory, March 31	
Materials cost (1,800 pounds, 100% complete)	?
Conversion cost (1,800 pounds, 80% complete)	?
Pounds of product transferred out:	8,400

Using these data, compute:

- The unit cost per equivalent unit for materials and conversion (use the average cost method).
- The cost of the product transferred out.

**Problems**

**Problem A** The following data refer to a production center of Sipp-Fizz, a soft drink bottler:

Work in process inventory, August 1, 4,000 units (units equal 12-bottle cases):	
Direct materials	\$12,000
Direct labor	6,120
Manufacturing overhead applied	8,000
	\$26,120
Units started in August	12,000
Costs incurred in August:	
Direct materials	\$36,000
Direct labor	48,000
Manufacturing overhead applied	60,000

The beginning inventory was 100 per cent complete for materials and 50 per cent complete for conversion costs.

The ending inventory on August 31 consisted of 6,000 units (100 per cent complete for materials, 70 per cent complete for conversion costs).

Compute the following:

- Number of units completed and transferred to finished goods inventory.

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- b. The equivalent units of production for materials and conversion costs using the average cost method.
- c. Cost per equivalent unit for materials and conversion costs.
- d. Cost of units completed and transferred.
- e. Cost of ending inventory.

**Problem B** The following information relates to Aromatic Company for its line of perfume products for the month ended March 31:

Units in beginning inventory (units equal cases of product)	2,700
Cost of units in beginning inventory:	
Materials	\$40,500
Conversion	\$ 18,900
Units placed in production	54,000
Cost incurred during current period:	
Materials	\$239,598
Conversion	\$215,310
Units remaining in ending inventory	3,000
(100% complete as to materials, 60% complete as to conversion)	

Prepare a production cost report for the month ended March 31, using the average cost method.

**Problem C** Shine Company uses a process cost system to account for the costs incurred in making its single product, a hair conditioner. This product is processed in Department A and then in Department B. Materials are added in both departments. Production for May was as follows:

	<b>Department A</b>	<b>Department B</b>
Units started or transferred in	200,000	160,000
Units completed and transferred out	160,000	120,000
Stage of completion of May 31 inventory:		
Materials	100%	80%
Conversion	50%	40%
Costs incurred this month:		
Direct materials costs	\$200,000	\$304,000
Conversion costs	\$540,000	\$272,000

There was no May 1 inventory in either department.

- a. Prepare a production cost report for Department A in May.
- b. Prepare a production cost report for Department B in May.

**Problem D** A bottling company bottles soft drinks using a process cost system. Following are cost and production data for the mixing department for June:

	<b>Units</b>	<b>Materials costs</b>	<b>Conversion costs</b>
Inventory, June 1	56,000	\$11,620	\$16,240
Placed in production in June	133,000	29,960	41,720
Inventory, June 30	63,000	?	?

The June 30 inventory was 100 per cent complete as to materials and 30 per cent complete as to conversion.

Prepare a production cost report for the month ended June 30 using the average cost method.

**Problem E** Refer to the facts given in the previous problem. Assume the beginning inventory on June 1 was 100 per cent complete as to materials and 25 per cent complete as to conversion.

- a. Prepare a production cost report for the month ended June 30, using FIFO. Round unit costs to the nearest cent.
- b. Why are ending inventory amounts different than those for the previous problem?

**Problem F** Quality Lumber Company produces two products from logs, Grade A lumber and Grade B lumber. The following events took place in June:

	<b>Grade A</b>	<b>Grade B</b>	<b>Total</b>
Units produced	80,000	120,000	200,000
Unit selling price at split-off	\$4.00	\$2.00	
Joint costs	?	?	\$120,000

- Allocate the joint costs to the two products using the physical measures method.
- Allocate the joint costs to the two products using the relative sales value method.
- Explain the difference in unit costs using the two methods.
- What are advantages of the relative sales value method if all of Grade A lumber has been sold and none of Grade B lumber has been sold at the end of a month?

### Alternate problems

**Alternate problem A** Pure Aqua Company is a producer of flavored mineral water. These data are for its March production:

Work in process inventory, March 1, 3,000 (units equal cases):	
Direct materials	\$12,600
Direct labor	6,000
Manufacturing overhead (1,500 machine-hours at \$6 per machine-hours)	9,000
	\$27,600
Units started in March	9,000
Costs incurred in March:	
Direct materials	\$36,360
Direct labor	55,200
Manufacturing overhead applied (13,800 machine-hours)	?

The ending inventory consisted of 4,500 units (100 per cent complete as to materials, 60 per cent complete as to conversion).

Compute the following:

- Number of units completed and transferred to finished goods inventory.
- The equivalent units of production for materials and conversion costs using the average cost method.
- Cost per equivalent unit for materials and conversion costs.
- Cost of units completed and transferred.
- Cost of ending inventory.

**Alternate problem B** The following data pertain to a production center of Sunbelt Company, a maker of sunscreen products:

	<b>Units</b>	<b>Materials costs</b>	<b>Conversion costs</b>
Inventory, October 1	70,000	\$12,000	\$16,000
Placed in production in October	200,000	20,400	18,200
Inventory, October 31	100,000	?	?

The October 31 inventory was 100 per cent complete as to materials and 20 per cent complete as to conversion costs.

Prepare a production cost report for the month ended October 31, using the average cost method.

**Alternate problem C** Healthbar Company produces a health food and determines product costs using a process cost system. The product is moved through two departments, mixing and bottling. Production and cost data for the bottling department in August follow.

Work in process, August 1 (30,000 pints):

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Costs transferred in	\$30,000
Materials costs	15,000
Conversion costs	9,000
Costs incurred in August:	
Transferred in (100,000 pints)	\$100,00
	0
Materials costs	50,000
Conversion costs	39,300

All materials are added at the beginning of the bottling process. Ending inventory consists of 25,000 pints, 100 per cent complete as to materials and 40 per cent complete as to conversion.

Prepare a production cost report for August using the average cost method.

### Beyond the numbers—Critical thinking

**Business decision case A** Bicycles Plus, Inc., produces bicycles. While the company has developed a per unit cost, it has not been able to break down its costs in each of its three departments: frames, assembling, and finishing. Karol Ring, the production manager, has been concerned with cost overruns during July in the frames department, which produces the bicycle frames.

On July 1, the frames department had 6,000 units in its work in process inventory. These units were 100 per cent complete as to materials and 40 per cent complete as to conversion. The department had incurred USD 12,000 in materials costs and USD 90,000 in conversion costs in processing these 6,000 units.

The department handled 30,000 units during the month, including the 6,000 units in beginning inventory on July 1. At the end of the month, the department's work in process included 3,600 units that were 100 per cent complete as to materials and 30 per cent complete as to conversion. The month's costs were allocated on the number of units processed during the month as follows:

	Materials	Conversion
Costs	\$60,000	\$300,216
Units handled during month	30,000	30,000
Cost per unit	\$ 2	\$ 10

The USD 12 per unit cost was assigned in a way that resulted in the following costs:

	Beginning work in process	Work started and completed	Ending work in process
Cost per unit incurred during the month:			
Units	6,000	20,400	3,600
Cost per unit	\$12	\$12	\$12

Ring realized that this per unit cost is incorrect and asks you to develop a better method of computing these costs for the month ended July 31.

a. How would you recommend that July's costs be assigned to the units produced? How would this differ from the present method?

b. To justify your recommendation, recalculate July's costs using your recommendation. Present your analysis in a production cost report.

**Ethics case – Writing experience B** Steve Yung works in the inventory control group at a company that produces stone-washed jeans. A good friend manages the Stitching Department at the same company. At the end of a recent month, Yung reviewed the Stitching Department's production cost report and found the department had no beginning Work in Process Inventory, had started 27,000 pairs of jeans, and had produced only 24,000 pairs. That leaves 3,000 pairs in ending inventory, Yung thought, that is a lot of jeans they did not finish.

Later, Yung visited his friend who managed the Stitching Department. "Why all the ending inventory?" he asked. "One of the new workers set several machines wrong, and the stitching was bad on 2,400 pairs," the manager replied. "We set those aside, and we will fix them when we have some free time. The other 600 pairs are complete now, and have been transferred out. Our entire operation was slower because of the machine problem."

"Company policy is to send all defective products to the Rework Department. They can fix the jeans. That is their job," Yung said.

"No way!" exclaimed the Stitching Department manager. "We would all be in trouble if plant management finds out. The worker who messed up would probably be fired. I do not want that. This is our little problem, and we will take care of it."

- a. What should Yung do?
- b. Would your answer change if Yung learned that the Stitching Department had fixed the jeans and sent them on to the next department?

**Financial analysis C** Suppose a bottling company made an error in estimating the stage of completion of its work in process inventory. Suppose the costs in beginning inventory and the costs transferred in were correct, but the company overstated the stage of completion for both materials and conversion costs in ending Work in Process Inventory causing ending Work in Process Inventory to be USD 100,000 too high. The beginning and ending Finished Goods Inventory amounts are correct. What effect would this error have on the company's last year's financial statements?

**Group project D** In groups of 3 or 4 students, write a paper on the topic, "How scientific is the allocation of joint costs to products?" Prepare the paper on a computer and prepare and edit several drafts before turning in the final paper. Use examples to demonstrate your points.

**Group project E** In teams of two or three students, interview the manager of a grocery store. What is the cost of spoilage in the vegetable and fruit section as a percentage of the total cost of goods sold? Does the manager differentiate between normal and abnormal spoilage? If so, provide some examples. Each team should write a memorandum to the instructor summarizing the results of the interview. Information contained in the memo should include:

Date:

To:

From:

Subject:

Content of the memo must include the name and title of the person interviewed, name of the company, and information responding to the questions above.

**Group project F** In teams of two or three students, interview the manager of a fast food restaurant such as McDonald's. What is the cost of spoilage as a percentage of the total cost of goods sold? Does the manager differentiate between normal and abnormal spoilage? If so, provide some examples. Each team should write a memorandum to the instructor summarizing the results of the interview. Information contained in the memo should include:

Date:

To:

From:

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Subject:

Content of the memo must include the name and title of the person interviewed, name of the company, and information responding to the questions above.

### Using the Internet—A view of the real world

Using the Internet as a research tool, describe the conversion activities (or processes) involved in producing oil or oil-related products. Your description should include examples of raw materials used as inputs, production activities required to convert inputs into products, and resulting outputs (finished goods). Write your report in the form of a memorandum. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter. Be sure to attach your research materials obtained from the Internet to the memorandum.

Using the Internet as a research tool, describe the conversion activities (or processes) involved in producing milk or milk-related products. Your description should include examples of raw materials used as inputs, production activities required to convert inputs into products, and resulting outputs (finished goods). Write your report in the form of a memorandum. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter. Be sure to attach your research materials obtained from the Internet to the memorandum.

### Answers to self-test

#### True-false

**True.** In process costing, costs are accumulated by process or department.

**False.** Job cost systems have one Work in Process Inventory account for each job, and process cost systems have a Work in Process Inventory account for each process or department.

**False.** The initial step in computing equivalent units is to determine either the stage of completion or the number of partially complete units.

**False.** Abnormal spoilage is treated as a period cost.

**True.** The relative sales value of the products at the split-off point is a commonly used basis to allocate joint costs.

#### Multiple-choice

**d.** Process costing does not keep track of the actual cost of each individual unit produced.

**c.**  $\text{Units completed} + [\text{Units in ending inventory} \times \text{Percentage complete}] = \text{Equivalent production}$

**a.** USD 1,370 [USD 1,200 + (1,000 X USD .05) + (200 X USD .60)]

**e.** Items **a** through **d** are included in the production cost report.

**b.** The equivalent production for the period would be:

Equivalent units of work done to complete the beginning inventory (1,500 x 0.60)	900
Units started and completed this period (5,000 – 2,500)	2,500
Equivalent units of work done to partially complete the ending inventory (2,500 x 0.20)	500
Equivalent units of production	3,900

### Comprehensive review problem

The Compack Company assembles personal computers. Personal computers go through several departments where sub assemblies are unpacked and checked, the circuit board is attached, the product is tested and repaired if defective, and the computers are packed carefully for shipping. Each order is treated as a job, and the entire job is shipped at once. The company keeps track of costs by job and calculates the equivalent stage of completion for each job based on machine-hours.

Although the company has grown rapidly, it has yet to show a profit. You have been called in as a consultant. Management believes some jobs are profitable and others are not, but it is not clear which are profitable. The accounting system is almost nonexistent; however, you piece together the following information for April:

- Production:

- Completed Job No. 101.
- Started and completed Job No. 102.
- Started Job No. 103.

- Inventory values:

- Work in process inventory:

March 31: Job No. 101	
Direct materials	\$60,000
Direct labor	9,600
Overhead	14,400
April 30: Job No. 103	
Direct materials	\$45,000
Direct labor	10,400
Overhead	15,600

b. Job No. 101 was exactly one-half finished in direct labor-hours and machine-hours at the beginning of April, and Job No. 103 was exactly one-half complete in direct labor-hours and machine-hours at the end of April. However, all of the direct materials necessary to do the entire job were charged to each job as soon as the job was started.

- There were no direct materials inventories or finished goods inventories at either March 31 or April 30.

- Manufacturing overhead is applied at USD 30 per machine-hour. The company used 1,600 machine-hours during April, 480 machine-hours on Job 101 and 600 machine-hours on Job 102. The actual overhead for the month of April was USD 50,000.

- Cost of goods sold (before adjustment for over applied or under applied overhead):

Job No. 101:	
Materials	\$60,000
Labor	?
Overhead	?
Total	?

Job No. 102:	
Materials	?
Labor	?
Overhead	?
Total	?

- Overhead was applied to jobs using the predetermined rate of USD 30 per machine-hour. The same rate had been used since the company began operations. Over- or under applied overhead is debited or credited to Cost of Goods Sold.

- All direct materials were purchased on account. Direct materials purchased in April amounted to USD 150,000.



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- Direct labor costs charged to jobs in April were USD 32,000. All labor costs were the same rate per hour for April for all laborers.
- a. Compute the cost of each job, whether in inventory or sold.
  - b. Show the transactions in journal entry form. Use a separate Work in Process Inventory account for each job.
  - c. Prepare an income statement for April assuming revenue was USD 250,000 and selling and administrative expenses were USD 60,000.

# 20. Using accounting for quality and cost management

## Learning objectives

After studying this chapter, you should be able to:

- Describe why managers need good accounting information to be competitive in the new production environment.
- Identify ways to improve quality.
- Develop measures of performance that help achieve high quality.
- Understand how the balanced scorecard helps organizations recognize and deal with opposing responsibilities.
- Explain how just-in-time purchasing and production can reduce costs and improve quality.
- Compare and contrast accounting in just-in-time settings with accounting in traditional settings.
- Define activity-based costing and explain its benefit to companies.
- List the four steps in activity-based costing.
- Compare product costs using activity-based costing with product costs using traditional costing methods.
- Describe the strategic and behavioral advantages of activity-based management.

## Importance of good accounting information

Have you ever purchased a product and found it to be defective? If so, you may have sworn to yourself that you would never buy one of those again. By doing so, you have demonstrated why high-quality products are essential for business success. Successful companies remain in business by seeking continual improvement in the quality of their products. For example, Territory Ahead, a merchandising company tells its customers to please hassle them if not completely satisfied. Nordstrom's department stores, Southwest Airlines Company, and Apple . are companies that have built reputations based on the notion of hassle us if you are not completely satisfied.

In its plant near Nashville, Tennessee, USA, Nissan Motor Corporation places some of the previous day's production of cars and trucks in the lobby with charts showing the number of production defects for that day. Displaying products and reporting on performance gives workers a sense of pride in their work and an incentive to reduce defects.

## Quality and the new production environment

Attention to quality is an important feature of the new production environment. The phrase, new production environment, refers to an environment in which company managers are concerned with (1) improving customer service and product quality and (2) reducing costs. Both actions are necessary to stay competitive.

In the new production environment, new technology is helping managers improve quality and reduce costs. Computer-assisted manufacturing enables managers to reduce inventories, yet respond quickly to customers'

## 20. Using accounting for quality and cost management

needs. For example, robots perform certain repetitive functions more reliably than humans. Computerized airline reservations systems also provide better customer service at a lower cost to airlines.

The new production environment is rooted in the new management philosophies that we discuss in this chapter. For example, managers now use nonfinancial as well as financial measures of quality performance. Many companies have adopted a just-in-time philosophy for managing purchasing and production. Managerial accountants are restructuring costing systems to provide activity-based costs resulting in better managerial decision making. Many observers believe that United States industry has fallen behind foreign competitors because managers and accountants have not worked together to produce the information management needs to make good decisions.

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Improving quality

## 20. Using accounting for quality and cost management

To make decisions about the costs and benefits of quality, we need to know what those costs and benefits of

quality are. Managers at Texas Instruments have placed the costs of quality in these four categories:<sup>55</sup>

- Prevention costs. Prevention costs cover the cost of preventing poor-quality products from being produced. Prevention costs include training employees to do quality work.
- Appraisal costs. Appraisal costs are the costs of detecting poor-quality products. Appraisal costs include the costs of inspecting materials when purchased and product testing during production.
- Internal failure costs. Internal failure costs are the costs of producing poor-quality products detected before products are shipped to customers. Internal failure costs include the costs of reworking poor-quality products to bring their quality up to specifications.
- External failure costs. External failure costs are the costs incurred because customers purchased poor-quality products. External failure costs include the costs of dealing with returned products and future lost profits because customers are dissatisfied.

The manager's task is to minimize the sum of these costs. By incurring substantial costs of prevention, for example, a company might reduce costs of appraisal, internal failure, and external failure costs. This idea is a modern adaptation of the old saying, "An ounce of prevention is worth a pound of cure". Small prevention costs may even result in large cost savings in the other three categories.

Assume Diana's Secret is a company that sells clothing through catalogs. A marketing manager concerned about customer satisfaction noticed a substantial amount of returned merchandise. Upon investigating, the manager discovered that most returns were due to an incorrect color or size; most of these errors could be traced to mistakes made by order takers who had not been adequately trained.

The company decided to invest USD 5,000 per month in a training program for order takers. After the training program started, the amount of returned merchandise dropped dramatically. Working with people in the marketing department, accountants estimated the company saved USD 4,000 per month by having less returned merchandise and fewer refilled orders. In addition, marketing managers believed Diana's Secret's profits increased by USD 2,000 to USD 10,000 per month because of increased customer satisfaction. Management considered the USD 5,000 cost of prevention to be justified by the benefits of reduced returned merchandise and increased customer satisfaction.

As you already may have figured out, measuring the cost of quality has a major disadvantage. It is difficult to measure increased customer satisfaction (reflected in sales) resulting from additional spending on prevention costs (or any of the four categories), and it is difficult to measure decreased customer satisfaction resulting from a reduction in prevention costs. For example, if prevention costs are reduced, how do we measure lost sales as a result of this reduction? Conversely, how do we measure the increase in sales directly associated with an increase in prevention costs? It is difficult to accurately measure the change in sales specifically resulting from either scenario.

A current theme in business today is that "quality is free". The belief is that if quality is built into the product, the resulting benefits in customer satisfaction, reduced rework and warranty costs, and other important factors far outweigh the costs of improving quality. Cost-benefit analyses are no longer the primary focus in improving quality. Instead, the emphasis is on improving quality with the understanding that quality is free in the long run.

Those who subscribe to the quality is free concept believe that zero defects is the only acceptable goal. The production process should be continuously improved. The result? Quality will improve, customers will be increasingly satisfied, and the cost of improving quality will pay for itself through increased sales and lower costs (providing for increased profit margins).

## 20. Using accounting for quality and cost management

Although both cost of quality and quality is free concepts strive for improved quality, the cost of quality approach assumes a cost-benefit trade-off when spending money on quality improvement. The quality is free approach assumes that the long-run benefits will always outweigh the costs of improving quality. One thing is for certain: quality is important to the success of any company!

The key quality concept in the new production environment is total quality management. **Total quality management (TQM)** is defined as managing the entire organization so it excels in its goods and services that are important to the customer. The key ideas are that the organization strives for excellence and that quality is ultimately defined by the customer.

**Customer-driven quality standards** Total quality management means that your goods and services are not excellent until the customer says they are excellent. It is not enough for production managers or engineers to say an automobile is well-designed and produced; customers must say they like it—a lot. TQM means translating customer needs and wants into specifications for product design. Southwest Airlines learned that customers want flights to leave and arrive on time. No amount of free food and beverages served to placate customers made up for late arrivals, missed connections, missed meetings, and missed birthday parties. So Southwest Airlines went to work to improve those things its customers wanted most; namely, on-time departures and arrivals. (Actually, the customers wanted on-time arrivals more than on-time departures, but on-time departures help you on-time arrivals.)

How do companies identify quality problems? Three methods managers use to identify quality problems are the following:

- Control charts.
- Pareto diagrams.
- Cause and effect analyses.

**Control charts** **Control charts** help managers distinguish between random or routine variations in quality and variations that should be investigated. For example, the managers of CD, Inc., expect some returned merchandise and do not panic because a customer returns merchandise. They use a control chart to plot data that shows trends or unusually high rates of returned merchandise.

Look at Exhibit 157, a control chart for product defects in producing compact disc players at CD, Inc. Every compact disc player is tested to ensure it works. Those products failing the test are reworked or scrapped, an example of internal failure cost. Management expects an average failure rate of 2 per cent of the daily production. Management has set an upper limit for failure at 4 per cent of daily production. If the failure rate exceeds 4 per cent, management investigates to find out what is causing such a high rate.

Quality testers continuously record failure rates at CD, Inc. Managers can call up the results on their computers at any time. Note in Exhibit 157 that Wednesday's results exceeded the 4 per cent limit. Management investigated the problem Wednesday afternoon and found a machine improperly installing a switch. The machine was fixed Wednesday night and production returned to normal on Thursday.

**Illustration 20.1** Control Chart for Defective Products

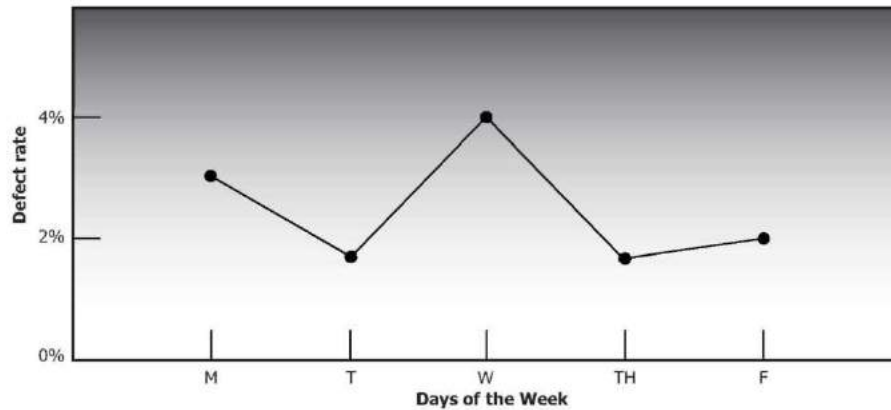


Exhibit 157: Control chart for defective products

**Pareto diagrams** indicate how frequently each type of failure occurs. Note the Pareto diagram for compact disc player production at CD, Inc., in Exhibit 158. Pareto diagrams have more information than simple control charts, but they require quality testers to classify and report defects. Managers learn more about the causes of problems from Pareto diagrams than they do from control charts.

**Illustration 20.2** Pareto Diagram for Production at CD, Inc.

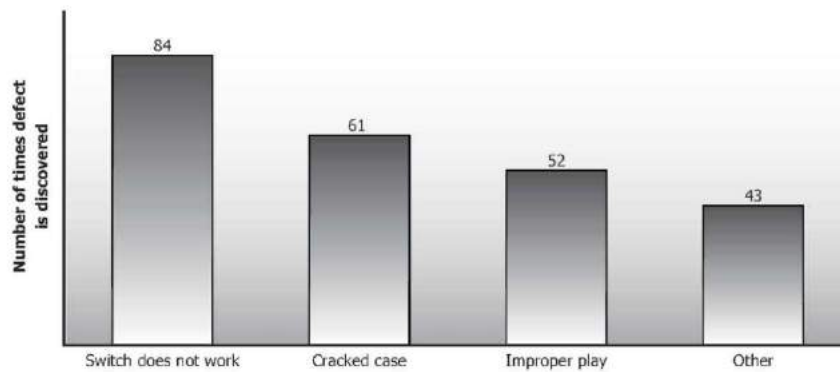


Exhibit 158: Pareto diagram for production at CD, Inc.

**Cause-and-effect analysis** identifies potential causes of defects. Consider the problem of cracked compact disc player cases, for example. Cracked cases could be due to breakage during production, faulty materials, or other handling problems. Managers must know the cause of problems to solve them. It makes no sense to focus on product handling, for example, if the problem is purchasing poor-quality materials.



## 20. Using accounting for quality and cost management

### Quality and customer satisfaction measures

Quality-oriented organizations continually monitor the quality of their products and solicit feedback from customers to assess their satisfaction with goods and services. For instance, in Exhibit 159 the second nonfinancial measure deals with delivery performance. Delivery performance is critical to success for companies such as FedEx, UPS, the US Postal Service, and other delivery services.

Performance measure	Objective
1. Quality control	
Number of customer complaints	Create customer satisfaction
Number of defects	Make a high-quality product
2. Delivery performance	
Percentage of on-time deliveries	Increase on-time deliveries
3. Materials waste	
Scrap and waste as a percentage of total materials used	Decrease scrap and waste; improve the quality of products
4. Machine downtime	
Percentage of time machines are not working	Decrease machine downtime; increase on-time delivery to customers

#### Exhibit 159: Nonfinancial performance measures

The success of Lands' End, L. L. Bean, The Territory Ahead, and other companies that sell through catalogs depends on quick delivery of their merchandise. Bottlers of soft drinks such as PepsiCola and canneries like Campbell Soup require precisely timed deliveries of cans and bottles. Ideally, the truck or railroad car unloads containers right onto the production line.

Nonfinancial performance measures are particularly important to motivate people to provide high-quality products and excellent customer service. For example, Exhibit 159 presents four nonfinancial performance measures used by managers to evaluate performance in providing quality products and service at a reasonable cost.

**Quality control** The first set of measures in Exhibit 159 reflect quality control. Firms measure their product quality by the number and type of customer complaints or by the number of product defects. By reducing the number of product defects, companies reduce the number of customer complaints. The objective is to increase customer satisfaction with the product, reduce the costs of dealing with customer complaints, and reduce the costs of repairing products or providing a new service.

**Delivery performance** The second type of nonfinancial measure in Exhibit 159 deals with delivery performance. As we noted earlier, delivery performance is critical for many companies. Domino's Pizza bases its success on delivery service. The objective is to deliver goods and services when promised. To achieve this objective, companies keep track of the percentage of total deliveries that are on time.

**Materials waste** Companies can take several steps to reduce materials waste, the third type of nonfinancial measure. They can purchase a higher quality of raw materials so there is less waste from defective materials, increase employee training so workers make fewer mistakes, and improve the production process. Reducing waste can improve quality. The causes of waste are often the causes of poor quality. For example, waste may reflect poor training of employees. Improving training could improve the quality of their work on all products, not just those that result in waste. Generally, workers are motivated to find ways to reduce waste when companies keep track of the quantity of materials wasted every day. Companies sometimes provide immediate feedback to workers the next day, often in the form of large charts showing the previous day's waste.

**Machine downtime** The fourth type of nonfinancial measure, machine downtime, is very important in all companies. At some automobile assembly plants, workers have the authority to stop the assembly line when they

see something wrong. It should come as no surprise that such an action brings a lot of attention to the problem from many people in the plant. Stopping production causes a loss of output while people wait for the machinery to start up again. Machine downtime also can cause customer dissatisfaction and loss of sales. You may have experienced this dissatisfaction at a bank when you could not be served because the computer was down, or when your airline flight was canceled because of an airplane's maintenance problems.

People like to take pride in their work. Surveys indicate that workers prefer to do high-quality work rather than low-quality work. Companies generally find that workers respond favorably to performance measures and incentives measuring and rewarding high-quality work.

Many companies use high quality as their strategic advantage. For example, FedEx entered the air courier business with a promise that it would guarantee delivery the next day by mid-morning. By continually delivering on this promise, the company built up trust in its customers. Canon and Honda are other well-known companies that have used product quality to compete effectively.

**Benchmarking** is the continuous process of measuring how well one is doing against performance levels either inside or outside of the organization. For instance, students often benchmark by comparing their performance against the professor's standards or other students' performance. Students often are interested in how well graduates of their school compare to graduates of other schools on CPA exams, bar exams, or other standardized exams.

Companies are benchmarking in a similar way. American Airlines looks at its own on-time arrival performance by computing the percentage of its flights that land within 15 minutes of their scheduled arrival time. The company compares the results with its own past experience and with its competitors' performance. American Airlines also compares its own per cent of lost luggage to its own past experience and the performance of major competitors such as United Airlines and Delta Air Lines.

Benchmarking transforms the theory of quality products or service into practice. Benchmarking focuses attention on the objective. When American Airlines benchmarks on-time arrivals, it focuses the attention of its pilots, ground crews, mechanics, and everyone else on ways to improve on-time arrival performance.

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### An accounting perspective:

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### Managers executed for poor quality

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### Business insight

Eighteen managers were executed for poor product quality in a refrigerator plant on the outskirts of Beijing, China. The managers—12 men and 6 women—were taken to a rice paddy outside of the factory and shot while plant workers watched.

A government official stated the action was required for committing unpardonable sins against the people of China. Apparently, workers complained the managers were forcing the production of poor quality products. When workers complained that components did not meet specifications and the refrigerators did not function as required, the managers told them to ship the products.

## 20. Using accounting for quality and cost management

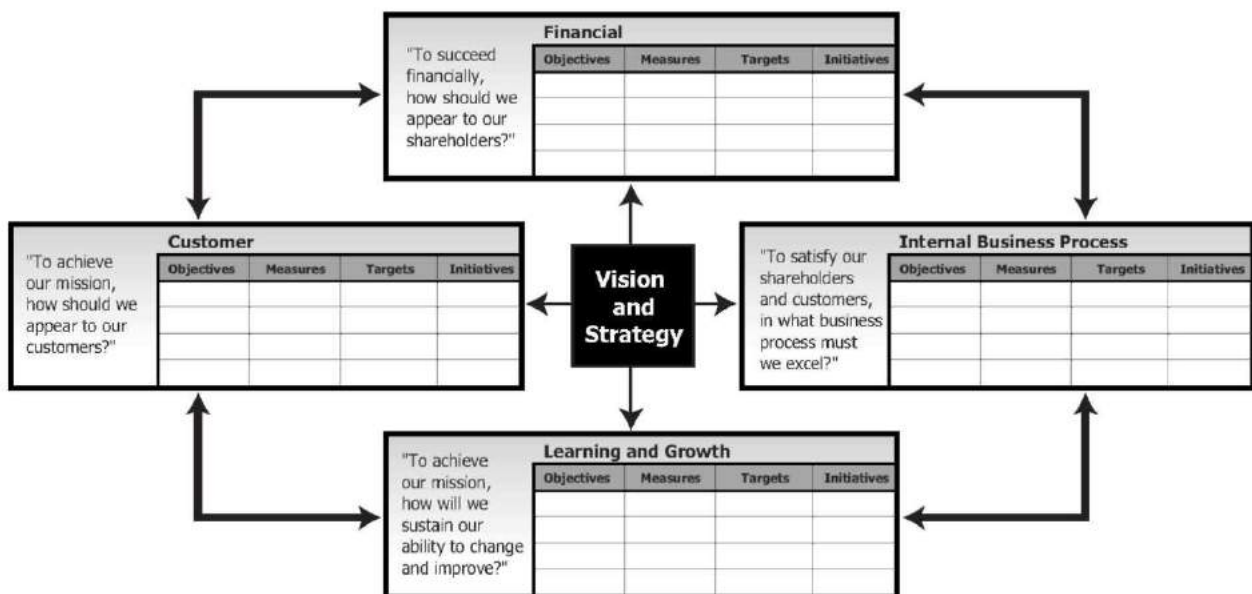
Customers also had complained. This factory had a reputation for turning out poor quality products.

Source: Authors' research.

The **balanced scorecard** is a set of performance targets and results that show an organization's performance in meeting its objectives to its stakeholders. It is a management tool that recognizes organizational responsibility to different stakeholder groups, such as employees, suppliers, customers, business partners, the community, and shareholders. Often different stakeholders have different needs or desires that the managers of the organization must balance. The concept of a balanced scorecard is to measure how well the organization is doing in view of those competing stakeholder concerns.

An example of a balanced scorecard is shown in Exhibit 160. As you can see, the focus is to balance the efforts of the organization between the financial, customer, process, and innovative responsibilities. Traditionally, business organizations have focused on financial results, which mainly have reflected the shareholders' interests. In recent years, organizations have shifted attention to customer issues, such as quality and service, to employees, and to the community. For example, Ben & Jerry's Ice Cream measures its social performance along with financial performance and presents a social audit in its annual report next to its financial audit. Johnson & Johnson's code of conduct makes it clear that the company has a responsibility to several competing stakeholders.

**Illustration 20.4** Balanced Scorecard



Source: R. S. Kaplan and D. P. Norton, "Using the Balanced Scorecard as a Strategic Management System," *Harvard Business Review*, January–February 1996.

Exhibit 160: Balanced scorecard

The balanced scorecard has been developed and used in many companies. It primarily has been used at the top management level to support the organization's development of strategies. For example, Kaplan and Norton describe the development of the balanced scorecard at an insurance company as follows:<sup>56</sup>

Step 1: Ten of the company's top executives formed a team to clarify the company's strategy and objectives to meet responsibilities.

Step 2: The top three layers of the company's management (100 people) were brought together to discuss the new strategy and to develop performance measures for each part of the company. These performance measures became the scorecards for each part of the business and reflected the company's desired balance in satisfying different stakeholders.

Step 3: Managers began eliminating programs that were not contributing to the company's objectives.

Step 4: Top management reviewed the scorecards for each part of the organization.

Step 5: Based on its reviews in step 4, top management went back to step 1 to refine and further clarify the company's strategy and objectives.

Organizations using the balanced scorecard generally have found it to be helpful for top and middle management to shape and clarify organization goals and strategy in the face of competing stakeholder wants.

### Just-in-time method

Innovations in purchasing, production, and inventory management have the potential to revolutionize companies. One of these innovations is the **just-in-time (JIT) method**. Companies that use just-in-time methods purchase materials just in time for production, produce parts just when needed in the production process, and complete finished goods just in time for sale.

The principal feature of the just-in-time system is that production does not begin on an item until an order is received. When a company receives an order it buys the raw materials, and the production cycle begins. As soon as the order is filled, production ends. Consequently, just-in-time requires immediate correction of processes or people making defective products because there is no inventory where defective products can await reworking or scrapping.

In theory, a JIT system eliminates the need for inventories because no production takes place until the company knows its products will be sold. As a practical matter, companies using this system normally have a backlog of orders so they can keep their production operations going. The benefits of the JIT system would be lost if a company had to shut down its operations for lengthy periods while waiting for new orders.

Just-in-time helps assure quality. If a unit is defective, employees cannot simply put it aside in inventory. Production workers and machines must do it right the first time.

To achieve just-in-time production, many companies install a system of flexible manufacturing. A flexible manufacturing system is computer-based; it enables companies to make a variety of products with a minimum of setup time. The system does what its name implies: it enables companies to be flexible in making products just-in-time to fill customers' orders.

For example, consider a company that makes after-market running boards for trucks. Customers install these running boards on trucks after they purchase them. By using flexible manufacturing, the company that makes these

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<sup>56</sup> Based on R. S. Kaplan and D. P. Norton, "Using the Balanced Scorecard as a Strategic Management System," *Harvard Business Review*, January-February 1996.

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running boards produces one set of running boards for a particular model of Dodge then one set for a particular GMC model, and so forth to fill customer orders. A traditional production system, by contrast, would produce numerous sets of running boards for the Dodge which would remain in inventory until needed to fill customer orders. The traditional company would then produce numerous sets of running boards for the GMC and place them in inventory until needed to fill customer orders.

Just-in-time is part of a lean production philosophy that has helped many companies successfully reduce costs and increase quality. One feature of lean production is the absence of shelves, floor space, and other places used to store partially finished products. For an example of lean production, imagine you are building a house and you have just enough materials arriving just when you need them. You do not have extra lumber lying about in case you make a mistake cutting the boards the first time. If your supplier of plumbing products does not deliver in time for your needs, you have to shut down production until the plumbing products arrive. As you can see, lean production requires high levels of efficiency and quality.

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### Accounting perspective:

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#### Business insight

A labor strike at General Motors' Dayton, Ohio, USA, plant, which produces brake parts, demonstrated the far-reaching effects of just-in-time when companies face plant shutdowns. When the United Auto Workers (UAW) struck the Dayton plant, they forced 30,000 non-UAW workers off their jobs. As General Motors has moved toward just-in-time production methods, its inventories of brakes and other parts have decreased. Because of the strike at the Dayton plant, US and Canadian plants using the brakes shut down quickly. Mexican plants were slower to shut down because inventory in transit kept the Mexican plants going for about a week longer than their US and Canadian counterparts.

Source: Authors' research.

Accountants using traditional costing methods assign costs to products as they go through the production steps. Assigning costs to products is time-consuming and expensive, not only for accountants, but also for workers and managers. One of the reasons for assigning costs as products proceed through production steps is to know the value of work-in-process inventory at the end of an accounting period. Suppose a product has completed the first three steps in a six-step production process at the end of the month. By assigning costs at each step along the way, accountants know the cost of the product at the end of the third step.

Accountants in JIT production facilities do not have to compute the cost of work-in-process inventories. There are no such inventories. Instead, accountants assign costs directly to the Cost of Goods Sold account. Companies have been known to save the time of two or three full-time accountants by assigning costs directly to Cost of Goods Sold. Since JIT production responds to the receipt of an order for goods, a JIT accounting system normally debits all costs directly to cost of goods sold and bypasses the usual inventory accounts. When it is necessary to report inventory amounts in the financial statements, accountants back the inventory amounts out of the Cost of Goods Sold account using a method called backflush costing. **Backflush costing** is a method of assigning costs to

inventories backwards from Cost of Goods Sold to Finished Goods Inventory and/or Work in Process Inventory accounts.

For example, say Arizona Sunscreen Company uses the JIT method. Direct materials costs are USD 3.00 per bottle and other manufacturing costs are USD 1.50 per bottle. The company received an order for 10,000 bottles of sunscreen. Materials costs were USD 30,000 and other manufacturing costs were USD 15,000. Assume that USD 6,000 of these other costs are wages and the remaining USD 9,000 were applied to production from overhead. Assume also the company had an inventory of USD 4,500 left in work in process as of the date financial statements were prepared.

**Traditional methods** Using traditional methods of recording costs, the costs would flow through the inventory accounts to Cost of Goods Sold as shown by the following journal entries:

(1) Materials inventory (+A)	30,000	
Accounts payable (+L)		30,000
To record the purchase of materials.		
(2) Work in process inventory (+A)	45,000	
Materials inventory (-A)		30,000
Payroll summary (+L)		6,000
Overhead (applied) (+SE)		9,000
To record production costs in the work in process account.		
(3) Finished goods inventory (+A)	40,500	
Work in process inventory (-A)		40,500
To transfer product from work in process to finished goods.		
(4) Cost of goods sold (-SE)	40,500	
Finished goods inventory (-A)		40,500
To record the cost of the goods sold.		

**Just-in-time and backflush costing** Using a just-in-time accounting system, the accountants would initially assume the company has no inventories. Therefore, they would debit all costs directly to Cost of Goods Sold, as follows:

(1) Cost of goods sold (-SE)	30,000	
Accounts payable (+L)		30,000
To record the use of materials.		
(2) Cost of goods sold (-SE)	15,000	
Payroll summary (+L)		6,000
Overhead (applied) (+SE)		9,000
To record other manufacturing costs.		

Upon learning the company has USD 4,500 of inventory in work in process, the accountants would back out USD 4,500 from Cost of Goods Sold, as follows:

(3) Work in process inventory (+A)	4,500	
Cost of goods sold (+SE)		4,500
To record inventory.		

This last entry is the backflush costing step. These entries appear in T-accounts in Exhibit 161.

Just-in-time production simplifies accounting procedures. If the costs of these sunscreen bottles were charged into production using traditional costing methods, it would be necessary to debit the materials costs to a Materials Inventory account. As the materials were used, their costs would be transferred to Work in Process Inventory and other manufacturing costs would be charged to Work in Process Inventory. As goods were completed, costs would

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be transferred out of Work in Process Inventory, into Finished Goods Inventory, and finally, into Cost of Goods Sold. Exhibit 161 contrasts traditional versus just-in-time cost flows.

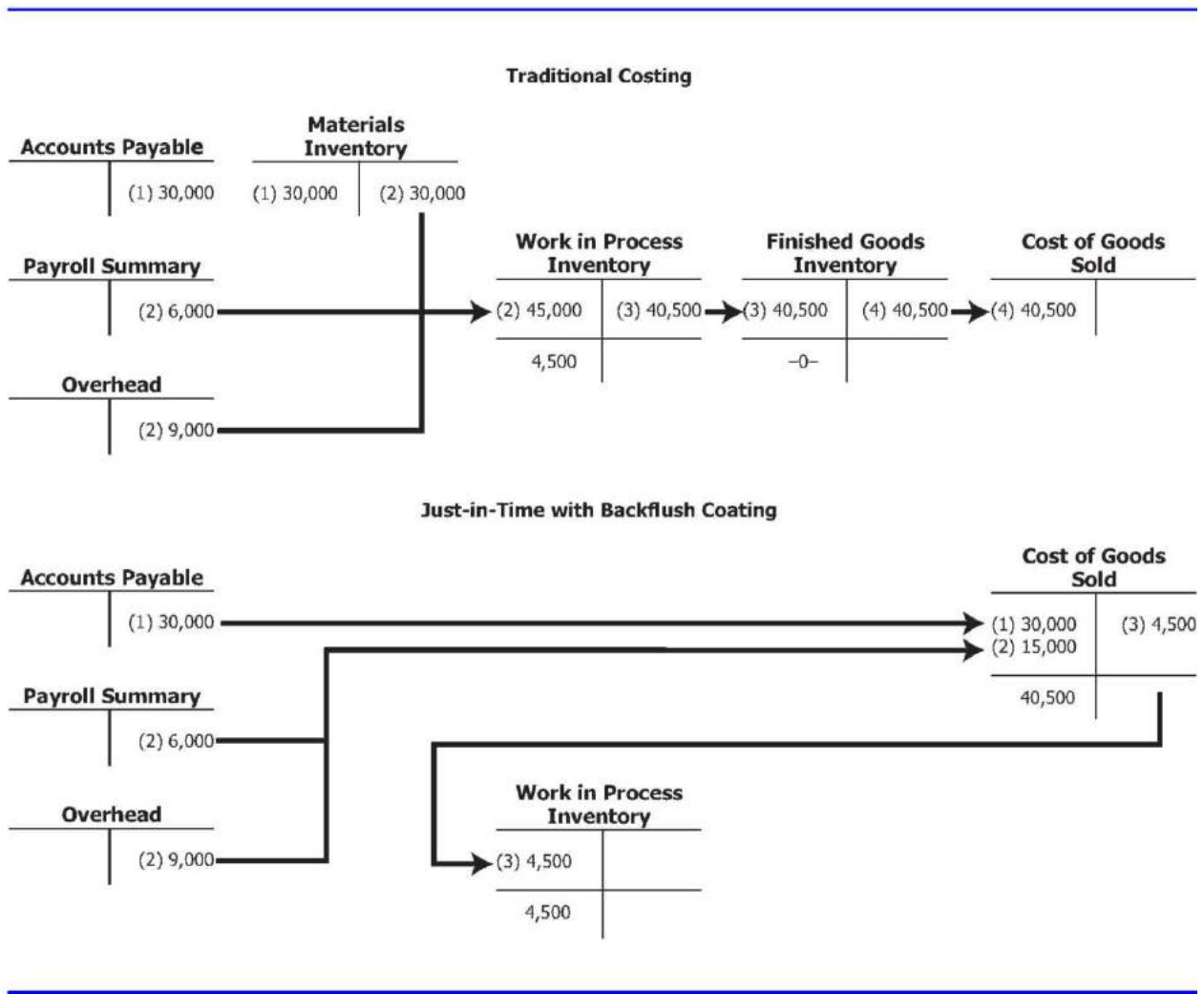


Exhibit 161: Traditional versus just-in-time cost flows

By reducing inventories, a just-in-time system offers potentially great cost savings. As noted earlier, it simplifies the accounting system. By reducing inventories, it releases investment dollars for use elsewhere and frees space that the inventory previously occupied. Companies also have found that reducing inventories where defective products could be hidden helps management detect production problems more quickly. By tying JIT to quality improvement programs, companies move toward zero defect production.

**Activity-based costing and management**

Suppose you go to a movie theater that has five screens showing five different movies. Jerome Justin works for the movie theater selling tickets for all five movies. Suppose management wants to know the cost of selling tickets per movie and asks you to assign Justin's wages to each of the five movies. How would you assign his wages?

You could simply divide Justin's wages by the number of movies and allocate 20 per cent of his salary to each movie. Or you could figure out how many tickets he sold to each movie, and allocate his wages on the basis of ticket

sales. For example, if 50 per cent of the ticket sales were for *Avatar*, you might allocate 50 per cent of Justin's wages to *Avatar*. You probably also could think of additional ways to allocate Justin's wages. No matter how we allocate Justin's wages, his wages would not be directly traceable to one of the movies if he sold tickets for all five movies. In short, the allocation of Justin's wages to a particular movie is at least somewhat arbitrary because alternative methods could allocate different amounts of Justin's wages to each movie. Justin's wages would be indirect costs to the different movies because his wages could not be directly assigned to any one of the movies.

By definition, the allocation of indirect costs is at least somewhat arbitrary. Nevertheless, accountants have discovered that they can improve the ways costs are assigned, such as to movies in this case, by using activity-based costing.

**Activity-based costing** is a costing method that assigns indirect costs to activities and to the products based on each product's use of activities. Activity-based costing is based on the premise: Products consume activities; activities consume resources.

Numerous companies, such as HP, Caterpillar, and IBM, have implemented activity-based costing. Activity-based costing (ABC) has revealed startling information in these companies. For example, after installing new costing methods, one well-known company found that one of its products, a printed circuit board, was generating negative margins of 46 per cent.

Activity-based costing identifies the activities generating costs and assigns costs to those activities. Take the earlier Justin example. By focusing on Justin's activities, management could learn what caused costs and find ways to improve Justin's efficiency. Suppose that by studying Justin's activities, management learns he spends 40 per cent of his time answering questions about movies, 40 per cent of his time selling tickets, and 20 per cent doing nothing. Based on this information, management could think about better ways to use Justin's time. By improving their signs and posting information about the movies, management could reassign Justin to other tasks.

Closely related to activity-based costing is the notion of activity-based management (ABM). Using activity-based management, managers identify which activities consume resources. The focus is then to effectively manage costly activities with the goal of reducing costs and improving quality. Consider Justin and the movie theater again. Using activity-based management, managers would identify what Justin did with his time and perhaps find ways to help him become more efficient.

The following discussion at a textile company that makes jeans demonstrates important issues about the difficulty with traditional cost allocation methods and the advantages of activity-based costing. The participants are concerned about their company's ability to compete with foreign manufacturers that have lower labor costs. Many people in the company believe the company's managerial accounting system provides inadequate information. In this discussion, George, a managerial accountant, reports on his recent study of activity-based costing.

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### A broader perspective:

#### HP

When a division of Hewlett-Packard Company introduced the just-in-time production method, the accountants found their traditional methods of cost accounting were no longer applicable. Reducing the work in process and finished goods inventories meant the accountants no longer needed to keep detailed records for inventory valuation.



## 20. Using accounting for quality and cost management

Lowering inventories to immaterial levels for financial reporting purposes reduces the amount of accounting time required to make journal entries to transfer costs between inventory accounts. This Hewlett-Packard plant saved an estimated 100,000 journal entries per month by simplifying the accounting for work in process inventories.

JIT did not eliminate the need for product costing. Managers needed to know how much products cost so they could make decisions, plan, and evaluate performance. After simplifying inventory accounting at the Hewlett-Packard plant, the accountants turned their attention to providing better information in a form managers could understand and use. The accountants found their new role in helping managers plan and control production exciting and challenging.

Source: Authors' research.

**George (managerial accountant):** I have been reading a lot of articles about companies like Ford and HP that have discovered major problems with their cost systems. Their symptoms are similar to ours. Namely, they cannot lower prices to be competitive on high-volume products, and their profits are shrinking.

**Pam (company president):** That sounds like us! What are they doing about it?

**George:** Well, they are putting in a new type of cost system called activity-based costing, or ABC for short. This system gives more detailed and better estimates of product costs, which helps their friends in marketing set prices. Applying this to ourselves, we may find, for example, that activity-based costing could reveal that the cost of skirts is lower than we thought, meaning we could lower our prices.

**Lynn (vice president of marketing):** That would be good news, but I thought costs were pretty cut-and-dried. How can a product cost less under one cost system than under another?

**George:** Actually, Lynn, the product does not cost less under one system or another. Our problem is that no cost system measures costs perfectly. We are able to trace some costs directly to the product. For example, we are pretty accurate in measuring the cost of denim, which is a direct material, in each of our shirts, pants, jackets, and so forth.

Overhead costs are another matter. Overhead includes costs like electricity to run machines and salaries of product designers and inspectors. All these costs are allocated to products. We know quality control inspectors cost money, but we do not know how much of that cost is caused by a particular jacket or pair of pants. So we make some assumptions about the relation between products and overhead costs. For example, we typically allocate overhead based on machine-hours required to stitch and fasten snaps. While that is probably a reasonable way to allocate the costs of electricity to run machines, its not a desirable way to allocate the cost of quality control inspectors.

**Pam:** As I understand it, overhead allocation is somewhat arbitrary. How will activity-based costing help?

**George:** Activity-based costing provides more accurate information because we can identify which activities cause costs, and we can determine the cost of the activity. Activity-based costing identifies and measures the costs of performing the activities that go into a product much better than traditional cost methods. For example, if a particular jacket requires 10 inspections for a production run of 1,000 jackets, we figure out the cost of those inspections and assign that cost to the production run for this particular jacket.

**Martha (vice president of production):** That makes sense to me. But exactly how would activity-based costing help us cut production costs?

**George:** Once we identify activities that cause costs, we can eliminate or modify costly activities. For example, if we find that a jacket requires too many costly inspections, we could redesign the jacket to reduce the need for inspections. Our current cost system allocates all overhead costs, including inspection costs, to products based on machine-hours. We really do not know how much it costs to make an inspection and how much inspection cost is required by each product.

**Pam:** George, why have you not used activity-based costing before?

**George (feeling somewhat defensive):** Because activity-based costing provides more information, it takes more time than traditional cost systems. New accounting methods sound great in theory, but there must be enough benefit from improved management decisions to justify the additional work required to provide numbers. Until now, I did not think activity-based costing would pass a cost-benefit test.

**Pam:** I see many benefits in better pricing, reducing the costs of high-cost activities, and possibly dropping some products if we learn that their costs are too high. Our long-term strategy calls for new product lines in new markets where we are low-cost, low-price producers. We need the best cost information we can get to succeed in those markets. George, what do you need to get started developing an activity-based costing system for us?

**George:** I need a lot of support. Installing a new cost system requires teamwork between management, accounting, marketing, engineering, production, purchasing, and everybody else. This is not something to be done in an ivory tower.

Remember these important points about activity-based costing:

- The allocation of indirect costs is at least somewhat arbitrary, even using sophisticated accounting methods.
- Activity-based costing provides more detailed measures of costs than traditional allocation methods.
- Activity-based costing can help marketing people by providing more accurate product cost numbers for decisions about pricing and which unprofitable products the company should eliminate.
- Production also benefits because activity-based costing provides better information about the cost of each activity. In practice, ABC helps managers identify cost-causing activities. To manage costs, production managers learn to manage the activities that cause costs.
- Activity-based costing provides more information about product costs than traditional methods but requires more record-keeping. Managers must decide whether the benefits or improved decisions justify the additional record-keeping cost.
- Installing activity-based costing requires teamwork among accountants, production managers, marketing managers, and other nonaccounting people.

Next, we discuss the methods used for activity-based costing and illustrate them with an example.

### Methods used for activity-based costing

Activity-based costing requires accountants to use the following four steps:

- Identify the activities that consume resources and assign costs to those activities. Purchasing materials would be an activity, for example.

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- Identify the cost drivers associated with each activity. A **cost driver** is an activity or transaction that causes costs to be incurred. For the purchasing materials activity, the cost drivers could be the number of orders placed or the number of items ordered. Each activity could have multiple cost drivers.
- Compute a cost rate per cost driver unit. The cost driver rate could be the cost per purchase order, for example.
- Assign costs to products by multiplying the cost driver rate times the volume of cost driver units consumed by the product. For example, the cost per purchase order times the number of orders required for Product A for the month of December would measure the cost of the purchasing activity for Product A for December.

The next section describes these four steps.

Step one is often the most interesting and challenging part of the exercise. This step requires people to understand all of the activities required to make the product. Imagine the activities involved in making a simple product like a pizza—ordering, receiving and inspecting materials, making the dough, putting on the ingredients, baking, and so forth. Or imagine the activities involved in making a complex product such as an automobile or computer.

**Complexity as an activity that consumes resources** One of the lessons of activity-based costing has been that the more complex the business, the higher the indirect costs. Imagine that each month you produce 100,000 gallons of vanilla ice cream and your friend produces 100,000 gallons of 39 different flavors of ice cream. Further, assume your ice cream is sold only in one liter containers, while your friend sells ice cream in various containers. Your friend has more complicated ordering, storage, product testing (one of the more desirable jobs, nevertheless), and packing in containers. Your friend has more machine setups, too. Presumably, you can set the machinery to one setting to obtain the desired product quality and taste. Your friend has to set the machines each time a new flavor is produced. Although both of you produce the same total volume of ice cream, it is not hard to imagine that your friend's overhead costs would be considerably higher.

In Exhibit 162, we present several examples of the cost drivers companies use. Most cost drivers are related to either the volume of production or to the complexity of the production or marketing process. In deciding which cost drivers to use, managers consider these three factors:

<b>Cost driver</b>	<b>Cost of assigned cost driver</b>
Miles driven	Automobile costs
Machine-hours	Electricity to run machines
Customers served	Overhead in a bank
Flight hours	Airplane maintenance costs
Number of customers	Selling costs

### Exhibit 162: Cost drivers

- Causal relation. Choosing a cost driver that causes the cost is ideal. For example, suppose students in biology classes are messier than students in history classes. As a result, the university does more maintenance per square foot in biology classrooms and labs than in history classrooms. Further, it is possible to keep track of the time maintenance people spend cleaning classrooms and labs. The university could assign maintenance costs based on the time spent in history classrooms and in biology classrooms and labs, respectively, to the history and biology departments.
- Benefits received. Choose a cost driver so costs are assigned in proportion to benefits received. For example, if the physics department in a university benefits more from the university's supercomputer than the German department does, the university should select a cost driver that recognizes such differences in

benefits. The cost driver could be the number of faculty and/or students in each department who use the computer.

- Reasonableness. Some costs that cannot be linked to products based on causality or benefits received are assigned on the basis of reasonableness.

In general, predetermined rates for allocating indirect costs to products are computed as follows:

$$\text{Predetermined indirect cost rate} = \frac{\text{Estimated indirect cost}}{\text{Estimated volume of the allocation base}}$$

This formula applies to all indirect costs, whether manufacturing overhead, administrative costs, distribution costs, selling costs, or any other indirect cost.

Using activity-based costing, we first define the notion of an activity center. An **activity center** is a unit of the organization that performs some activity. For example, the costs of setting up machines would be assigned to the activity center that sets up machines. This means that each activity has associated costs. When the cost driver is the number of inspections, for example, the company must keep track of the cost of inspections.

Workers and machines perform activities on each product as it is produced. Accountants allocate costs to products by multiplying each activity's indirect cost rate by the volume of activity used in making the product.

The following example illustrates how unit costs are computed when companies use activity-based costing. We contrast the results using activity-based costing to those using a departmental rate.

Assume High Challenge Company makes two products, touring bicycles and mountain bicycles. The touring bicycles product line is a high-volume line, while the mountain bicycle is a low-volume, specialized product.

**Traditional costing method** Using a traditional costing method, assume that High Challenge Company followed this procedure to allocate manufacturing overhead costs to the two products for the month of January 2011.

- Managers and accountants developed an overhead rate based on the following data for 2011:

Overhead for department A for 2011	\$2,000,000
Machine-hours worked during 2011 in department A	20,000 hours
Department A overhead rate (\$2,000,000/20,000 hours)	\$100 per machine-hour

- To compare activity-based costing with the company's traditional method, the accountants selected the month of January to study. At the end of January 2011 the following information was available for the month:

Actual machine-hours used in January 2011:

Touring bicycle products	1,500
Mountain bicycle products	500
Total	2,000

- Using a traditional costing method, accountants then allocated overhead to the products worked on in January using the overhead rate of USD 100 per machine-hour times the machine-hours worked on each product in Department A during January:

Overhead allocated to products worked on in January:

Touring bicycles (\$100 x 1,500 hours)	\$150,000
Mountain bicycles (\$100 x 500 hours)	50,000
Total overhead	\$200,000

In using activity-based costing, the company identified four activities that were important cost drivers and a cost driver used to allocate overhead. These activities were (1) purchasing materials, (2) setting up machines when a new product was started, (3) inspecting products, and (4) operating machines.

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Accountants estimated the overhead and the volume of events for each activity. For example, management estimated the company would purchase 100,000 pieces of materials that would require overhead costs of USD 200,000 for the year. These overhead costs included salaries of people to purchase, inspect, and store materials. Consequently, each piece of material used to make a product would be assigned an overhead cost of USD 2.00 (USD 200,000/100,000 pieces).

These estimates made in 2010 were used during all of 2011. In practice, companies most frequently set rates for the entire year, although some set rates for shorter periods, such as a quarter. Look at the overhead rates computed for the four activities in Exhibit 163. Note that the total overhead for 2011 is USD 2,000,000 using activity-based costing, just as it was using a traditional costing method. The total amount of overhead should be the same whether using activity-based costing or traditional methods of cost allocation to products. The primary difference between activity-based costing and the traditional allocation methods is the amount of detail; particularly, the number of activities used to assign overhead costs to products. Traditional allocation uses just one activity, such as machine-hours. Activity-based costing used four activities in this case. In practice, companies using activity-based costing generally use more than four activities because more than four activities are important. We used four to keep the illustration as simple as possible. (Many companies that use traditional allocation methods use just one activity, as we have in this example.)

(1) Activity	(2) Cost driver used to allocate overhead cost driver	(3) Overhead cost for the activity	(4) Cost driver units for 2011	(5) Rate: column (3)/column (4)
1. Purchasing materials	Pieces of materials in each unit	\$ 200,000	100,000 pieces	\$2/piece
2. Machine setups	Machine setups	800,000	400 setups	\$2,000/setup
3. Inspections	Inspection hours	400,000	4,000 hours	\$100/hour
4. Running machines	Machine-hours	600,000	20,000	\$30/hour
Total overhead		\$ 2,000,000		

Exhibit 163: Overhead rates for activity-based costing

For January 2011, the High Challenge Company has the following information about the actual number of cost driver units for each of the two products:

	Touring bicycles	Mountain bicycles
1. Purchasing materials	6,000 pieces	4,000 pieces
2. Machine setups	10 setups	30 setups
3. Inspections	200 hours	200 hours
4. Running machines	1,500 hours	500 hours

Multiplying the actual activity events for each product times the predetermined rates computed earlier resulted in the overhead allocated to the two products shown in Exhibit 164.

Activity	Rate	Touring Actual cost driver units	Bicycles Cost allocated to Product	Mountain Actual cost driver units	Bicycles Cost allocated to product
1. Purchasing materials	\$2/piece	6,000 pieces	\$12,000	4,000 pieces	\$ 8,000
2. Machine setups	\$2,000/setup	10 setups	20,000	30 setups	60,000
3. Inspections	\$100/hour	200 hours	20,000	200 hours	20,000
4. Running machines	\$30/hour	1,500 hours	45,000	500 hours	15,000
Total cost allocated to each product			\$97,000		\$ 103,000

Exhibit 164: Overhead costs assigned to products using activity-based costing

Now we can compare the overhead allocated to the two product lines using the traditional method and activity-based costing, as follows:

	Touring bicycles	Mountain bicycles
Traditional method	\$150,000	\$50,000
Activity-based costing	97,000	103,000

**Unit costs** Assume High Challenge Company produced 1,000 units of touring bicycles and 200 units of mountain bicycles in January. The direct materials cost is USD 100 per unit for touring bicycles and USD 200 per unit for mountain bicycles. Direct labor cost is USD 20 per unit for touring bicycles and USD 30 per unit for mountain bicycles. Comparing the overhead allocations using the department allocation and the activity-based costing allocation reveals the differences in unit costs, as we show in Exhibit 165.

	Traditional Costing		Activity-based Costing	
	Touring bicycles	Mountain bicycles	Touring bicycles	Mountain bicycles
Direct materials	\$ 100	\$200	\$100	\$200
Direct labor	20	30	20	30
Overhead	150 <sup>a</sup>	250 <sup>b</sup>	97	515 <sup>d</sup>
Total	\$270	\$480	\$217	\$745

<sup>a</sup> \$150 = overhead cost allocation to products using departmental rate divided by number of units produced = \$150,000/1,000 units.

<sup>b</sup> \$250 = overhead cost allocation to products using departmental rate divided by number of units produced = \$50,000/200 units.

<sup>c</sup> \$97 = overhead cost allocation to products using activity-based costing divided by number of units produced = \$97,000/1,000 units.

<sup>d</sup> \$515 = overhead cost allocation to products using activity-based costing divided by number of units produced = \$103,000/200 units.

Exhibit 165: Comparison of product costs using traditional costing and activity-based costing

**Analysis** More overhead is allocated to the lower volume mountain bicycles using activity-based costing. The mountain bicycles are allocated more overhead per unit primarily because activity-based costing recognizes the need for more setups for mountain bicycles and for as many inspection hours for the more specialized mountain bicycles as for the higher volume touring bicycles. By failing to assign costs to all of the activities, touring bicycles were subsidizing mountain bicycles. Many companies have found themselves in similar situations. Activity-based costing has revealed that low-volume, specialized products have been the cause of greater costs than managers had realized.

### Impact of new production environment on cost drivers

When cost systems were first developed in industry, companies were far more labor intensive than they are today. The majority of the overhead cost was related to the support of labor, so it made sense to allocate overhead to products based on the amount of labor in the products. Labor is still a major product cost in many companies, especially service organizations such as public accounting firms. Often they allocate overhead to products (which are called jobs) on the basis of the amount of labor in the product.

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As manufacturers and service companies have become more automated, direct labor has become less appropriate as a basis for allocating overhead. Direct labor has shrunk to less than 5 per cent of product costs in many companies and overhead has increased. Thus, companies that continue to allocate overhead to products based on direct labor are seeing rates increase as high as 500 per cent or more. (Some overhead rates are more than 1,000 per cent of direct labor costs.)

When labor is such a small part of product costs, there is little—if any—relationship between labor and overhead. Further, small errors in assigning labor to products are magnified many times when overhead rates are several hundred per cent of labor costs, or more.

Finally, allocating overhead on the basis of direct labor sends signals that direct labor is more expensive than it really is. This also creates tremendous incentives to reduce the labor content of products. While this may be desirable in particular circumstances, such decisions should be based on accurate cost numbers, not numbers heavily biased because of an arbitrary cost allocation method.

### Activity-based costing in marketing

Activity-based costing is not limited to the cost of producing goods and services; companies also apply it to marketing or administrative activities. The principles and methods are the same as discussed earlier: (1) identify activities or cost drivers, (2) compute an indirect cost rate for each activity, and (3) allocate indirect costs by multiplying the indirect cost rate for each activity by the volume of activities.

Instead of computing a cost of production, however, accountants compute a cost of performing an administrative or marketing service. Tissue products, for example, can be sold to grocery stores, convenience stores, the industrial market, and other channels of distribution. Each channel has different activities:

- Convenience stores would require many shipments in small orders and considerable marketing support.
- Grocery stores would require relatively large shipments, a variety of products, and considerable marketing support.
- Industrial users would involve brokers, minimum marketing support, and large orders.

Information on the cost of alternative channels of distribution is useful to marketing managers who make decisions about which channel to use. In this case, obvious cost drivers would include the number of shipments per period, size of shipment, number of products in a shipment, and measures of merchandising support.

### Strategic use of activity-based management

Many believe activity-based costing offers strategic opportunities for companies. One of the key ways companies develop a competitive advantage is by becoming low-cost producers or sellers. Companies such as Wal-Mart Stores in retailing, UPS in delivery services, and Southwest Airlines in the airline industry have created competitive advantages by reducing costs. Professor Michael Porter of the Harvard Business School, among others, has pointed out that certain companies have learned to use the information they have gained from their cost systems to make substantial price cuts to increase market share.

Activity-based costing plays an important role in companies' strategies and long-range plans to develop a competitive cost advantage. Activity-based costing focuses attention on activities. Cost reduction generally requires a change in activities. Although top management can send notices asking company employees to reduce costs, the implementation requires a change in activities. If you have been in school during a period when education costs were cut, you know that achieving the cut required a change in activities such as canceled classes, larger class sizes,

and reduced services. It is impossible to know the effect of a change in activities on costs without the cost information provided by activity-based costing.

### **Behavioral and implementation issues**

Accountants cannot implement activity-based costing without becoming familiar with the operations of the company. In identifying activities, accountants team up with management and people from production, engineering, marketing, and other departments in identifying the activities that drive the company's costs. This often creates discomfort at first as accountants are forced to deal with unfamiliar areas; in the long run their familiarity with the company's operating activities can improve their contribution to the company. Nonaccounting personnel also feel a greater sense of ownership of the numbers reported by the accounting system so accounting improves its credibility among nonaccountants.

One of the problems encountered when implementing activity-based costing is the failure to get influential people in the organization to buy into the process. Accounting methods in companies are like rules in sports; people become accustomed to playing by the rules and oppose changing to something unknown.

For example, two analysts at one company spent several months of their time and hundreds of hours of computer time to develop an activity-based costing system. Their analysis revealed several hundred products that were clearly unprofitable and should be eliminated. However, the key managers who made product elimination decisions agreed to drop only about 20 products. Why? The analysts had failed to talk to these key managers early in the process. When presented with the final results, these managers raised numerous objections that the analysts had not anticipated. Moral: If you are involved in trying to make a change, get all of the people who are important to that change to buy into the process early.

### **Opportunities to improve activity-based costing in practice**

The use of activity-based costing in industry is relatively new. Companies are continually encountering limitations and finding ways to improve activity-based costing. A philosopher once said that our knowledge is like a circle; the more we know, the larger the circle. But the larger the circle, the greater its boundary and the more we realize the limits of our knowledge. Activity-based costing has shown managers they have much to learn about the cost of the activities required to make their products.

#### **Understanding the learning objectives**

- The new production environment refers to an environment in which company managers are concerned with (1) improving quality and (2) reducing costs. Accounting information can help managers assess the costs of quality and reduce the costs of making products.
- Three methods managers use to identify quality problems are control charts, Pareto diagrams, and cause and effect analyses.
- Knowing the four costs of quality—prevention, appraisal, internal failure, and external failure—can help managers minimize the cost of quality while providing high-quality products to customers.
- Four such measures are quality control, delivery performance, materials waste, and machine downtime.
- Managers can use benchmarking to focus attention on measuring how well one is doing against levels of performance either inside or outside of the organization.
- The balanced scorecard is a set of performance targets and results that show an organization's performance in meeting its stakeholder objectives.



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- JIT substantially reduces or eliminates the need for inventories and improves quality by eliminating the flexibility provided by inventories. Products must be produced properly the first time.
- Just-in-time accounting procedures normally debit all costs directly to cost of goods sold and bypass the usual inventory accounts. When it is necessary to report inventories in financial statements, the inventory amounts are backed out of the Cost of Goods Sold account.
- Activity-based costing is a costing method that assigns costs to activities and then to the products based on each product's use of activities. Activity-based costing is based on the premise that products consume activities; activities consume resources.
- Companies benefit from activity-based costing because managers have more detailed information about the cost of activities and better product cost information.
- First, identify the activities that consume resources and assign costs to those activities. Second, identify the cost drivers associated with each activity. Third, compute a cost rate per cost driver unit. Fourth, assign costs to products by multiplying the cost driver rate times the volume of cost driver units consumed by the product.
- In many companies, activity-based costing has revealed that low-volume, specialized products have been more costly than managers had realized.
- By focusing attention on activities that cause costs, activity-based management helps managers eliminate activities that consume resources, thereby becoming more efficient and competitive.

### Demonstration problem

To continue the text example, consider December 2011 for High Challenge Company. Recall that the departmental overhead rate for 2011 was USD 100 per machine-hour. The following information for December is available:

	<b>Touring bicycles</b>	<b>Mountain bicycles</b>
Machine-hours	2,000	1,000
Units	1,300	400
<b>Activities</b>		
1. Purchasing materials	10,000 pieces	10,000 pieces
2. Machine setups	15 setups	40 setups
3. Inspections	200 hours	400 hours
4. Running machines	2,000 hours	1,000 hours

Compute the costs in total and per unit for touring bicycle and mountain bicycle products using both the traditional method based on machine-hours to allocate overhead and the activity-based costing rates. The actual activity levels for December are given in this problem; however, you should use the rates presented earlier in the text. Do not assume that the total overhead assigned to products for December using activity-based costing necessarily equals the total overhead allocated using the departmental allocation rate. Assume the direct materials costs are USD 100 and USD 200 per unit for touring bicycles and mountain bicycles, respectively; and direct labor costs are USD 20 and USD 30 per unit, respectively. Production was 1,300 touring bicycles and 400 mountain bicycles. Round unit costs to the nearest dollar.

### Solution to demonstration problem

Overhead costs allocated to products using the traditional method:

Touring bicycles (\$100 x 2,000 machine-hours)	\$200,000
Mountain bicycles (\$100 x 1,000 machine-hours)	100,000

hours)  
Total \$300,000

Overhead costs assigned to products using activity-based costing:

Activity	Rate	Touring	Bicycles	Mountain	Bicycles
		Actual cost driver units	Cost allocated to product	Actual cost driver units	Cost allocated to product
1. Purchasing materials	\$2/piece	10,000 pieces	\$ 20,000	10,000 pieces	\$ 20,000
2. Machine setups	\$2,000/setup	15 setups	30,000	40 setups	80,000
3. Inspections	\$100/hour	200 hours	20,000	400 hours	40,000
4. Running machines	\$30/hour	2,000 hours	60,000	1,000	30,000
Total cost allocated to each product			\$ 130,000		\$ 170,000

Comparison of product costs using traditional costing and activity-based costing:

	Traditional Costing		Activity-based Costing	
	Touring bicycles	Mountain bicycles	Touring bicycles	Mountain bicycles
Direct materials	\$100	\$200	\$100	\$200
Direct labor	20	30	20	30
Overhead	154 <sup>a</sup>	250 <sup>b</sup>	100 <sup>c</sup>	425 <sup>d</sup>
Total	\$274	\$480	\$220	\$655

<sup>a</sup> \$154 = overhead cost allocation to products using departmental rate divided by number of units produced = \$200,000/1,300 units.

<sup>b</sup> \$250 = overhead cost allocation to products using departmental rate divided by number of units produced = \$100,000/400 units.

<sup>c</sup> \$100 = overhead cost allocation to products using activity-based costing divided by number of units produced = \$130,000/1,300 units.

<sup>d</sup> \$425 overhead cost allocation to products using activity-based costing divided by number of units produced = \$170,000/400 units.

## Key terms

**Activity-based costing** A costing method that first assigns costs to activities, then assigns costs to products based on their consumption of activities.

**Activity center** An activity center is a unit of the organization that performs some activity.

**Backflush costing** Backflush costing is a method of assigning costs to inventories backwards from Cost of Goods Sold to Work in Process or Finished Goods Inventory accounts.

**Balanced scorecard** A set of performance targets and results that show an organization's performance in meeting its responsibilities to various stakeholders.

**Benchmarking** Benchmarking is the continuous process of measuring how well one is doing against performance levels either inside or outside of the organization.

**Cause-and-effect analysis** Cause-and-effect analysis identifies potential causes of defects.

**Control charts** Control charts help managers distinguish between random or routine variations in quality and variations that they should investigate.

**Cost driver** A cost driver is an activity or transaction that causes costs to be incurred.

**Just-in-time (JIT) method** The just-in-time method manages purchasing and production so that materials are purchased just in time for production, parts are produced just when needed for the next step in the production process, and finished goods are completed just in time for sale.

**Pareto diagrams** Pareto diagrams indicate how frequently each type of failure occurs.

**Total quality management (TQM)** Defined as managing the entire organization so it excels in its goods and services that are important to the customer.

## Self-test

### True-false

Indicate whether each of the following statements is true or false.

In Texas Instruments' cost of quality program, the managers' task was to maximize the sum of prevention, appraisal, internal failure, and external failure costs.

Control charts are a means of distinguishing between random or routine variation in product quality and variations that managers should investigate.

The allocation of indirect costs is never arbitrary.

A cost driver is an activity or transaction that causes costs to be incurred.

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The formula for computing an indirect cost rate has the cost in the numerator and the volume of the cost driver or allocation base in the denominator.

### Multiple-choice

Select the best answer for each of the following questions.

The new production environment refers to an environment in which company managers are concerned with:

- a. Improving customer service and product quality.
- b. Reducing costs.
- c. Increasing government regulation.
- d. a and b above.
- e. All of the above.

Just-in-time production and purchasing methods:

- a. Must be used in conjunction with activity-based costing.
- b. Require government regulation.
- c. Eliminate the need for inventories in theory because production does not take place until it is known the item will be sold.
- d. Require the use of Pareto charts.
- e. All of the above.

UR Company has two products, U and R. Overhead costs are presently allocated to the two products based on the labor-hours used to produce each product. It takes one labor-hour to make one unit of each product. The chief financial officer has suggested converting to activity-based costing. She collected the data shown below for three cost drivers and activities to be used under activity-based costing:

Activity	Cost driver	Amount	Cost driver	
			U	R
Production	Number of setups	\$82,000	8	12
Quality control	Number of inspections	48,000	56	24
Packaging costs	Number of units produced	130,000	80,000	50,000
Total overhead		\$260,000		

What is the total overhead allocated to Product U using the current method of allocating overhead based on labor-hours (80,000 labor-hours for U and 50,000 labor-hours for R)?

- a. USD 113,600.
- b. USD 130,000.
- c. USD 146,400.
- d. USD 160,000.
- e. None of the above.

Refer to the facts for in the above question. What is the overhead per unit assigned to Product R using activity-based costing? (Round to the nearest cent.)

- a. USD 2.60.
- b. USD 2.27.
- c. USD 2.00.
- d. USD 1.83.
- e. None of the above.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- To what does the phrase new production environment refer?
- Explain the purpose of using control charts, Pareto diagrams, and cause and effect analyses. You may find it useful to use examples.
- Audio Company makes compact disc players. After producing a compact disc player, the company tests it, then scraps it because it does not work. Is this an example of an internal failure cost, an appraisal cost, or a prevention cost?
- A company's performance measure is the number of customer complaints. Why would the company measure the number of customer complaints?
- A company's performance measure is the percentage of time that machines are not working. Why would the company measure the percentage of time that the machines are not working?
- How could reducing materials waste during production improve the quality of products?
- What is benchmarking? Give an example of benchmarking that you might use.
- What is the benefit to American Airlines of benchmarking on-time airplane arrivals?
- How does just-in-time help assure quality of production?
- Elimination of inventories through a just-in-time (JIT) method is believed to result in different types of cost savings. Give an example of a type of savings from JIT.
- What is the difference between accounting for costs using a JIT method and using traditional cost flows through inventory accounts?
- What operating conditions are necessary for a company to make use of a JIT method?
- What is the difference between activity-based costing and activity-based management?
- Activity-based costing methods use four steps in computing a product's cost. What are these steps?
- "Activity-based costing is great for manufacturing plants, but does not really address the needs of the service sector." Do you agree with this statement? Explain.
- What is a cost driver? Give three examples.
- The vice president of marketing wonders how products can cost less under one cost system than under another. How would you respond to her question "Are not costs cut-and-dried?"
- A drawback to activity-based costing is that it requires more record-keeping and extensive teamwork between all departments. What are the potential benefits of a more detailed product cost system?
- Give three criteria for choosing cost drivers for allocating costs to products.
- "Activity-based costing is for accountants and production managers. I plan to be a marketing specialist so ABC will not help me." Do you agree with this statement? Explain.
- Observe the workings of a food service or coffee house. What activities are being performed? Give examples of some cost drivers that cause the cost of those activities. (For example, cooking food is an activity; the number of meals could be a cost driver for the cooking activity.)
- Observe the workings of a bank, credit union, or savings and loan institution. What activities are being performed? Give examples of some cost drivers that cause the cost of those activities. (For

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example, opening checking accounts is an activity; the number of accounts opened could be a cost driver for the opening accounts activity.)

- Activity-based costing assigns costs to activities that consume resources and to the products based on each product's use of activities. What is a benefit of this approach compared to a traditional approach that allocates costs to products based on the machine-hours used to produce the product?
- What is a balanced scorecard?
- **Real world question** Refer to the discussion “A broader perspective: HP” of the impact of just-in-time on accounting methods at HP. What effect did the implementation have on the HP plant's accounting methods?
- **Real world question** Why might Domino's Pizza make such a big deal out of delivering pizzas within 30 minutes?

### Exercises

**Exercise A** Classify Curly Company's costs for a typical month into prevention costs, appraisal costs, internal failure costs, and external failure costs:

Inspection at the end of the production process	\$10,000
Scrap	9,000
Design work to improve the way products are made	12,000
Cost of customer complaints	20,000
Employee training	6,000
Incoming materials inspection	5,000

Suppose Curly Company could increase employee training by USD 7,500 per month, and thereby reduce internal failure and external failure costs by 20 per cent each per month. (Appraisal costs would not be affected.) Would this be a wise thing for Curly Company to do?

**Exercise B** You have been hired by a food service organization on campus to help assess the quality of food services in the student union building. The following food service information is for the month of February:

Customer complaints	60
Waste as a percentage of total food prepared	10%
Cases of food poisoning	2

What additional information would you like to have to assess the quality of the food service organization's performance?

**Exercise C** Network, Inc., manufactures networking devices for personal computer systems, using just-in-time methods. After receiving an order for 300 devices, the company bought materials (for cash) costing USD 14,000 to fill this order. It incurred labor and overhead costs of USD 48,000, of which USD 10,000 was for wages and the rest overhead.

After the production was finished, but before all goods were sold, the company needed to compute an inventory cost for financial statement purposes. The cost of finished goods inventory was USD 2,480.

- a. Use T-accounts to show the flow of costs under a traditional costing system.
- b. Prepare journal entries for these transactions using backflush costing.
- c. Use T-accounts to show the flow of costs using a JIT system with backflush costing.

**Exercise D** Quality Sound Corporation produces two types of compact discs (CDs), one is to install on touring bicycles and the other is a high-grade product for home and car use. The touring bicycles' CDs are designed for

durability rather than accurate sound reproduction. The company only recently began producing the high-grade disc. Management believes the accounting system may not be accurately allocating costs to products.

Management asked you to investigate the cost allocation problem. You found that manufacturing overhead is currently assigned based on the direct labor costs in the products. For your investigation, you are using data from last year. Last year's manufacturing overhead was USD 440,000 based on production of 320,000 touring bicycle CDs and 100,000 high-grade CDs. Direct labor and direct materials costs were as follows:

	<b>Touring bicycle</b>	<b>High grade</b>	<b>Total</b>
Direct labor	\$180,000	\$60,000	\$240,000
Materials	120,000	112,000	232,000

Management believes three activities cause overhead costs. The cost drivers and related costs for your analysis are as follows:

<b>Cost drivers</b>	<b>Cost assigned</b>	<b>Activity Touring bicycle</b>	<b>Level High grade</b>	<b>Total</b>
Number of production runs	\$200,000	40	10	50
Quality tests performed	180,000	12	18	30
Shipping orders processed	60,000	100	50	150
Total overhead	\$440,000			

a. How much of the overhead would be assigned to each product if the three cost drivers are used to allocate overhead? What would be the cost per unit (including materials, labor, and overhead) for each product if overhead is assigned to products using the three cost drivers?

b. How much of the overhead would be assigned to each product if direct labor costs had been used as the basis for allocating overhead to each product? What would be the cost per unit (including materials, labor, and overhead) for each product if overhead is allocated to products using direct labor cost as the allocation base?

**Exercise E** Landscape, Inc., is a lawn and garden service. The company originally specialized in serving small residential clients; recently it has started contracting for work on larger office building grounds.

Employees worked a total of 10,000 hours last year, 6,500 on residential jobs and 3,500 on commercial jobs. Wages amounted to USD 10 per hour for all work done. Materials used are included in overhead and called supplies. All overhead is allocated on the basis of labor-hours worked, which is also the basis for customer charges. Landscape, Inc., can charge USD 30 per hour for residential work but, because of greater competition for commercial accounts, only USD 20 per hour for commercial work.

a. Using labor-hours as the basis for allocating overhead, what was the gross margin (revenues minus labor and overhead expense) for (1) commercial and (2) residential service? Assume overhead was USD 50,000.

b. Overhead consists of transportation, lawn mowing and landscaping equipment costs, depreciation on equipment, supplies, fuels, and maintenance. These costs can be traced to the following activities:

<b>Activity</b>	<b>Cost driver</b>	<b>Cost</b>	<b>Activity Commercial</b>	<b>Level Residential</b>
Transportation	Clients served	\$10,000	15	45
Equipment costs:				
Fuel, maintenance, depreciation	Equipment hours	25,000	3,000	2,000
Supplies	Square yards serviced per year	15,000	100,000	50,000
Total overhead		\$50,000		

Recalculate gross margin for commercial and residential services based on these cost driver bases.

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c. Would you advise Landscape, Inc., to drop either the residential or commercial service based on your analysis? Explain.

### Problems

**Problem A** Here are cost items from Huskie Company's accounts for a typical month:

Inspection at the end of the production process	\$80,000
Cost of returned goods	36,000
Design work to improve the way products are made	48,000
Repairs to satisfy customer complaints	20,000
Employee training	24,000
Incoming materials inspection	20,000
Scrap	36,000

- Classify these items into prevention costs, appraisal costs, internal failure costs, and external failure costs.
- Suppose Huskie Company could spend an additional USD 40,000 per month on design work to improve the way products are made, and thereby reduce internal failure and external failure costs by 30 per cent each per month. (Appraisal costs would not be affected.) Would this be a wise thing for Huskie Company to do?
- Give two examples of additional nonfinancial quality measures that Huskie Company could use to help improve quality. (Hint: See Exhibit 159.)

**Problem B** You have been hired by Bucks 'R' Us Bank to help assess the quality of their services. This information is for the month of March:

Customer complaints	60
Average customer waiting time	22 minutes
Number of lost files	2
Lawsuits filed against the bank	1

What additional information would you like to have to assess the quality of the bank's performance?

**Problem C** Heatseek Precision Instruments produces sensitive heat measurement meters. The company has a large backlog of orders and no beginning inventories because all units in production last year were sold by the end of the year. At the start of this year, an order was received for 2,000 meters.

The company purchased and used USD 105,000 of materials in production for this order. Direct labor costs of USD 320,000 were incurred, and overhead costs of USD 520,000 were applied. Goods representing 10 per cent of these costs were still in finished goods inventory at the end of the period.

- Use T-accounts to show the flow of costs under a traditional costing system.
- Prepare journal entries for these transactions using backflush costing.
- Use T-accounts to show the flow of costs using a JIT system with backflush costing.

**Problem D** C & W Corporation manufactures travel clocks and watches. Overhead costs are currently allocated using direct labor-hours, but the controller has recommended using an activity-based costing system based on the following data:

Activity	Cost driver	Cost	Activity Level	
			Travel clocks	Watches
Production setup	Setups	\$100,000	20	30
Material handling and requisition	Parts	30,000	24	36
Packaging and shipping	Units shipped	60,000	80,000	120,000
Total overhead		\$190,000		

- Compute the amount of total overhead allocated to each of the products under activity-based costing.

b. Compute the amount of total overhead allocated to each product using labor-hours as the allocation base. Assume labor-hours required to assemble each unit are .5 per travel clock and 1.0 per watch, and that 80,000 travel clocks and 120,000 watches were produced.

c. Should the company follow the controller's recommendations?

**Problem E** Sunshield Company makes three types of sunglasses: Nerds, Stars, and Fashions. Sunshield presently allocates overhead to products using a rate based on direct labor-hours. A consultant recommended that Sunshield switch to activity-based costing. Management decided to give ABC a try and identified the following activities, cost drivers, and costs for a typical year for each activity center. Use this information to compute the overhead rates for each cost driver.

Activity	Recommended cost driver	Costs	Cost driver units
Production setup	Production runs	\$ 30,000	100
Order processing	Orders	50,000	200
Materials handling	Pounds of materials used	20,000	8,000
Equipment depreciation and maintenance	Machine-hours	60,000	10,000
Quality management	Inspections	50,000	40
Packing and shipping	Units shipped	40,000	20,000
Total overhead		\$250,000	

In addition, there are 2,500 direct labor-hours in a typical year.

Assume the following activities occurred in February of 2011:

	Nerds	Stars	Fashions
Units produced	1,000	500	400
Direct materials costs	\$4,000	\$2,500	\$2,000
Direct labor-hours	100	100	89
Orders	8	8	4
Production runs	2	4	8
Pounds of material	400	200	200
Machine-hours	500	300	300
Inspections	2	2	2
Units shipped	1,000	500	300

Direct labor costs are USD 15 per hour.

a. Compute an overhead allocation rate (1) for each of the cost drivers recommended by the consultant and (2) for direct labor.

b. Management wants to compare the product costs using ABC and the traditional method for the month of February. Compute the production costs for each product for February using direct labor-hours as the allocation base. (Note: Production costs are direct materials, direct labor, and overhead.)

c. To derive product costs under ABC, compute the production costs for each product for February using the cost drivers recommended by the consultant.

d. Management has seen your numbers and wants to know how you account for the discrepancy between the product costs using direct labor-hours as the allocation base and using activity-based costing. Write a brief response to management.

**Problem F** Filmworks Photography offers two types of services, student portraits and family portraits. Last year, Filmworks had the following costs and revenues:

Filmworks Photography Income statement		
Deluxe	Family	Total



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<b>Revenue</b>	\$180,000	\$200,000	\$380,000
Direct materials	25,000	25,000	50,000
Direct labor	90,000	60,000	150,000
Indirect costs:			
Administration	-----	-----	25,000
Production setup	-----	-----	50,000
Quality control	-----	-----	25,000
Marketing	-----	-----	20,000
Operating profit			\$60,000

Filmworks Photography currently uses labor costs to allocate all overhead, but management is considering implementing an activity-based costing system. After interviewing the sales and production staff, management decides to allocate administrative costs on the basis of direct labor costs and to use the following bases to allocate the remaining overhead:

Activity	Cost driver	Cost driver	Units
		Student	Family
Production setup	Photo sessions	150	250
Quality control	Customer inspections	300	200
Marketing	Advertisements	60	40

- Complete the income statement using these activity bases.
- Write a report describing how management might use activity-based costing to reduce costs.
- Restate the income statement for Filmworks Photography using direct labor costs as the only overhead allocation base.
- Write a report to management stating why product line profits differ using activity-based costing compared to the traditional approach. Indicate whether the activity-based costing method provides more accurate information and why (if you believe it does provide more accurate information). Indicate in your report how the use of labor-based overhead allocation could result in Filmworks Photography management making suboptimal decisions.

### Alternate problems

**Alternate problem A** These cost items are from Rocket Company's accounts for a typical month:

Design work to improve the way products are made	\$48,000
Warranty work to satisfy customer complaints	24,000
Employee training	36,000
Incoming materials inspection	40,000
Scrap	36,000
Cost of returned goods	48,000
Inspection at the end of the production process	60,000

- Classify these items into prevention costs, appraisal costs, internal failure costs, and external failure costs.
- Suppose Rocket Company could spend an additional USD 40,000 per month on incoming materials inspection, and thereby reduce internal failure and external failure costs by 20 per cent each per month. Would this be a wise thing for Rocket Company to do?
- Give two examples of additional nonfinancial quality measures that Rocket Company could use to help improve quality. (Hint: See Exhibit 159.)

**Alternate problem B** You have been hired by Student Health Services to help assess the quality of their services. You have been looking over the following information for the month of May:

Number of patient complaints	120
Minutes the average patient waits	3.8
Cases of missed diagnosis	4

What additional information would you like to have to assess the quality of the organization's performance?

**Alternate problem C** Precision Instruments produces high-tech devices. The company has a large backlog of orders and had no beginning inventories because all units in production last year were sold by the end of the year. At the start of this year, the firm received an order for 6,000 items.

The company purchased and used USD 200,000 of materials in production for this order. Direct labor costs of USD 150,000 and overhead costs of USD 400,000 were incurred. Goods representing 10 per cent of these costs were still in finished goods inventory at the end of the period.

- Use T-accounts to show the flow of costs under a traditional costing system.
- Prepare journal entries for these transactions using backflush costing.
- Use T-accounts to show the flow of costs using a JIT system with backflush costing.

**Alternate problem D** The manager of Rafting Excursions uses activity-based costing to compute the costs of her raft trips. Each raft holds six paying customers and a guide. She offers two types of raft trips, a three-day float trip for beginners, and a three-day white-water trip for seasoned rafters. The breakdown of costs is as follows:

Activities (with cost drivers)	Costs per float trip	Costs per white-water trip
Advertising (trips)	\$430	\$430
Permit to use the river (trips)	60	100
Equipment use (trips, people)	40 + 10 per person	80 + \$16 per person
Insurance (trips)	150	300
Paying guide (trips, guides)	600 per guide	800 per guide
Food (people)	120 per person	120 per person

- Compute the cost of a 28-person (including guides) float trip with four rafts and four guides.
- Compute the cost of a 28-person (including guides) white-water trip with four rafts and four guides.
- How much should the manager charge each customer if she wants to cover her costs?

**Alternate problem E** Shoe Express, Inc., manufactures two types of shoes, B-Ball and Marathon. The B-Ball shoe has a complex design that uses gel-filled compartments to provide support. The Marathon shoe is simpler to manufacture and uses conventional foam padding. Last year, Shoe Express had the following revenues and costs:

	Shoe Express, Inc. Income Statement		
	B-Ball	Marathon Total	
Revenue	\$390,000	\$368,000	\$758,000
Direct materials	110,000	100,000	210,000
Direct labor	80,000	40,000	120,000
Indirect costs:			
Administration	-----	-----	40,000
Production setup	-----	-----	90,000
Quality control	-----	-----	60,000
Advertising	-----	-----	120,000
Net income before taxes			\$118,000

Shoe Express currently uses labor costs to allocate all overhead, but management is considering implementing an activity-based costing system. After interviewing the sales and production staff, management decides to allocate administrative costs on the basis of direct labor costs, but to use the following bases to allocate the remaining overhead:

Activity	Cost drivers	Activity Level	
		B-ball	Marathon
Production setup	Production runs	20	20
Quality control	Inspections	40	20
Advertising	Advertisements	12	48

- Complete the income statement using these activity bases.
- Write a brief report indicating how management could use activity-based costing to reduce costs.

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c. Restate the income statement for Shoe Express, Inc., using direct labor costs as the only overhead allocation base.

d. Write a report to management stating why product line profits differ using activity-based costing compared to the traditional approach. Indicate whether the activity-based costing method provides more accurate information and why (if you believe it does provide more accurate information). Indicate in your report how the use of labor-based overhead allocation could result in Shoe Express management making suboptimal decisions.

### Beyond the numbers—Critical thinking

**Business decision case A** Many companies recognize that their cost systems are inadequate for today's global market. Managers in companies selling multiple products are making important product decisions based on distorted cost information.

Write a short paper describing the benefits management should expect from implementing activity-based costing.

**Business decision case B** A company that makes Halloween costumes is considering using just-in-time purchasing and production methods. Write a short paper describing the problems this company might face in using just-in-time.

**Business decision case C** Managers at Texas Instruments developed these four cost-of-quality categories: prevention costs, appraisal costs, internal failure costs, and external failure costs. Give an example of a cost for each of these four categories. Would minimizing the sum of these four costs assure high-quality products? Why or why not? Write a short paper summarizing your analysis.

**Group project D** The chapter listed the following six important points to remember about activity-based costing. Following each point are the comments of a cynic in italics. After forming six groups, discuss one of these points in each group. How would you respond to the cynic's comments? (It is okay to agree; even cynics have good points to make.) Choose one group member to report your group's response to the class.

- The allocation of indirect costs is at least somewhat arbitrary, even using sophisticated accounting methods. (*"This means no method gives you a true cost; all are arbitrary. So why go to the trouble of implementing ABC?"*)
- Activity-based costing provides more detailed measures of costs than traditional allocation methods. (*"Who needs more detail? Life is already too complicated".*)
- Activity-based costing can help marketing people by providing more accurate product cost numbers for decisions about pricing and which unprofitable products the company should eliminate. (*"Why should accountants want to help marketing people?"*)
- Production also benefits because activity-based costing provides better information about the cost of each activity. In practice, ABC helps managers identify cost causing activities. To manage costs, production managers learn to manage the activities that cause costs. (*"If production people know their jobs, they do not need help from accountants".*)
- Activity-based costing provides more information about product costs than traditional methods but requires more record-keeping. Managers must decide whether the benefits of improved decisions justify the additional record-keeping cost. (*"ABC sounds like a lot of work. Why bother?"*)

- Installing activity-based costing requires teamwork among accountants, production managers, marketing managers, and other nonaccounting people. ("You will never get these people to work together. Accountants and marketing people? You have got to be kidding!")

**Group project E** Form a group of three or four students and assume you are hired as business consultants for each of the cases below. Respond to each of the comments made in case 1 and case 2. Your response should assume you are talking directly to the CEO. State whether you agree or disagree with the statement and justify your response. (Hint: Consider the potential costs and benefits associated with each case.)

Case 1 Your group is meeting with the CEO of a relatively small company that produces one model of bicycles. After lengthy discussion regarding the company's costing system, the CEO makes the following statement: "From what I have seen at other companies lately, activity-based costing is the wave of the future. Everyone, including us, should drop existing cost systems and adopt ABC!"

Case 2 Your group is meeting with the CEO of a relatively large company that produces hundreds of expensive custom computers. After lengthy discussion regarding the company's costing system, the CEO makes the following statement: "From what I have seen at other companies lately, activity-based costing is the wave of the future. Everyone, including us, should drop existing cost systems and adopt ABC!"

**Group project F** In teams of two or three, interview the manager of a retail (or wholesale) store such as a music store, an automobile parts store, or the parts department of an appliance dealership. Ask the manager how items are ordered to replace those sold. For example, does he or she order based on observing inventory levels or place an order each time a customer buys an item? Does he or she appear to use just-in-time inventory? Write a memorandum to the instructor summarizing the results of the interview. Information contained in the memo should include:

Date:

To:

From:

Subject:

Content of the memo must include the name and title of the person interviewed, name of the company, date of the interview, and the results of the interview.

**Group project G** In teams of two or three, observe an organization of your choice—wholesale, retail, or service. Give examples of warning and diagnostic signals the organization uses. How could it use control charts, Pareto charts, and cause-and-effect analysis?

#### Using the Internet—A view of the real world

The Malcolm Baldrige National Quality Award is awarded to companies meeting certain quality standards and criteria. This award is issued annually by the National Institute of Standards and Technology (NIST). Visit the following website:

<http://www.baldrige.nist.gov>

Click on "Criteria and their Impact". What criteria are used as a basis for making awards to applicants? Click on "Winners Showcase". Who were the most recent winners of the Baldrige Award? What products or services do these companies provide?

Based on the results of the previous Internet project, perform an Internet search to find at least one recent Baldrige Award winning company. Does the company provide information on the Internet about being the recipient

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of the award? If so, write a report summarizing this information. If not, search for a recent award winner that does provide this information, and write a report summarizing the information provided.

### Answers to self-test

#### True-false

**False.** The managers' task is to minimize these costs, not maximize them.

**True.** Control charts are a means of distinguishing between random or routine variations in product quality and variations that managers should investigate.

**False.** To the contrary, the allocation of indirect costs is, by definition, at least somewhat arbitrary.

**True.** A cost driver is an activity or transaction that causes costs to be incurred.

**True.** The formula for computing an indirect cost rate has the cost in the numerator and the volume of the cost driver or allocation base in the denominator.

#### Multiple-choice

**d.** The new production environment refers to an environment in which company managers are concerned with improving customer service and product quality, and reducing costs.

**c.** Production does not begin on an item until an order is received.

**d.** USD 160,000

$\text{USD } 260,000 / (80,000 \text{ hours} + 50,000 \text{ hours}) = \text{USD } 2$ .  $\text{USD } 2 \times 80,000 \text{ hours} = \text{USD } 160,000$ .

**b.** USD 2.27

First find the rates:

$$\frac{\text{USD } 82,000}{(8+12)} = \text{USD } 4,100. \quad \frac{\text{USD } 48,000}{(56+24)} = \text{USD } 600.$$

$$\frac{\text{USD } 130,000}{(80,000+50,000)} = \text{USD } 1.$$

Next assign overhead to Product R:

$(\text{USD } 4,100 \times 12) + (\text{USD } 600 \times 24) + (\text{USD } 1 \times 50,000) = \text{USD } 49,200 + \text{USD } 14,400 + \text{USD } 50,000 = \text{USD } 113,600$ .

Now find the unit cost:

$$\frac{\text{USD } 113,600}{50,000 \text{ units}} = \text{USD } 2.27.$$

# 21. Cost-volume-profit analysis

## Learning objectives

After studying this chapter, you should be able to:

- Explain and describe cost behavior patterns.
- Separate mixed costs into fixed and variable components using the scatter diagram and high-low method.
- Explain the relationship among costs, volume, revenue, and profits.
- Find the break-even point.
- Compute the margin of safety.
- Demonstrate applications of cost-volume-profit analysis.
- List the assumptions underlying cost-volume-profit analysis.
- Describe how computer spreadsheets expand your capability to use cost-volume-profit analysis.
- Describe the impact of automation on fixed-variable cost relationships.

## A manager's perspective

### **Renee Vaughn**

*Manager, Administration and Special Projects*

*Public and Media Relations*

*The Coca-Cola Company*

I am responsible for providing scheduling and assisting with staffing with the Public and Media Relations group. This requires anticipating needs for the group and planning accordingly. I also administer budgets for three departments (about 35 employees).

I began my professional career in an elementary school district administration office, serving as an administrative assistant for the superintendent of schools. I learned to plan and manage budgets in that capacity. At The Coca-Cola Company, once a budget is created at the departmental level, it is tracked on a monthly basis by reviewing all spending by account and in total. We also review a rolling estimate of annual expenses and adjust the budget accordingly.

We plan for non-project capital budgeting a year in advance, which enables us to order computer, fax, and other office equipment as well as make other necessary major purchases. If an unforeseen need develops, we will review our plan and make revisions as necessary on a case-by-case basis.

Assume that a student organization wants to show movies on campus. The organization can rent a particular movie for one weekend for USD 1,000. Rent for an auditorium, salaries for ticket takers and other personnel, and other fixed costs would amount to USD 800 for the weekend. The organization would sell tickets for USD 4 per person. In addition, profits from the sale of soft drinks, popcorn, and candy are estimated to be USD 1 per ticket

## 21. Cost-volume-profit analysis

holder. How many people would have to buy tickets to justify renting the movie? (The answer is 360 ticket-buyers as shown in the solution to Demonstration problem at the end of this chapter.)

Solving problems like this requires an understanding of the relationship between costs, revenue, and volume. This chapter discusses the use of cost-volume-profit analysis for decision making and planning. (Although accountants call this topic cost-volume-profit analysis, it could just as easily have been called cost-volume- revenue analysis.) All of the analysis in this chapter is on a before-tax basis.

In this chapter we will focus on short-run decisions. The term **short run** describes a time frame during which a company's management cannot change the effects of certain past decisions. The short run is one year or less for practical purposes. For example, GM's decision to offer a special rebate starting January 5 and expiring on January 31 would be a short-run decision. In contrast, GM's decision to begin producing cars in China .

In the short run, we assume many costs are fixed and unchangeable, such as building rental expense. However, all costs are subject to change in the long run. Although we identify particular costs as fixed in this chapter, you should realize that costs fixed in the short run may change in the long run. Someday the building rental agreement will change, so the building rental expense will change.

### Cost behavior patterns

Exhibit 166 shows four basic cost behavior patterns: fixed, variable, mixed (semivariable), and step. As discussed in earlier chapters, **fixed costs** remain constant (in total) over some relevant range of output. Often, we describe them as time-related costs. Depreciation, insurance, property taxes, and administrative salaries are examples of fixed costs. Recall that so-called fixed costs are fixed in the short run but not necessarily in the long run.

For example, a local high-tech company did not lay off employees during a recent decrease in business volume because the management did not want to hire and train new people when business picked up again. Management treated direct labor as a fixed cost in this situation. Although volume decreased, direct labor costs remained fixed.

#### Illustration 21.1 Four Cost Patterns

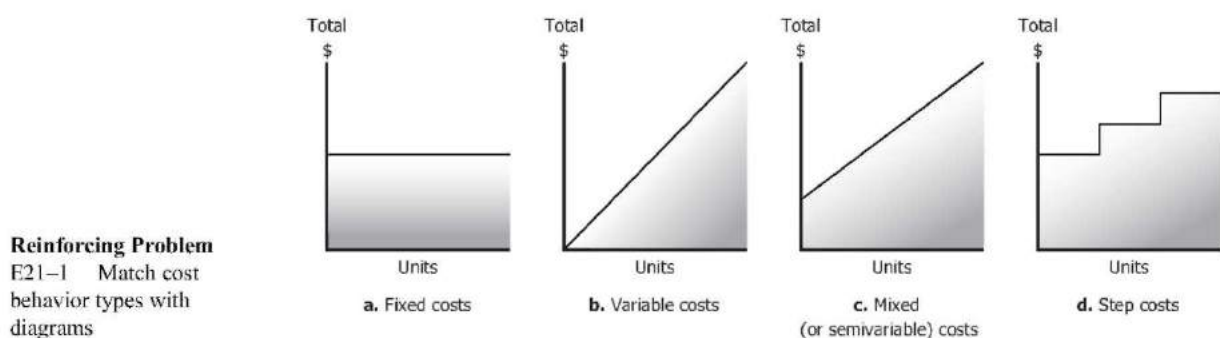


Exhibit 166: Four cost patterns

In contrast to fixed costs, **variable costs** vary (in total) directly with changes in volume of production or sales. In particular, total variable costs change as total volume changes. If pizza production increases from 100 10-inch

pizzas to 200 10-inch pizzas per day, the amount of dough required per day to make 10-inch pizzas would double. The dough is a variable cost of pizza production. Direct materials and sales commissions are variable costs.

Direct labor is a variable cost in many cases. If the total direct labor cost increases as the volume of output increases and decreases as volume decreases, direct labor is a variable cost. Piecework pay is an excellent example of direct labor as a variable cost. In addition, direct labor is frequently a variable cost for workers paid on an hourly basis, as the volume of output increases, more workers are hired. However, sometimes the nature of the work or management policy does not allow direct labor to change as volume changes and direct labor can be a fixed cost.

Mixed costs have both fixed and variable characteristics. A **mixed cost** contains a fixed portion of cost incurred even when the facility is idle, and a variable portion that increases directly with volume. Electricity is an example of a mixed cost. A company must incur a certain cost for basic electrical service. As the company increases its volume of activity, it runs more machines and runs them longer. The firm also may extend its hours of operation. As activity increases, so does the cost of electricity.

Managers usually separate mixed costs into their fixed and variable components for decision-making purposes. They include the fixed portion of mixed costs with other fixed costs, while assuming the variable part changes with volume. Look at Exhibit 167 to see how to separate the fixed and variable portions of a mixed cost such as electricity.

#### Illustration 21.2 Separation of Mixed Costs into Fixed and Variable Parts

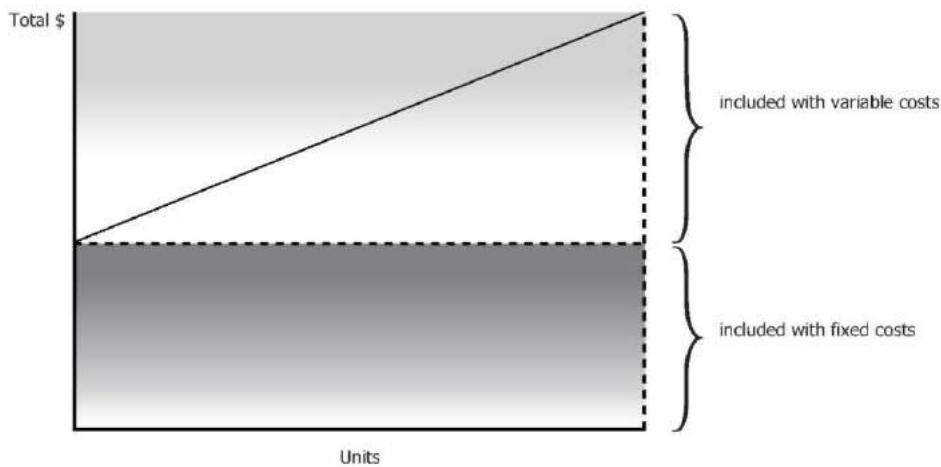


Exhibit 167: Separation of mixed costs into fixed and variable parts

A **step cost** remains constant at a certain fixed amount over a range of output (or sales). Then, at certain points, the step costs increase to higher amounts. Visually, step costs appear like stair steps, as shown in Exhibit 166.

Supervisors' salaries are an example of a step cost when companies hire additional supervisors as production increases. For instance, the local McDonald's restaurant has one supervisor until sales exceed 100 meals during the lunch hour. If sales regularly exceed 100 meals during that hour, the company adds a second supervisor. In Exhibit 168, we show a step cost for supervisors' salaries, assuming each supervisor is paid USD 2,000 per month. Step costs are sometimes labeled as step variable costs (many small steps) or step fixed costs (only a few large steps).



## 21. Cost-volume-profit analysis

### Illustration 21.3 A Step Cost

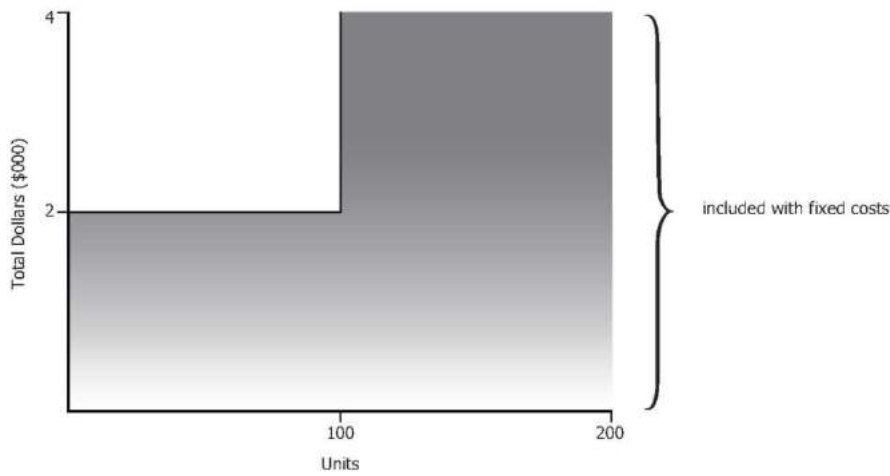


Exhibit 168: A step cost

Although we have described four different cost patterns (fixed, variable, mixed, and step), we simplify our discussions in this chapter by assuming managers can separate mixed and step costs into fixed and variable components.

Many costs do not vary in a strictly linear relationship with volume. Rather, costs may vary in a curvilinear pattern—a 10 per cent increase in volume may yield an 8 per cent change in total variable costs at lower output levels and an 11 per cent change in total variable costs at higher output levels. We show a curvilinear cost pattern in Exhibit 169.

### Illustration 21.4 Curvilinear Cost Pattern

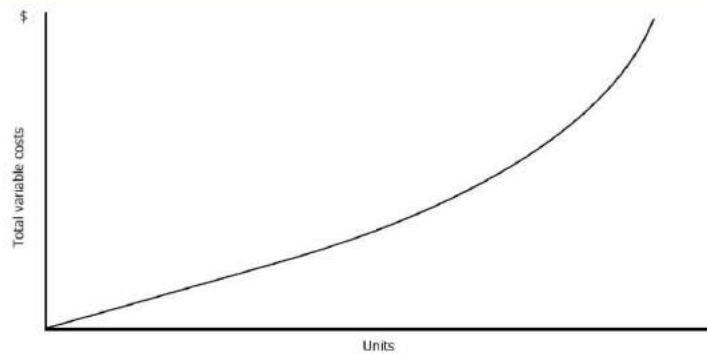


Exhibit 169: Curvilinear cost pattern

One way to deal with a curvilinear cost pattern is to assume a linear relationship between costs and volume within some relevant range. The **relevant range** is the range of production or sales volume over which the assumptions about cost behavior are valid. Look at Exhibit 170 to see how to apply the relevant range to a portion of the curvilinear cost curve. Within that relevant range, the total cost varies linearly with volume, at least approximately. Outside of the relevant range, we presume the assumptions about cost behavior may be invalid.

**Illustration 21.5 Relevant Range**

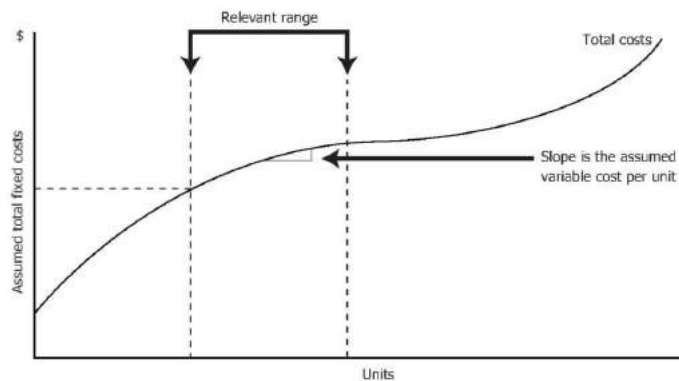


Exhibit 170: Relevant range

Costs rarely behave in the simple way that would make life easy for decision makers. Even within the relevant range, the assumed cost behavior is usually only approximately linear. As decision makers, we have to live with the fact that cost estimates are not as precise as physical or engineering measurements.

### Methods for analyzing costs

You can use several methods to break down a mixed cost into its fixed and variable cost components. We present two of these methods—the scatter diagram and the high-low method.

A **scatter diagram** shows plots of actual costs incurred for various levels of activity. Assume the dots on the scatter diagram in Exhibit 171 represent total actual maintenance costs per month for a Federal Express fleet of delivery trucks. Each dot represents one month's activity for one city. For example, the left point represents a USD 38,000 cost for approximately 30,000 miles a month. The next point to the right represents USD 42,000 for approximately 40,000 miles for another month. We drew a line that appears to best fit the pattern of dots. The line we drew is subjective. If you were to draw such a line, your line would probably differ from ours.

Estimating fixed and variable costs using a scatter diagram is subjective. If your line through the dots in Exhibit 171 differs from ours, you would estimate different fixed and variable costs. Your line and cost estimates would not necessarily be right or wrong compared to ours, just different.

## 21. Cost-volume-profit analysis

### Illustration 21.6 Scatter Diagram

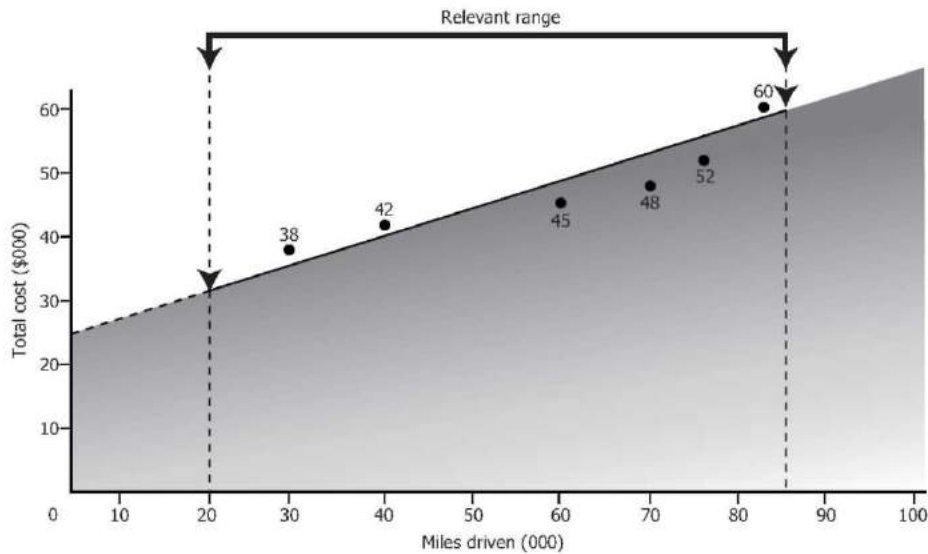


Exhibit 171: Scatter diagram

In Exhibit 171, our line intersects the vertical axis at USD 25,000, which we estimate to be the fixed portion of the mixed cost. We estimate the line would pass through a point representing a cost of USD 57,000 at a volume of 80,000 miles. Thus, our line rises from USD 25,000, representing 0 (zero) miles, to USD 57,000 over a volume of 80,000 miles on the horizontal axis. Based on that information, we can now compute the variable cost portion of the mixed cost as follows:

$$\frac{\text{USD } 57,000 - \text{USD } 25,000}{80,000 \text{ miles} - 0 \text{ miles}} = \text{USD } 0.40 \text{ per mile}$$

Using this result, we estimate the company's truck maintenance costs are USD 25,000 per month plus 40 cents for every mile driven.

You can also use the **high-low method** to identify the elements of mixed costs. This method uses only the highest and lowest points (levels of operation) on a scatter diagram to fit a line to the data.

To illustrate, the lowest point in Exhibit 171, is USD 38,000 of expense at 30,000 miles driven, and the highest point is USD 60,000 at 80,000 miles. Calculate the amount of variable cost per mile as follows:

$$\frac{\text{Change for cost}}{\text{Change for units}} = \frac{\text{USD } 60,000 - \text{USD } 38,000}{80,000 \text{ miles} - 30,000 \text{ miles}} = \frac{\text{USD } 22,000}{50,000 \text{ miles}} = \text{USD } 0.44 \text{ per mile}$$

To compute the fixed portion:

Total cost at 80,000 miles	\$60,000
Less: Variable cost at that level of output (80,000 × \$0.44)	35,200
Fixed cost at all levels of mileage within the relevant range	\$24,800

The high-low method is less precise than the scatter diagram because it uses only two data points in the computation. Either or both points may not be representative of the data as a whole.

Many people use more sophisticated statistical techniques to divide mixed costs into fixed and variable portions. Statistics and cost accounting texts discuss these techniques.

Now that you understand cost patterns and how to analyze costs, we will apply these concepts to the specific tools that managers use in short-term decision making. The first of these tools is cost-volume-profit (CVP) analysis.

### Cost-volume-profit (CVP) analysis

Companies use **cost-volume-profit (CVP) analysis** (also called break-even analysis) to determine what affects changes in their selling prices, costs, and/or volume will have on profits in the short run. A careful and accurate cost-volume-profit (CVP) analysis requires knowledge of costs and their fixed or variable behavior as volume changes.

A **cost-volume-profit chart** is a graph that shows the relationships among sales, costs, volume, and profit. Look at Exhibit 172, a cost-volume-profit chart for Video Productions, a company that produces videotapes. Each tape sells for USD 20. The variable cost per tape is USD 12, and the fixed costs per month are USD 40,000.

The total cost line in Exhibit 172 represents the fixed costs of USD 40,000 plus USD 12 per unit. Thus, if Video Productions produces and sells 6,000 tapes, the company's total costs are USD 112,000, made up of USD 40,000 fixed costs and USD 72,000 total variable costs (USD 72,000 = USD 12 per unit X 6,000 units produced and sold).

The total revenue line in Exhibit 172 shows how revenue increases as volume increases. Total revenue is USD 120,000 for sales of 6,000 tapes (USD 120,000 = USD 20 per unit X 6,000 units sold). In Exhibit 172, we demonstrate the effect of volume on revenue, costs, and net income, for a particular price, variable cost per unit, and fixed cost per period.

**Illustration 21.7** The Cost-Volume-Profit Chart

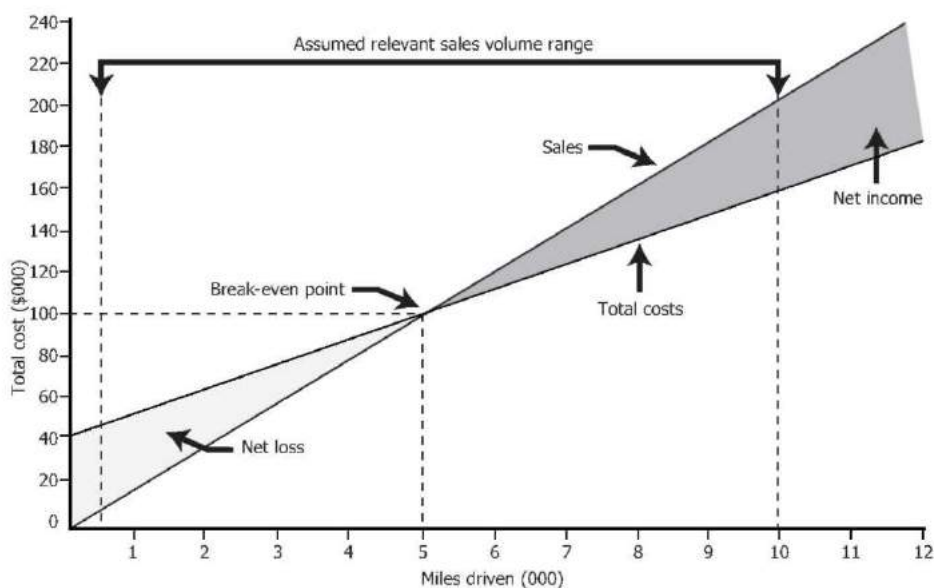


Exhibit 172: The cost-volume-profit chart

At each volume, one can estimate the company's profit or loss. For example, at a volume of 6,000 units, the profit is USD 8,000. We can find the net income either by constructing an income statement or using the profit equation. The income statement gives the following results for a volume of 6,000 units:

Revenue    \$120,000

## 21. Cost-volume-profit analysis

Less: variable costs	72,000
Contribution margin	\$ 48,000
Less: Fixed costs	40,000
Net income	\$ 8,000

We have introduced a new term in this income statement—the contribution margin. The **contribution margin** is the amount by which revenue exceeds the variable costs of producing that revenue. We can calculate it on a per unit or total sales volume basis. On a per unit basis, the contribution margin for Video Productions is USD 8 (the selling price of USD 20 minus the variable cost per unit of USD 12).

The contribution margin indicates the amount of money remaining after the company covers its variable costs. This remainder contributes to the coverage of fixed costs and to net income. In Video Production's income statement, the USD 48,000 contribution margin covers the USD 40,000 fixed costs and leaves USD 8,000 in net income.

**Profit equation** The profit equation is just like the income statement, except it presents the analysis in a slightly different form. According to the **profit equation**:

$$\text{Net income} = \text{Revenue} - \text{Total variable costs} - \text{Fixed costs}$$

For Video Productions, the profit equation looks like this:

$$\text{Net income} = \text{USD } 120,000 - \text{USD } 72,000 - \text{USD } 40,000$$

$$\text{Net income} = \text{USD } 8,000$$

Exhibit 172 shows cost data for Video Productions in a relevant range of output from 500 to 10,000 units. Recall the relevant range is the range of production or sales volume over which the basic cost behavior assumptions hold true. For volumes outside these ranges, costs behave differently and alter the assumed relationships. For example, if Video Productions produced and sold more than 10,000 units per month, it might be necessary to increase plant capacity (thus incurring additional fixed costs) or to work extra shifts (thus incurring overtime charges and other inefficiencies). In either case, the assumed cost relationships would no longer be valid.

### Finding the break-even point

A company breaks even for a given period when sales revenue and costs charged to that period are equal. Thus, the **break-even point** is that level of operations at which a company realizes no net income or loss.

A company may express a break-even point in dollars of sales revenue or number of units produced or sold. No matter how a company expresses its break-even point, it is still the point of zero income or loss. To illustrate the calculation of a break-even point, recall that Video Productions produces videotapes selling for USD 20 per unit. Fixed costs per period total USD 40,000, while variable cost is USD 12 per unit.

**Break-even in units** We compute the break-even point in units by dividing total fixed costs by the contribution margin per unit. The contribution margin per unit is USD 8 (USD 20 selling price per unit - USD 12 variable cost per unit). In the following break-even equation, BE refers to the break-even point:

$$\text{BE units} = \frac{\text{Fix costs}}{\text{Contribution margin per unit}}$$

$$\text{BE units} = \frac{\text{USD } 40,000}{\text{USD } 8 \text{ per unit}}$$

$$\text{BE units} = 5,000 \text{ units}$$

The result tells us that Video Productions breaks even at a volume of 5,000 units per month. We can prove that to be true by computing the revenue and total costs at a volume of 5,000 units. Revenue = 5,000 units X USD 20

sales price per unit = USD 100,000. Total costs = USD 100,000 = USD 40,000 fixed costs + USD 60,000 variable costs (USD 60,000 = USD 12 per unit X 5,000 units).

Look at Exhibit 172 and note that the revenue and total cost lines cross at 5,000 units—the break-even point. Video Productions has net income at volumes greater than 5,000, but it has losses at volumes less than 5,000 units.

**Break-even in sales dollars** Companies frequently think of volume in sales dollars instead of units. For a company such as GM that makes Cadillacs and certain small components, it makes no sense to think of a break-even point in units. GM breaks even in sales dollars.

The formula to compute the break-even point in sales dollars looks a lot like the formula to compute the break-even in units, except we divide fixed costs by the contribution margin ratio instead of the contribution margin per unit.

$$\text{BE dollars} = \frac{\text{Fix costs}}{\text{Contribution margin ratio}}$$

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### A broader perspective: Even colleges use CVP

The dean of the Business School at a particular university was considering whether to offer a seminar for executives. The tuition would be USD 650 per person. Variable costs, including meals, parking, and materials, would be USD 80 per person. Certain costs of offering the seminar, including advertising, instructors' fees, room rent, and audiovisual equipment rent, would not be affected by the number of people attending (within a "relevant range"). Such costs, which could be thought of as fixed costs, amounted to USD 8,000 for the seminar.

In addition to these costs, a number of staff, including the dean, would work on the program. Although the salaries paid to these staff were not affected by offering the seminar, working on it took these people away from other duties, thus creating an opportunity cost, estimated to be USD 7,000 for this seminar.

Given this information, the school estimated the break-even point to be  $(\text{USD } 8,000 + \text{USD } 7,000) / (\text{USD } 650 - \text{USD } 80) = 26.3$  students. If the school wanted at least to break even on this program, it should offer the program only if it expected at least 27 students to attend.

Based on the authors' research.

The **contribution margin ratio** expresses the contribution margin as a percentage of sales. To calculate this ratio, divide the contribution margin per unit by the selling price per unit, or total contribution margin by total revenues. Video Production's contribution margin ratio is:

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin per unit}}{\text{Selling price per unit}}$$

$$\frac{\text{USD } 20 - \text{USD } 12}{\text{USD } 20} = \frac{\text{USD } 8}{\text{USD } 20}$$

$$= 0.40$$

Or, referring to the income statement in which Video Productions had a total contribution margin of USD 48,000 on revenues of USD 120,000, we compute the contribution margin ratio as follows:

## 21. Cost-volume-profit analysis

$$\begin{aligned} \text{Contribution margin ratio} &= \frac{\text{Total contribution margin}}{\text{Total revenues}} \\ &= \frac{\text{USD } 48,000}{\text{USD } 120,000} \\ &= 0.40 \end{aligned}$$

That is, for each dollar of sales, there is a USD 0.40 contribution to covering fixed costs and generating net income.

Using this ratio, we calculate Video Production's break-even point in sales dollars as:

$$\begin{aligned} \text{BE dollars} &= \frac{\text{Fix costs}}{\text{Contribution margin rate}} \\ \text{BE dollars} &= \frac{\text{USD } 40,000}{0.40} \\ &= \text{USD } 100,000 \end{aligned}$$

The break-even volume of sales is USD 100,000 (5,000 units at USD 20 per unit). At this level of sales, fixed costs plus variable costs equal sales revenue, as shown here:

Revenue	\$120,000
Less: variable costs	72,000
Contribution margin	\$ 48,000
Less: Fixed costs	40,000
Net income	\$ 8,000

The cost-volume-profit chart in Exhibit 172 shows that in a period of complete idleness, Video Productions would lose USD 40,000 (the amount of fixed costs). However, when Video Productions has an output of 10,000 units, the company has net income of USD 40,000. Other points on the graph show that sales of 7,500 units results in USD 150,000 of revenue. At that point, Video Production's total costs amount to USD 130,000, leaving net income of USD 20,000.

Although you are likely to use cost-volume-profit analysis for a single product, you will more frequently use it in multi-product situations. The easiest way to use cost-volume-profit analysis for a multi-product company is to use dollars of sales as the volume measure. For CVP purposes, a multi-product company must assume a given product mix. **Product mix** refers to the proportion of the company's total sales attributable to each type of product sold.

To illustrate the computation of the break-even point for Wonderfood, a multi-product company that makes three types of cereal, assume the following historical data:

	Product							
	1		2		3		Total	
	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent
Sales	\$60,000	100%	\$30,000	100%	\$10,000	100%	\$100,000	100%
Less:								
Variable costs	40,000	67%	16,000	53%	4,000	40%	60,000	60%
Contribution margin	\$20,000	33%	\$14,000	47%	\$ 6,000	60%	\$ 40,000	40%

We use the data in the total columns to compute the break-even point. The contribution margin ratio is 40 per cent or (USD 40,000/USD 100,000). Assuming the product mix remains constant and fixed costs for the company are USD 50,000, break-even sales are USD 125,000, computed as follows:

$$\begin{aligned} \text{BE dollars} &= \frac{\text{Fix costs}}{\text{Contribution margin ratio}} \\ \text{BE dollars} &= \frac{\text{USD } 50,000}{0.40} \\ &= \text{USD } 125,000 \end{aligned}$$

[To check our answer: (USD 125,000 X 0.40) - USD 50,000 = USD 0.]

To find the three product sales totals, we multiply total sales dollars by the per cent of product mix for each of the three products. The product mix for products 1, 2, and 3 is 60:30:10, respectively. That is, out of the USD 100,000 total sales, there were sales of USD 60,000 for product 1, USD 30,000 for product 2, and USD 10,000 for product 3. Therefore, the company has to sell USD 75,000 of product 1 (0.6 X USD 125,000), USD 37,500 of product 2 (0.3 X USD 125,000), and USD 12,500 of product 3 (0.1 X USD 125,000) to break even.

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### An accounting perspective:

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#### Business insight

The founder of Domino's Pizza, Inc. nearly went bankrupt several times before he finally made Domino's a financial success. One early problem was that the company was providing small pizzas that cost almost as much to make and just as much to deliver as larger pizzas. Because they were small, the company could not charge enough to cover its costs. At one point, the company's founder was so busy producing small pizzas that he did not have time to determine that the company was losing money on them.

If a company's current sales are more than its break-even point, it has a margin of safety equal to current sales minus break-even sales. The **margin of safety** is the amount by which sales can decrease before the company incurs a loss. For example, assume Video Productions currently has sales of USD 120,000 and its break-even sales are USD 100,000. The margin of safety is USD 20,000, computed as follows:

$$\begin{aligned}\text{Margin safety} &= \text{Current sales} - \text{Break-even sales} \\ &= \text{USD } 120,000 - \text{USD } 100,000 \\ &= \text{USD } 20,000\end{aligned}$$

Sometimes people express the margin of safety as a percentage, called the margin of safety rate. The **margin of safety rate** is equal to  $\frac{(\text{Current sales} - \text{Break-even sales})}{\text{Current sales}}$ . Using the data just presented, we compute the margin of safety rate as follows:

$$\begin{aligned}\text{Margin of safety rate} &= \frac{(\text{Current sales} - \text{Break-even sales})}{\text{Current sales}} \\ &= \frac{(\text{USD } 120,000 - \text{USD } 100,000)}{\text{USD } 120,000} \\ &= 16.67 \text{ per cent}\end{aligned}$$

This means that sales volume could drop by 16.67 per cent before the company would incur a loss.

### Cost-volume-profit analysis illustrated

CVP analysis has many applications. This section illustrates several applications using airline data.

The management of a major airline wishes to know how many seats must be sold on Flight 529 to break even. To solve this problem, management must identify and separate costs into fixed and variable categories.



## 21. Cost-volume-profit analysis

The fixed costs of Flight 529 are the same regardless of the number of seats filled. Fixed costs include the fuel required to fly the plane and crew (with no passengers) to its destination; depreciation on the plane used on the flight; and salaries of required crew members, gate attendants, and maintenance and refueling personnel.

The variable costs vary directly with the number of passengers. Variable costs include snacks and beverages provided to passengers, baggage handling costs, and the cost of the additional fuel required to fly the plane with passengers to its destination. Management would express each variable cost on a per passenger basis.

Assume that after analyzing the various costs and separating them into fixed or variable categories, management finds the fixed costs for Flight 529 are USD 12,000 and variable costs are USD 25 per passenger. Tickets cost USD 125. Thus, the contribution margin ratio is 80 per cent or [(USD 125 - USD 25)/USD 125].

We can express the break-even point either in sales dollars or in the number of passengers. The break-even point in sales dollars is:

$$\begin{aligned}\text{BE dollars} &= \frac{\text{Fix costs}}{\text{Contribution margin ratio}} \\ &= \frac{\text{USD } 12,000}{0.80} \\ &= \text{USD } 15,000\end{aligned}$$

We can find the break-even point in number of passengers (units) by dividing fixed costs by the contribution margin per unit:

$$\begin{aligned}\text{BE units} &= \frac{\text{Fix costs}}{\text{Contribution margin per unit (passenger)}} \\ &= \frac{\text{USD } 12,000}{(\text{USD } 125 - \text{USD } 25)} \\ &= 120 \text{ passengers}\end{aligned}$$

To check our answers: 120 passengers X USD 125 ticket price = USD 15,000.

With a simple adjustment in the break-even formulas, CVP analysis can also show the sales volume needed to generate some desired level of net income (ignore taxes). To make this adjustment, management adds the desired net income amount to the fixed costs that must be covered. From this, management can determine the necessary sales volume in dollars or units to provide the desired net income. For example, assume management wishes to earn USD 8,000 of net income on Flight 529.

How many passenger tickets must the airline sell to earn USD 8,000? Remember, the contribution margin per ticket is USD 100. We compute the number of tickets to be sold to earn USD 8,000 on a flight as follows:

$$\begin{aligned}\text{Number of units} &= \frac{\text{Fix costs} + \text{Desired net income}}{\text{Contribution margin per unit}} \\ &= \frac{\text{USD } 12,000 + \text{USD } 8,000}{\text{USD } 100} \\ &= \frac{\text{USD } 20,000}{\text{USD } 100} \\ &= 200 \text{ tickets}\end{aligned}$$

The airline must sell 200 tickets to earn net income of USD 8,000. To check our answer: (200 tickets X USD 125 sales price per ticket) - (200 tickets X USD 25 variable cost per ticket) - USD 12,000 fixed costs = USD 25,000 - USD 5,000 - USD 12,000 = USD 8,000.

The airline management can also use cost-volume-profit analysis to determine the effect of changing the sales price. To illustrate, assume that Flight 529 normally carries 150 passengers (sales of USD 18,750 and net income of USD 3,000), and the airline decides to increase ticket prices by 5 per cent. If variable and fixed costs remain constant and passenger load does not change, net income increases from USD 3,000 to USD 3,937.50 as follows:

Revenue – Total variable costs – Fixed costs = Net income

[USD 125[1.05] x 150 passengers] – (USD 25 x 150 passengers) – USD 12,000 = NI

USD 19,687.50 – USD 3,750 – USD 12,000 = NI

USD 3,937.50 = NI

Net income would rise by the entire amount of the price increase (USD 19,687.50 - USD 18,750 = USD 937.50).

Management can use cost-volume-profit analysis to calculate the sales needed to maintain net income when costs change. For example, assume both fixed and variable costs would increase for the airline if the price of fuel rises. Assume that fixed costs increase by USD 4,000 and variable costs increase by USD 6.25 per passenger. Variable costs are now 25 per cent, or (USD 31.25/USD 125), of the sales price. The contribution margin is now USD 93.75, or (USD 125 - USD 31.25), per passenger. The contribution margin ratio is now 75 per cent, or (USD 93.75/USD 125).

To maintain the current net income of USD 3,000, the airline needs to increase sales revenue to USD 25,333:

Revenue required =  $\frac{\text{Fix costs} + \text{Desired net income}}{\text{Contribution margin ratio}}$

=  $\frac{\text{USD 16,000} + \text{USD 3,000}}{0.75}$

= USD 25,333

Management can also use its knowledge of cost-volume-profit relationships to determine whether to increase sales promotion costs in an effort to increase sales volume or to accept an order at a lower-than-usual price. In general, the careful study of cost behavior helps management plan future courses of action.

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### A broader perspective:

#### Major television networks are finding it harder to break even

With increasing competition from cable and satellite television, prerecorded videos, and independent stations, the three major television networks are facing smaller and smaller margins of safety. Most new shows do not break even. Many do not even cover their variable costs and are dropped during the first season.

As the networks find it more and more difficult to break even on their regular shows, they are expanding into cable, satellite, and pay-per-view television. For example, the National Broadcasting Company (NBC), a major television network owned by General Electric Company, is part owner of a national cable channel and a sports channel. The company has also invested in CNBC, a cable network that specializes in consumer and business issues.

Based on the authors' research.

#### Assumptions made in cost-volume-profit analysis

To summarize, the most important assumptions underlying CVP analysis are:

## 21. Cost-volume-profit analysis

- Selling price, variable cost per unit, and total fixed costs remain constant through the relevant range. This means that a company can sell more or fewer units at the same price and that the company has no change in technical efficiency as volume changes.
- In multi-product situations, the product mix is known in advance.
- Costs can be accurately classified into their fixed and variable portions.

Critics may call these assumptions unrealistic in many situations, but they greatly simplify the analysis.

### Using computer spreadsheets for CVP analysis

Computer spreadsheet packages are well suited for CVP analysis because they enable managers to answer what-if questions. The cost and revenue items in CVP analysis are estimates, not actual results. Since they are used in planning and decision making, it is reasonable to ask whether plans or decisions would change if the estimates changed. The most important issue is whether the information is correct. The output is only as good as the information that goes in.

Consider the following example: The management of Prince Cruises wants to know what the income before taxes would be for a proposed product, a Caribbean cruise. The analyst prepared the following formulas for the spreadsheet:

- Revenue equals ticket price times number of passengers (amounts to be inserted for ticket price and number of passengers).
- Contribution margin equals (amount to be inserted) per cent of revenue.
- Fixed costs equal USD 200,000.
- Income equals revenue minus variable costs minus fixed costs.

Management then inserted various values for ticket price, number of passengers, the per cent of variable cost to revenue, and fixed costs, all per cruise. Exhibit 173 shows the results. Based on these results, management sees what combinations of ticket price, number of passengers, and contribution ratio are required for the cruise to be profitable.

We show only a few of the possible combinations in Exhibit 173 to save space. Spreadsheets provide the advantage of a large number of possible combinations with minimal data entry.

<b>Fixed cost</b>	<b>Ticket price</b>	<b>Number of passengers</b>	<b>Per cent contribution margin to revenue</b>	<b>Income</b>
\$200,000	\$3,000	100	70%	\$10,000
200,000	3,000	80	70%	(32,000)
200,000	3,000	100	75%	25,000
200,000	3,000	80	75%	(20,000)
200,000	4,000	70	70%	(4,000)
200,000	4,000	50	70%	(60,000)
200,000	4,000	70	75%	10,000
200,000	4,000	50	75%	(50,000)

Exhibit 173: Spreadsheet analysis of CVP relationships

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## An accounting perspective:

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### Uses of technology

Cost-volume-profit analysis using a computer spreadsheet is becoming routine. In many business meetings, we find one or more people crunching cost-volume-profit numbers on their notebook or laptop computers.

#### Effect of automation on cost-volume-profit analysis

Increasing automation does not affect the fundamental CVP model or the types of analysis we have discussed. However, it does affect the relative size of fixed and variable costs. As companies become more automated, they substitute machinery for labor. Companies that make this substitution often increase fixed costs and decrease variable costs. For example, when banks installed automated teller machines, their labor costs decreased but their fixed costs, including machine depreciation, increased.

When a company substitutes fixed costs for variable costs, the total cost line shifts up as shown in Exhibit 174. At low levels of volume, becoming more automated increases total costs, but at high levels of volume it decreases them. What does this do to the company's break-even point? It depends on where the revenue line crosses the total cost line.

#### Illustration 21.9 Effects of Automation

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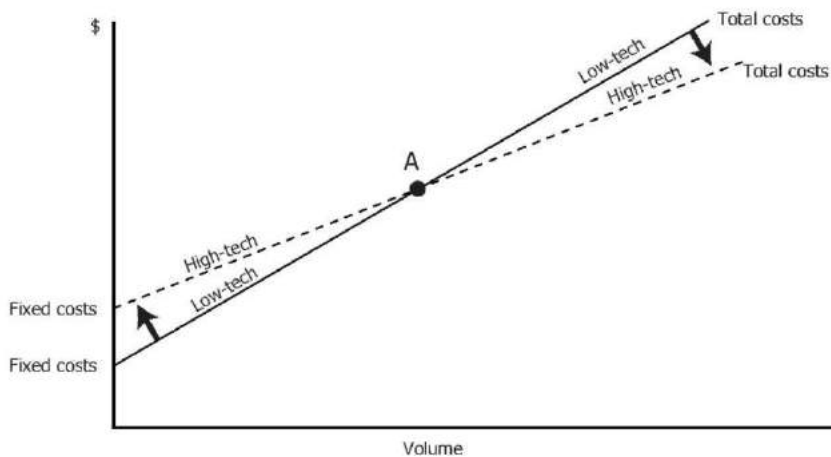


Exhibit 174: Effects of automation

If it crosses at low volumes, to the left of point A in Exhibit 174, then increasing automation increases the company's break-even point. At high volumes, however, if increasing automation lowers total costs, it lowers the company's break-even point.

In this chapter we began studying short-run decisions based on cost-volume-profit analysis. In Chapter 22 we will apply differential analysis to short-term decisions.

## 21. Cost-volume-profit analysis

### Understanding the learning objectives

- **Fixed costs.** These costs remain constant in total over some relevant range of output and are often described as time-related costs. Depreciation and insurance are examples.
- **Variable costs.** These costs vary in total directly with changes in the volume of production or sales. Direct materials and sales commissions are examples.
- **Mixed costs.** These costs contain a fixed portion of cost incurred even when the plant is completely idle and a variable portion that increases directly with production volume. Electricity is an example of a mixed cost.
- **Step costs.** These costs remain constant at a certain fixed amount over a short range of output (or sales) but increase to higher amounts at certain points. The cost of supervisors' salaries is an example.
- The scatter diagram shows plots of actual costs incurred for various levels of activity.
- The high-low method uses the highest and lowest points on a scatter diagram to fit a line to the data.
- Cost-volume-profit analysis (sometimes called break-even analysis) can determine what effects any changes in a company's selling prices, costs, and/or volume will have on net income in the short run.
- The break-even point is that level of operations at which a company realizes no income or loss.
- To compute the break-even point in sales dollars:

$$\text{BE dollars} = \frac{\text{Fix costs}}{\text{Contribution margin ratio}}$$

Or, to express the break-even point in units:

$$\text{BE units} = \frac{\text{Fix costs}}{\text{Contribution margin per unit}}$$

- To compute the margin of safety:

Margin of safety = Current sales – Break-even sales

- Applications include calculation of the break-even point, calculation of the sales volume needed for a desired net income, calculation of the effect of changing price on net income, and calculation of the sales needed to maintain net income when costs change.
- Selling price, variable cost per unit, and total fixed costs remain constant through the relevant range.
- In multi-product situations, the product mix is known in advance.
- Costs can be accurately classified into their fixed and variable portions.
- Computer spreadsheet packages are well suited for CVP analysis because they enable managers to answer what-if questions.
- As companies become more automated, they substitute machinery for labor, which generally increases fixed costs and decreases variable costs.

### Demonstration problem

**Demonstration problem A** Davis Company has fixed costs of USD 625,000 per year and variable costs of USD 7.50 per unit. Its product sells for USD 12.50 per unit. Full capacity is 200,000 units. The contribution margin is USD 5 per unit (USD 12.50 - USD 7.50).

- Compute the break-even point in (1) sales dollars and (2) units.
- Compute the number of units the company must sell if it wishes to have net income of USD 300,000.

**Demonstration problem B** At the beginning of this chapter, we presented a problem: A campus organization wants to show movies. Recall that the movie rental would be USD 1,000. Rent for an auditorium, salaries to the

ticket takers and other personnel, and other fixed costs would be USD 800 for the weekend. The organization would sell tickets for USD 4 per person. In addition, profits from the sale of soft drinks, popcorn, and candy are estimated to be USD 1 per ticket holder. How many people have to buy tickets for the organization to break even?

#### Solution to demonstration problem

#### Solution to demonstration problem A

a. (1) The contribution margin ratio is 0.40.

$$\text{BE dollars} = \frac{\text{Fix costs}}{\text{Contribution margin ratio}}$$

$$\text{BE dollars} = \frac{\text{USD } 625,000}{0.40}$$

$$= \text{USD } 1,562,500$$

(2)  $\text{BE units} = \frac{\text{Fix costs}}{\text{Contribution margin per unit}}$

$$\text{BE units} = \frac{\text{USD } 625,000}{\text{USD } 5}$$

$$= 125,000 \text{ units}$$

b.  $\text{Number of units} = \frac{\text{Fix cost} + \text{Desired net income}}{\text{Contribution margin per unit}}$

$$= \frac{\text{USD } 625,000 + \text{USD } 300,000}{\text{USD } 5}$$

$$= \frac{\text{USD } 925,000}{\text{USD } 5}$$

$$= 185,000 \text{ units}$$

#### Solution to demonstration problem B

$$\text{Number of ticket buyers so they break even} = \frac{\text{USD } 1,000 + \text{USD } 800}{\text{USD } 4 + \text{USD } 1}$$

$$= \frac{\text{USD } 1,800}{\text{USD } 5}$$

$$= 360 \text{ ticket buyers}$$

#### Key terms\*

**Break-even point** That level of operations at which revenues for a period are equal to the costs assigned to that period so there is no net income or loss.

**Contribution margin** The amount by which revenue exceeds the variable costs of producing that revenue. The contribution margin per unit is the selling price minus the variable cost per unit.

**Contribution margin ratio** Contribution margin per unit divided by selling price per unit, or total contribution margin divided by total revenues.

**Cost-volume-profit (CVP) analysis** An analysis of the effect that any changes in a company's selling prices, costs, and/or volume will have on income (profits) in the short run. Also called break-even analysis.

**Cost-volume-profit (CVP) chart** A graph that shows the relationships among sales, volume, costs, and net income or loss.

**Fixed costs** Costs that remain constant (in total) over some relevant range of output.

**High-low method** A method used in dividing mixed costs into their fixed and variable portions. The high plot and low plot of actual costs are used to draw a line representing a total mixed cost.

**Margin of safety** Amount by which sales can decrease before a loss is incurred.

**Margin of safety rate** Margin of safety expressed as a percentage, which equals (Current sales – Break-even sales)/Current sales.

## 21. Cost-volume-profit analysis

**Mixed cost** Contains a fixed portion of cost incurred even when the plant is completely idle and a variable portion that increases directly with production volume.

**Product mix** The proportion of the company's total sales attributable to each type of product sold.

**Profit equation** The equation is  $\text{Net income} = \text{Revenue} - \text{Total variable costs} - \text{Fixed costs}$ .

**Relevant range** The range of production or sales volume over which the assumptions about cost behavior are valid.

**Scatter diagram** A diagram that shows plots of actual costs incurred for various levels of activity; it is used in dividing mixed costs into their fixed and variable portions.

**Short run** The time during which a company's management cannot change the effects of certain past decisions; often determined to be one year or less. In the short run, many costs are assumed to be fixed and unchangeable.

**Step cost** A cost that remains constant at a certain fixed amount over a range of output (or sales) but then keeps increasing to a higher amount at certain points.

**Variable costs** Costs that vary (in total) directly with changes in the volume of production or sales.

\*Some terms listed in earlier chapters are repeated here for your convenience.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

The scatter diagram method is less precise than the high-low method for evaluating costs.

A break-even point is expressed only in dollars of sales revenues.

Total contribution margin indicates the amount of money remaining after variable and fixed costs are covered.

The margin of safety is calculated using the following formula:

$\text{Margin of safety} = \text{Break-even sales} - \text{Current sales}$

Dollars of sales are used when computing the break-even point for a multi-product company.

#### Multiple-choice

Select the best answer for each of the following questions.

Under which of the following cost behavior patterns would electricity be categorized?

- a. Variable cost.
- b. Fixed cost.
- c. Mixed cost.
- d. Step cost.

Which of the following are characteristics of step costs?

- a. A fixed component.
- b. Costs increase in steps as production volume increases.
- c. Can remain constant over some relevant range of output.
- d. All of the above.

Using the following data, calculate the sales revenue needed to break even:

Selling price per unit USD 10

Fixed costs 20,000

Variable cost per unit 6

- a. USD 40,000.
- b. USD 33,333.
- c. USD 50,000.

d. USD 60,000.

Using the following data, calculate the contribution margin:

Selling price USD 20

Fixed costs 4

Variable cost 6

a. USD 14.

b. USD 10.

c. USD 16.

d. USD 18.

Using the following data, calculate the break-even point in units:

Selling price per unit USD 20

Fixed costs 28,000

Variable cost per unit 6

a. 1,400 units.

b. 2,800 units.

c. 2,275 units.

d. 2,000 units.

Which of the following describe(s) the underlying assumptions of cost-volume-profit analysis?

a. Selling price, variable cost per unit, and total fixed costs remain constant through the relevant range.

b. In multi-product situations, the product mix is known in advance.

c. Costs can be accurately classified into their fixed and variable portions.

d. All of the above.

Now turn to “Answers to self-test” at the end of the book to check your answers.

## Questions

- Name and describe four cost behavior patterns.
- Describe two methods of determining the fixed and variable components of mixed costs.
- What is meant by the term break-even point?
- What are two ways in which the break-even point can be expressed?
- What is the relevant range?
- What is the formula for calculating the break-even point in sales revenue?
- What formula is used to solve for the break-even point in units?
- How can the break-even formula be altered to calculate the number of units that must be sold to achieve a desired level of income?
- Why might a business wish to lower its break-even point? How would it go about lowering the break-even point?
- What effect would you expect the mechanization and automation of production processes to have on the break-even point?

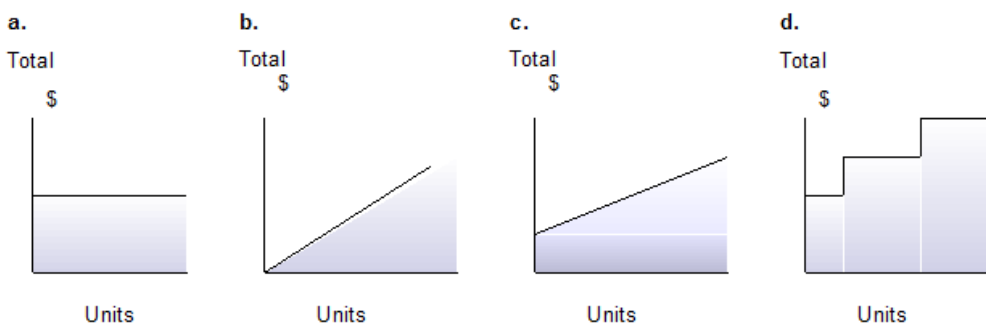


## 21. Cost-volume-profit analysis

- **Real world question** Assume your college is considering hiring a lecturer to teach a special class in communication skills. Identify at least two costs that college administrators might consider in deciding whether to hire the lecturer and add the class.
- **Real world question** Two enterprising students are considering renting space and opening a class video recording service. They would hire camera operators to record large introductory classes. The students taking the classes would be charged a fee to rent and view the video on their laptops or smart phones. Identify as many costs of this business as you can and indicate which would be variable and which would be fixed.

### Exercises

**Exercise A** Name and match the types of cost behavior with the appropriate diagram below:



**Exercise B** Research Inc., performs laboratory tests. Use the high-low method to determine the fixed and variable components of a mixed cost, given the following observations:

Volume (number of tests)	Total cost
4,800	\$6,000
19,200	9,600

**Exercise C** Compute the break-even point in sales dollars if fixed costs are USD 200,000 and the total contribution margin is 20 per cent of revenue.

**Exercise D** Barney Company makes and sells stuffed animals. One product, Michael Bears, sells for USD 28 per bear. Michael Bears have fixed costs of USD 100,000 per month and a variable cost of USD 12 per bear. How many Michael Bears must be produced and sold each month to break even?

**Exercise E** Peter Garcia Meza is considering buying a company if it will break even or earn net income on revenues of USD 80,000 per month. The company that Peter is considering sells each unit it produces for USD 5. Use the following cost data to compute the variable cost per unit and the fixed cost for the period. Calculate the break-even point in sales dollars. Should Peter buy this company?

Volume (units)	Cost
8,000	\$70,000
68,000	190,000

**Exercise F** Never Late Delivery currently delivers packages for USD 9 each. The variable cost is USD 3 per package, and fixed costs are USD 60,000 per month. Compute the break-even point in both sales dollars and units under each of the following independent assumptions. Comment on why the break-even points are different.

- a. The costs and selling price are as just given.
- b. Fixed costs are increased to USD 75,000.
- c. Selling price is increased by 10 per cent. (Fixed costs are USD 60,000.)

d. Variable cost is increased to USD 4.50 per unit. (Fixed costs are USD 60,000 and selling price is USD 9.)

**Exercise G** Best Eastern Motel is a regional motel chain. Its rooms rent for USD 100 per night, on average. The variable cost is USD 40 a room per night. Fixed costs are USD 5,000,000 per year. The company currently rents 200,000 units per year, with each unit defined as one room for one night. Should this company undertake an advertising campaign resulting in a USD 500,000 increase in fixed costs per year, no change in variable cost per unit, and a 10 per cent increase in revenue (resulting from an increase in the number of rooms rented)? What is the margin of safety before and after the campaign?

**Exercise H** Fall-For-Fun Company sells three products. Last year's sales were USD 600,000 for parachutes, USD 800,000 for hang gliders, and USD 200,000 for bungee jumping harnesses. Variable costs were: parachutes, USD 400,000; hang gliders, USD 700,000; and bungee jumping harnesses, USD 100,000. Fixed costs were USD 240,000. Find (a) the break-even point in sales dollars and (b) the margin of safety.

**Exercise I** Early Horizons Day Care Center has fixed costs of USD 300,000 per year and variable costs of USD 10 per child per day. If it charges USD 25 a child per day, what will be its break-even point expressed in dollars of revenue? How much revenue would be required for Early Horizons Day Care to earn USD 100,000 net income per year?

### Problems

**Problem A** Assume the local franchise of Togorio Sandwich Company assigns you the task of estimating total maintenance cost on its delivery vehicles. This cost is a mixed cost. You receive the following data from past months:

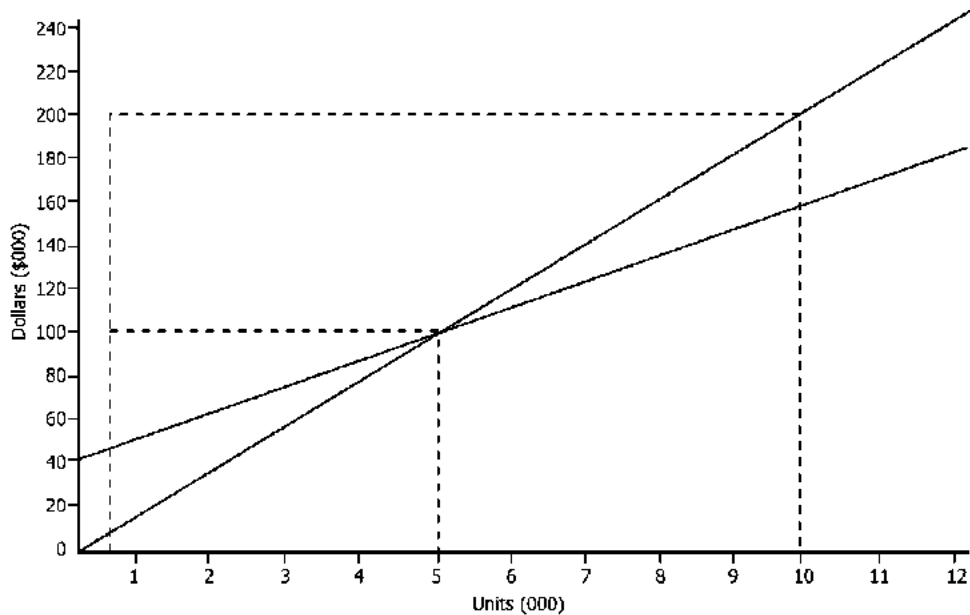
Month	Units	Costs
March	8,000	\$14,000
April	10,000	14,960
May	9,000	15,200
June	11,000	15,920
July	10,000	15,920
August	13,000	16,880
September	14,000	18,080
October	18,000	19,280
November	20,000	21,200

a. Using the high-low method, determine the total amount of fixed costs and the amount of variable cost per unit. Draw the cost line.

b. Prepare a scatter diagram, plot the actual costs, and visually fit a linear cost line to the points. Estimate the amount of total fixed costs and the amount of variable cost per unit.

### Problem B

## 21. Cost-volume-profit analysis



a. Using the preceding graph, label the relevant range, total costs, fixed costs, break-even point, and profit and loss areas.

b. At 8,000 units, what are the variable costs, fixed costs, sales, and contribution margin amounts in dollars?

c. At 8,000 units, is there net income or loss? How much?

**Problem C** The management of Bootleg Company wants to know the break-even point for its new line hiking boots under each of the following independent assumptions. The selling price is USD 50 pair of boots unless otherwise stated. (Each pair of boots is one unit.)

a. Fixed costs are USD 300,000; variable cost is USD 30 per unit.

b. Fixed costs are USD 300,000; variable cost is USD 20 per unit.

c. Fixed costs are USD 250,000; variable cost is USD 20 per unit.

d. Fixed costs are USD 250,000; selling price is USD 40; and variable cost is USD 30 per unit.

Compute the break-even point in units and sales dollars for each of the four independent case.

**Problem D** Refer to the previous problem. Bootleg Company's sales are USD 1,100,000. Determine the margin (safety in dollars for cases (a) through (d).

**Problem E** Using the data in the Bootleg Company problem (a through d), determine the level of sales dollars required achieve a net income of USD 125,000.

**Problem F** Bikes Unlimited, Inc., sells three types of bicycles. It has fixed costs of USD 258,000 per month. The sales and variable costs of these products for April follow:

	<b>Bikes</b>		
	<b>Racing</b>	<b>Mountain</b>	<b>Touring</b>
Sales	\$1,00,000	\$1,500,000	\$2,500,000
Variable costs	700,000	900,000	1,250,000

Compute the break-even point in sales dollars.

**Problem G** a. Assume that fixed costs of Celtics Company are USD 180,000 per year, variable cost is USD 12 per unit, and selling price is USD 30 per unit. Determine the break-even point in sales dollars.

b. Hawks Corporation breaks even when its sales amount to USD 89,600,000. In 2010, its sales were USD 14,400,000, and its variable costs amounted to USD 5,760,000. Determine the amount of its fixed costs.

c. The sales of Niners Corporation last year amounted to USD 20,000,000, its variable costs were USD 6,000,000, and its fixed costs were USD 4,000,000. At what level of sales dollars would the Niners Corporation break even?

d. What would have been the net income of the Niners Corporation in part (c), if sales volume had been 10 per cent higher but selling prices had remained unchanged?

e. What would have been the net income of the Niners Corporation in part (c), if variable costs had been 10 per cent lower?

f. What would have been the net income of the Niners Corporation in part (c), if fixed costs had been 10 per cent lower?

g. Determine the break-even point in sales dollars for the Niners Corporation on the basis of the data given in (e) and then in (f).

Answer each of the preceding questions.

**Problem H** After graduating from college, M. J. Orth started a company that produced cookbooks. After three years, Orth decided to analyze how well the company was doing. He discovered the company has fixed costs of USD 1,200,000 per year, variable cost of USD 14.40 per cookbook (on average), and a selling price of USD 26.90 per cookbook (on average).

How many units (that is, cookbooks) must be sold to break even? How many units will the company have to sell to earn USD 48,000?

**Problem I** The operating results for two companies follow:

	Sierra	Olympias
Sales (20,000) units	\$1,920,000	\$1,920,000
Variable costs	480,000	1,056,000
Contribution margin	1,440,000	864,000
Fixed costs	960,000	384,000
Net income	480,000	480,000

a. Prepare a cost-volume-profit chart for Sierra Company, indicating the break-even point, the contribution margin, and the areas of income and losses.

b. Compute the break-even point of both companies in sales dollars and units.

c. Assume that without changes in selling price, the sales of each company decline by 10 per cent. Prepare income statements similar to the preceding statements for both companies.

**Problem J** Soundoff, Inc., a leading manufacturer of electronic equipment, decided to analyze the profitability of its new portable compact disc (CD) players. On the CD player line, the company incurred USD 2,520,000 of fixed costs per month while selling 20,000 units at USD 600 each. Variable cost was USD 240 per unit.

Recently, a new machine used in the production of CD players has become available; it is more efficient than the machine currently being used. The new machine would reduce the company's variable costs by 20 per cent, and leasing it would increase fixed costs by USD 96,000 per year.

a. Compute the break-even point in units assuming use of the old machine.

b. Compute the break-even point in units assuming use of the new machine.

c. Assuming that total sales remain at USD 12,000,000 and that the new machine is leased, compute the expected net income.

## 21. Cost-volume-profit analysis

d. Should the new machine be leased? Why?

**Problem K** Surething CD Company reports sales of USD 720,000, variable costs of USD 432,000, and fixed costs of USD 108,000. If the company spends USD 72,000 on a sales promotion campaign, it estimates that sales will be increased by USD 270,000.

Determine whether the sales promotion campaign should be undertaken. Provide calculations.

### Alternate problems

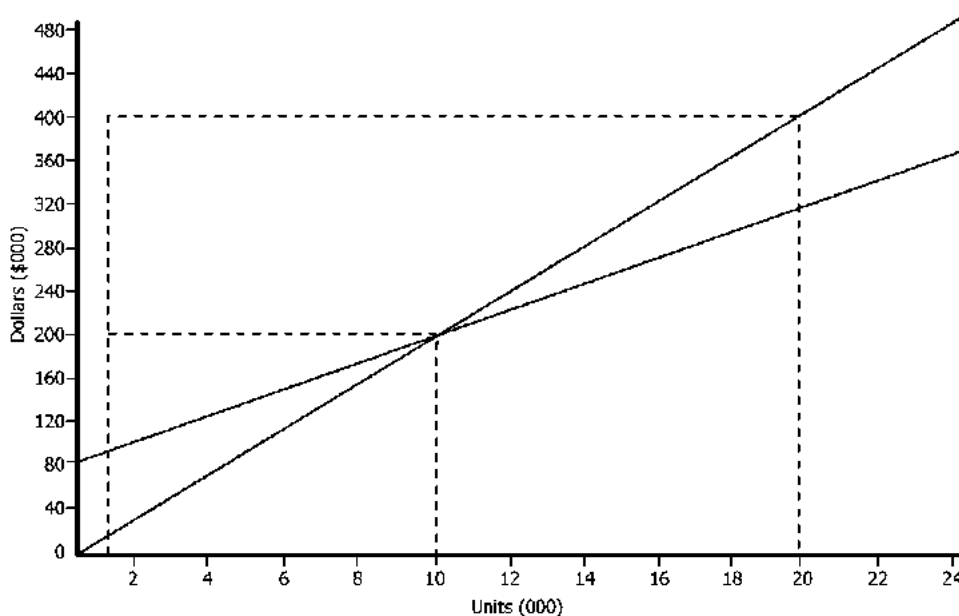
**Alternate problem A** Hear Right Company has identified certain variable and fixed costs in its production of hearing aids. Management wants you to divide one of its mixed costs into its fixed and variable portions. Here are the data for this cost:

Month	Units	Costs
January	20,800	\$57,600
February	20,000	54,000
March	22,000	58,500
April	25,600	57,600
May	28,400	58,500
June	30,000	62,100
July	32,800	63,900
August	35,600	68,400
September	37,600	72,000
October	40,000	77,400

a. Using the high-low method, determine the total amount of fixed costs and the amount of variable cost per unit. Draw the cost line.

b. Prepare a scatter diagram, plot the actual costs, and visually fit a linear cost line to the points. Estimate the amount of total fixed costs and the variable cost per unit.

### Alternate problem B



a. Using the preceding graph, label the relevant range, total costs, fixed costs, break-even point, and profit and loss areas.

b. At 18,000 units, what would sales revenue, total costs, fixed and variable costs be?

c. At 18,000 units, would there be a profit or loss? How much?

**Alternate problem C** Jefferson Company has a plant capacity of 100,000 units, at which level variable costs are USD 720,000. Fixed costs are expected to be USD 432,000. Each unit of product sells for USD 12.

- Determine the company's break-even point in sales dollars and units.
- At what level of sales dollars would the company earn net income of USD 144,000?
- If the selling price were raised to USD 14.40 per unit, at what level of sales dollars would the company earn USD 144,000?

**Alternate problem D** a. Determine the break-even point in sales dollars and units for Cowboys Company that has fixed costs of USD 63,000, variable cost of USD 24.50 per unit, and a selling price of USD 35.00 per unit.

b. Wildcats Company breaks even when sales are USD 280,000. In March, sales were USD 670,000, and variable costs were USD 536,000. Compute the amount of fixed costs.

c. Hoosiers Company had sales in June of USD 84,000; variable costs of USD 46,200; and fixed costs of USD 50,400. At what level of sales, in dollars, would the company break even?

d. What would the break-even point in sales dollars have been in (c) if variable costs had been 10 per cent higher?

e. What would the break-even point in sales dollars have been in (c) if fixed costs had been 10 per cent higher?

f. Compute the break-even point in sales dollars for Hoosiers Company in (c) under the assumptions of (d) and (e) together.

Answer each of the preceding questions.

**Alternate problem E** See Right Company makes contact lenses. The company has a plant capacity of 200,000 units. Variable costs are USD 4,000,000 at 100 per cent capacity. Fixed costs are USD 2,000,000 per year, but this is true only between 50,000 and 200,000 units.

a. Prepare a cost-volume-profit chart for See Right Company assuming it sells its product for USD 40 each. Indicate on the chart the relevant range, break-even point, and the areas of net income and losses.

b. Compute the break-even point in units.

c. How many units would have to be sold to earn USD 200,000 per year?

**Alternate problem F** Mr Feelds Cookies has fixed costs of USD 360,000 per year. It sells three types of cookies. The cost and revenue data for these products follow:

	<b>Cookies</b>		
	<b>Cream cake</b>	<b>Goo fill</b>	<b>Sweet tooth</b>
Sales	\$64,000	\$95,000	\$131,000
Variable costs	38,400	55,100	66,000

Compute the break-even point in sales dollars.

### Beyond the numbers—Critical thinking

**Business decision case A** Quality Furniture Company is operating at almost 100 per cent of capacity. The company expects sales to increase by 25 per cent in 2011. To satisfy the demand for its product, the company is considering two alternatives: The first alternative would increase fixed costs by 15 per cent but not affect variable costs. The second alternative would not affect fixed costs but increase variable costs to 60 per cent of the selling price of the company's product.

This is Quality Furniture Company's condensed income statement for 2010:

Sales	\$3,600,000
Costs:	
Variable	\$1,620,000

## 21. Cost-volume-profit analysis

Fixed	330,000	1,950,000
Income before taxes		\$1,650,000

- Determine the break-even point in sales dollars for 2011 under each of the alternatives.
- Determine projected income for 2011 under each of the alternatives.
- Which alternative would you recommend? Why?

**Business decision case B** When the Weidkamp Company's plant is completely idle, fixed costs amount to USD 720,000. When the plant operates at levels of 50 per cent of capacity or less, its fixed costs are USD 840,000; at levels more than 50 per cent of capacity, its fixed costs are USD 1,200,000. The company's variable costs at full capacity (100,000 units) amount to USD 1,800,000.

- Assuming that the company's product sells for USD 60 per unit, what is the company's break-even point in sales dollars?
- Using only the data given, at what level of sales would it be more economical to close the factory than to operate it? In other words, at what level would operating losses approximate the losses incurred if the factory closed down completely?
- Assume that Weidkamp Company is operating at 50 per cent of its capacity and decides to reduce the selling price from USD 60 per unit to USD 36 per unit to increase sales. At what percentage of capacity must the company operate to break even at the reduced sales price?

**Business decision case C** Monroe Company has recently been awarded a contract to sell 25,000 units of its product to the federal government. Monroe manufactures the components of the product rather than purchasing them. When the news of the contract was released to the public, President Mary Monroe, received a call from the president of the McLean Corporation, Carl Cahn. Cahn offered to sell Monroe 25,000 units of a needed component, Part J, for USD 15.00 each. After receiving the offer, Monroe calls you into her office and asks you to recommend whether to accept or reject Cahn's offer.

You go to the company's records and obtain the following information concerning the production of Part J.

	<b>Costs at current production level (200,000 units)</b>
Direct labor	\$1,248,000
Direct materials	576,000
Manufacturing overhead	600,000
Total cost	\$2,424,000

You calculate the unit cost of Part J to be USD 12.12 or (USD 2,424,000/200,000). But you suspect that this unit cost may not hold true at all production levels. To find out, you consult the production manager. She tells you that to meet the increased production needs, equipment would have to be rented and the production workers would work some overtime. She estimates the machine rental to be USD 60,000 and the total overtime premiums to be USD 108,000. She provides you with the following information:

	<b>Costs at current production level (225,000 units)</b>
Direct labor	\$1,404,000
Direct materials	648,000
Manufacturing overhead (including equipmental rental and overtime premiums)	828,000
Total cost	\$2,880,000

The production manager advises you to reject Cahn's offer, since the unit cost of Part J would be only USD 12.80 or (USD 2,880,000/225,000 units) with the additional costs of equipment rental and overtime premiums. This amount still is less than the USD 15.00 that Cahn would charge. Undecided, you return to your office to consider the matter further.

a. Using the high-low method, compute the variable cost portion of manufacturing overhead. (Remember that the costs of equipment rental and overtime premiums are included in manufacturing overhead. Subtract these amounts before performing the calculation).

b. Compute the total costs to manufacture the additional units of Part J. (Note: include overtime premiums as a part of direct labor.)

c. Compute the unit cost to manufacture the additional units of Part J.

d. Write a report recommending that Monroe accept or reject Cahn's offer.

**Business decision case D** Refer to the "A broader perspective: Major television networks are finding it harder to break even" discussion of cost-volume-profit analysis for television networks. Write a memo to your instructor describing how the networks can reduce their break-even points.

**Group project E** In teams of two or three students, develop a cost-volume-profit equation for a new business that you might start. Examples of such businesses are a portable espresso bar, a pizza stand, a campus movie theater, a package delivery service, a campus-to-airport limousine service, and a T-shirt printing business.

Your equation should be in the form:  $\text{Profits} = (\text{Price per unit} \times \text{Volume}) - (\text{Variable cost per unit} \times \text{Volume}) - \text{Fixed costs per period}$ . Pick a period of time, say one month, and project the unit price, volume, unit variable cost, and fixed costs for the period. From this information, you will be able to estimate the profits—or losses—for the period. Select one spokesperson for your team to tell the class about your proposed business and its profits or losses. Good luck, and have fun.

**Group project F** Refer to "A broader perspective: Even colleges use CVP" discussion of how cost-volume-profit analysis is used by colleges. In teams of two or three students, write a memo to your instructor defining step costs and explain why the step costs identified in the case are classified as such. Also include in your memo how the school might lower its break-even point.

**Group project G** In teams of two or three students, address the following questions:

- Why would a company consider increasing automation and decreasing the use of labor if the result would be an increase in the break-even point?
- Would an increase in automation increase fixed costs over the short-run, long-run, or both?

Write a memo to your instructor that addresses both questions. Be sure to explain your answers.

#### Using the Internet—A view of the real world

Visit the website for Intel Corporation, a high technology manufacturing company.

<http://www.intel.com>

Go to the company's most recent financial statements and review the consolidated statement of income. What additional information, if any, would you need to perform cost-volume-profit analysis? Why is this information excluded from Intel's income statement?

Visit the website for Wal-Mart Corporation, a retail company.

<http://www.walmart.com>



## 21. Cost-volume-profit analysis

Go to the company's most recent financial statements and review the statement of income. What additional information, if any, would you need to perform cost-volume-profit analysis? Why is this information excluded from Wal-Mart Corporation's income statement?

### Answers to self-test

#### True-false

**False.** The high-low method is less precise than the scatter diagram because it requires only two data points in the computation.

**False.** The break-even point can also be expressed in units produced or sold.

**False.** Total contribution margin is the amount by which revenue exceeds variable costs of producing that revenue.

**False.** Margin of safety = Current sales - Break-even sales.

**True.** Dollars of sales are used as the measure of volume when a company has many different products.

#### Multiple-choice

**c.** Electricity is a mixed cost.

**d.** Step costs have all of these characteristics—a fixed component, costs increase, and constancy over a relevant range for a step.

$$\text{c. BE dollars} = \frac{\text{Fix costs}}{\text{Contribution margin ratio}}$$

$$\text{Contribution margin ratio} = \frac{(\text{USD } 10 - \text{USD } 6)}{\text{USD } 10} = 0.40$$

$$\text{BE dollars} = \frac{\text{USD } 20,000}{0.40} = \text{USD } 50,000$$

$$\begin{aligned} \text{a. Contribution margin} &= \text{Selling price} - \text{Variable costs} \\ &= \text{USD } 20 - \text{USD } 6 = \text{USD } 14 \end{aligned}$$

$$\text{d. BE units} = \frac{\text{Fix costs}}{\text{Contribution margin per unit}}$$

$$\text{BE units} = \frac{\text{USD } 28,000}{\text{USD } 14 \text{ per unit}}$$

$$= 2,000$$

**d.** All of these are assumptions—prices and costs remain constant through the relevant range, product mix is known, and costs can be accurately classified into fixed and variable components.

# 22. Short-term decision making: Differential analysis

## Learning objectives

After studying this chapter, you should be able to:

- Compare and contrast contribution margin income statements to traditional income statements.
- Explain differential analysis and describe its components.
- Make pricing decisions using differential analysis.
- Use differential analysis to decide whether to accept or reject special orders.
- Decide whether to eliminate or add product lines or segments of the business using differential analysis.
- Use differential analysis to decide whether to sell joint products at the split-off point or process them further.
- Decide whether to make or buy products using differential analysis.
- Use differential analysis to decide whether to improve product quality.

In this chapter, we will discuss how companies use financial information in making decisions. The framework for our discussion is differential analysis. We begin by presenting an alternative to the traditional income statement format. This alternative, the contribution margin income statement, generally is more useful for the managerial decisions we discuss in this chapter. Then we discuss differential analysis as a method of choosing the best solution to decision problems. We also present several applications of differential analysis to managerial problems that you will likely encounter.

## Contribution margin income statements

Both this and the previous chapter discuss the use of accounting for managerial decision making. We have introduced the concepts of fixed and variable costs, and shown how you can use these concepts in making decisions. However, income statements published for external use do not break costs down into fixed and variable components. We now present another income statement that not only breaks down costs into their fixed and variable components but also presents the total contribution margin. The contribution margin income statement subtracts variable costs from revenues to show the contribution margin, and then subtracts fixed costs to derive net income.

You can see the differences between the traditional and contribution margin income statements by contrasting two income statements based on the same data. Assume Bart Company had the following data relating to manufacturing and sales activities for May 2011:

<b>Bart Company</b>	
<b>May 2011</b>	
Variable manufacturing costs (per unit):	
Direct materials	\$ 1
Direct labor	1
Overhead	1
Total	3
Variable selling expenses (per unit)	\$0.50
Fixed costs:	

## 22. Short-term decision making: Differential analysis

Manufacturing overhead (\$1.00 per unit for \$ 9,000 9,000 units)	
Selling expenses	15,000
Administrative expenses	18,000
Selling price (per unit)	\$ 9

Look at Exhibit 175, where we compare the traditional and contribution margin methods.

### A. Traditional method

<b>Bart company</b>	
<b>Income statement</b>	
<b>For the month ending 2011 May 31</b>	
Revenue (9,000 units at \$9 per unit)	\$81,000
Less: Cost of goods sold (9,000 units at \$4 manufacturing cost per unit:	36,000
Less: \$3 variable + \$1 fixed)	
Gross margin	\$45,000
Less: Selling and administrative expenses (9,000 units at \$0.50 variable selling cost	37,500
per unit, plus fixed costs of \$15,000 for selling and \$18,000 for administrative)	
Net income tax	\$7,500

### B. Contribution margin method

<b>Bart company</b>	
<b>Income statement</b>	
<b>For the month ending 2011 May 31</b>	
Revenue (9,000 units at \$9 per unit)	\$81,000
Less: Variable cost of goods sold (9,000 units at \$3 variable manufacturing cost per unit)	\$27,000
Variable selling expenses (9,000 units at \$0.50 per unit)	4,500
Total contribution margin	\$ 49,500
Less: Fixed manufacturing costs	\$ 9,000
Less: Fixed selling expenses	15,000
Less: Fixed administrative expenses	18,000
Net income before tax	\$ 7,500

#### Exhibit 175: Comparative income statements

The contribution margin method shows managers the amount of variable costs, the amount of fixed costs, and the contribution the company is making toward covering fixed costs and earning net income. For example, suppose the managers of Bart Company asked, "What would be the impact on net income if we increase sales units by 10 per cent without changing unit price or variable cost per unit or total fixed costs?" Looking at the contribution margin statement, we predict the following increases:

Revenue increase (10% of \$81,000)	\$8,100
Variable cost of goods sold increase (10% of \$27,000)	\$2,700
Increase in total variable selling expense (10% of \$4,500)	450
Increase in total contribution margin	\$4,950

If we assume no increase in fixed costs, we expect Bart's net income to increase by USD 4,950.

The traditional statement does not break down costs into fixed and variable components, so we cannot easily answer the question posed by Bart's management. Most companies use the traditional approach for external financial statements, but they use the contribution margin format for internal purposes because it is more informative. Management often needs information on the contribution margin rather than the gross margin to calculate break-even points and make decisions regarding special-order pricing.

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## An accounting perspective:

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### Uses of technology

Generating multiple financial reports in different formats does not mean companies must keep several sets of books. After data are entered into a database, it is relatively simple for computer software to generate several sets of financial statements—a contribution margin income statement for managers, a traditional income statement for external financial reporting, and yet another report for tax purposes. Two problems remain: First, the reports are only as good as the quality of the data in the database. Second, people who read the financial statements must be sufficiently informed to understand the differences in the way the information is presented.

### Differential analysis

**Differential analysis** involves analyzing the different costs and benefits that would arise from alternative solutions to a particular problem. **Relevant revenues or costs** in a given situation are future revenues or costs that differ depending on the alternative course of action selected. **Differential revenue** is the difference in revenues between two alternatives. **Differential cost or expense** is the difference between the amounts of relevant costs for two alternatives.<sup>53</sup>

Future costs that do not differ between alternatives are irrelevant and may be ignored since they affect both alternatives similarly. Past costs, also known as **sunk costs**, are not relevant in decision making because they have already been incurred; therefore, these costs cannot be changed no matter which alternative is selected.

For certain decisions, revenues do not differ between alternatives. Under those circumstances, management should select the alternative with the least cost. In other situations, costs do not differ between alternatives. Accordingly, management should select the alternative that results in the largest revenue. Many times both future costs and revenues differ between alternatives. In these situations, the management should select the alternative that results in the greatest positive difference between future revenues and expenses (costs).

To illustrate relevant, differential, and sunk costs, assume that Joanna Bennett invested USD 400 in a tiller so she could till gardens to earn USD 1,500 during the summer. Not long afterward, Bennett was offered a job at a horse stable feeding horses and cleaning stalls for USD 1,200 for the summer. The costs that she would incur in tilling are USD 100 for transportation and USD 150 for supplies. The costs she would incur at the horse stable are USD 100 for transportation and USD 50 for supplies. If Bennett works at the stable, she would still have the tiller, which she could loan to her parents and friends at no charge.

The tiller cost of USD 400 is not relevant to the decision because it is a sunk cost. The transportation cost of USD 100 is also not relevant because it is the same for both alternatives. These costs and revenues are relevant:

	<b>Performing tilling service</b>	<b>Working at horse stable</b>	<b>Differential</b>
Revenues	\$1,500	\$1,200	\$300
Costs	150	50	100
Net benefit in favor of tilling			\$200

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<sup>53</sup> Some authors equate relevant cost and differential cost. This text uses the term relevant to identify which costs should be considered in a situation and the term differential to identify the amount by which these costs differ.

## 22. Short-term decision making: Differential analysis

service

Based on this differential analysis, Joanna Bennett should perform her tilling service rather than work at the stable. Of course, this analysis considers only cash flows; nonmonetary considerations, such as her love for horses, could sway the decision.

In many situations, total variable costs differ between alternatives while total fixed costs do not. For example, suppose you are deciding between taking the bus to work or driving your car on a particular day. The differential costs of driving a car to work or taking the bus would involve only the variable costs of driving the car versus the variable costs of taking the bus.

Suppose the decision is whether to drive your car to work every day for a year versus taking the bus for a year. If you bought a second car for commuting, certain costs such as insurance and an auto license that are fixed costs of owning a car would be differential costs for this particular decision.

Before studying the applications of differential analysis, you must realize that (1) two types of fixed costs exist and (2) opportunity costs are also relevant in choosing between alternatives. For this reason, we discuss committed fixed costs, discretionary fixed costs, and opportunity costs before concentrating on the applications of differential analysis.

Up to this point, we have treated fixed costs as if they were all alike. Now we describe two types of fixed costs—committed fixed costs and discretionary fixed costs.

**Committed fixed costs** **Committed fixed costs** relate to the basic facilities and organizational structure that a company must have to continue operations. These costs cannot be changed in the short run without seriously disrupting operations. Examples of committed fixed costs are leases on buildings and equipment and salaries of key executives. In the short run, these costs are not subject to the discretion or control of management. These costs result from past decisions that committed the company for several years. For instance, once a company constructs a building to house production operations, it is committed to use the building for many years. Thus, unlike some other types of fixed costs, the depreciation on that building is not as subject to management's control.

**Discretionary fixed costs** In contrast to committed fixed costs, management controls **discretionary fixed costs** from year to year. Each year management decides how much to spend on advertising, research and development, and employee training or development programs. Because it makes such decisions each year, these costs are under management's discretion. Management is not locked in or committed to a certain level of expense for longer than one budget period. In the next period, management may change the level of expense or eliminate the expense completely.

To some extent, management's philosophy can affect which fixed costs are committed and which are discretionary. For instance, some companies terminate people in the upper levels of management when they downsize, while other companies keep their management team intact. Thus, in some companies the salaries of top-level managers are discretionary while in other companies they are committed.

The discussion of committed fixed costs and discretionary fixed costs is relevant to CVP analysis. When almost all of a company's fixed costs are committed fixed costs, it has more difficulty reducing its break-even point for the next budget period than if most of its fixed costs are discretionary. A company with a large proportion of discretionary fixed costs may be able to reduce fixed costs dramatically in recessionary periods. By running lean, the company may show some income even when economic conditions are difficult. As a result, the company may enhance its chances of long-run survival.

Another cost concept relevant to decision making is opportunity cost. An **opportunity cost** is the potential benefit that is forgone by not following the next best alternative course of action. For example, assume that the two best uses of a plot of land are as a mobile home park (annual income of USD 100,000) and as a golf driving range (annual income of USD 60,000). The opportunity cost of using the land as a mobile home park is USD 60,000, while the opportunity cost of using the land as a driving range is USD 100,000.

Companies do not record opportunity costs in the accounting records because they are the costs of not following a certain alternative. Thus, opportunity costs are not transactions that occurred but that did not occur. However, opportunity cost is a relevant cost in many decisions because it represents a real sacrifice when one alternative is chosen instead of another.

### Applications of differential analysis

To illustrate the application of differential analysis to specific decision problems, we consider five decisions: (1) setting prices of products; (2) accepting or rejecting special orders; (3) adding or eliminating products, segments, or customers; (4) processing or selling joint products; and (5) deciding whether to make products or buy them. Although these five decisions are not the only applications of differential analysis, they represent typical short-term business decisions using differential analysis. Our discussion ignores income taxes.

When applying differential analysis to pricing decisions, each possible price for a given product represents an alternative course of action. The sales revenues for each alternative and the costs that differ between alternatives are the relevant amounts in these decisions. Total fixed costs often remain the same between pricing alternatives and, if so, may be ignored. In selecting a price for a product, the goal is to select the price at which total future revenues exceed total future costs by the greatest amount, thus maximizing income.

A high price is not necessarily the price that maximizes income. The product may have many substitutes. If a company sets a high price, the number of units sold may decline substantially as customers switch to lower-priced competitive products. Thus, in the maximization of income, the expected volume of sales at each price is as important as the contribution margin per unit of product sold. In making any pricing decision, management should seek the combination of price and volume that produces the largest total contribution margin. This combination is often difficult to identify in an actual situation because management may have to estimate the number of units that can be sold at each price.

For example, assume that a company selling fried chicken in the New York market estimates product demand for its large bucket of chicken for a particular period to be:

Choice	Demand
1	15,000 units at \$6 per unit
2	12,000 units at \$7 per unit
3	10,000 units at \$8 per unit
4	7,000 units at \$9 per unit

The company's fixed costs of USD 20,000 per year are not affected by the different volume alternatives. Variable costs are USD 5 per unit. What price should be set for the product? Based on the calculations shown in the table below, the company should select a price of USD 8 per unit because choice (3) results in the greatest total contribution margin. In the short run, maximizing total contribution margin maximizes profits.

Choice	Contribution margin per unit*	Number of units	=	Total margin	Fixed costs	Net income (loss)
	<b>x</b>					
1	\$1	15,000		\$15,000	\$20,000	\$(5,000)
2	2	12,000		24,000	20,000	4,000

## 22. Short-term decision making: Differential analysis

3	3	10,000	30,000	20,000	10,000
4	4	7,000	28,000	20,000	8,000

\*Sales price  
– Variable  
cost.

Sometimes management has an opportunity to sell its product in two or more markets at two or more different prices. Movie theaters, for example, sell tickets at discount prices to particular groups of people—children, students, and senior citizens. Differential analysis can determine whether companies should sell their products at prices below regular levels.

Good business management requires keeping the cost of idleness at a minimum. When operating at less than full capacity, management should seek additional business. Management may decide to accept such additional business at prices lower than average unit costs if the differential revenues from the additional business exceed the differential costs. By accepting special orders at a discount, businesses can keep people employed that they would otherwise lay off.

To illustrate, assume Rios Company produces and sells a single product with a variable cost of USD 8 per unit. (See Exhibit 176 for details.) Annual capacity is 10,000 units, and annual fixed costs total USD 48,000. The selling price is USD 20 per unit and production and sales are budgeted at 5,000 units. Thus, budgeted income before income taxes is USD 12,000, as shown in Exhibit 176.

<b>Rios company</b>			
<b>Income statement</b>			
<b>For the period ending 2011</b>			
<b>May 31</b>			
Revenue (5,000 units at \$20)			\$100,000
Variable costs:			
Direct materials cost	\$20,000		
Labor	5,000		
Overhead	10,000		
Marketing and administrative costs	5,000		
Total variable costs (\$8 per unit)		\$40,000	
Fixed costs:			
Overhead	\$28,000		
Marketing and administrative costs	20,000		
Total fixed costs		48,000	
Total costs (\$17.60 per unit)			88,000
Net income			\$12,000

### Exhibit 176: Rios company before special order

Assume the company receives an order from a foreign distributor for 3,000 units at USD 10 per unit. This USD 10 price is not only half of the regular selling price per unit, but also less than the USD 17.60 average cost per unit (USD 88,000/5,000 units). However, the USD 10 price offered exceeds the variable cost per unit by USD 2. If the company accepts the order, net income increases to USD 18,000.

As shown in the income statement in Exhibit 177, revenue increases to USD 130,000 with the special order. Each of the variable costs increases in total by 60 per cent because total volume increases by 60 per cent (3,000 units in the special order/5,000 units regularly produced).

**Rios company  
Income statement  
For the period ending 2011 May  
31**

Revenue (5,000 units at \$20, 3,000 units at \$10)		\$130,000
Variable costs:		
Direct materials cost	\$32,000	
Labor	8,000	
Overhead	16,000	
Marketing and administrative costs	8,000	
Total variable costs (\$8 per unit)	\$64,000	
Fixed costs:		
Manufacturing overhead	\$28,000	
Marketing and administrative costs	20,000	
Total fixed costs	48,000	
Total costs (\$14 per unit)		112,000
Net income		\$18,000

Exhibit 177: Rios company if special order is accepted

Note that the fixed costs do not increase with the special order. Because the special order does not increase the fixed costs, the special order's revenues need only cover its variable costs.

If Rios Company continues to operate at 50 per cent capacity (producing 5,000 units) it would generate income of only USD 12,000. By accepting the special order, net income increases by USD 6,000.

Differential analysis would provide the following calculations:

	<b>Accept order</b>	<b>Reject order</b>	<b>Differential</b>
Revenues	\$130,000	\$100,000	\$30,000
Costs	112,000	88,000	24,000
Net benefit of accepting order			\$6,000

Variable costs set a floor for the selling price in special-order situations. Even if the price exceeds variable costs only slightly, the additional business increases net income, assuming fixed costs do not change. However, pricing just above variable costs of special-order business often brings only short-term increases in net income. In the long run, companies must cover all of their costs, not just the variable costs.

Periodically, management has to decide whether to add or eliminate certain products, segments, or customers. If you have watched a store or a plant open or close in your area, you have seen the results of these decisions. Differential analysis is useful in this decision making because a company's income statement does not automatically associate costs with certain products, segments, or customers. Thus, companies must reclassify costs as those that the action would change and those that it would not change.

If companies add or eliminate products, they usually increase or decrease variable costs. The fixed costs may change, but not in many cases. Management bases decisions to add or eliminate products only on the differential items; that is, the costs and revenues that change.

To illustrate, assume that the Campus Bookstore is considering eliminating its art supplies department. If the bookstore dropped the art supplies department, it would lose revenues of USD 100,000 annually. The bookstore's management assigns costs of USD 110,000 (USD 80,000 variable and USD 30,000 fixed) to the art supplies department. Therefore, art supplies has an apparent annual loss of USD 10,000 (USD 100,000 revenue minus USD 110,000 costs). But careful cost analysis reveals that if the art supplies department were dropped, the reduction in costs would be only USD 80,000. The USD 30,000 fixed costs were general bookstore fixed costs allocated to the art supplies department. These fixed costs would continue to be incurred and would not be saved by closing the art supplies department. Look at the differential analysis in Exhibit 178. Note that the art supplies department has



## 22. Short-term decision making: Differential analysis

been contributing USD 20,000 (USD 100,000 revenues - USD 80,000 variable costs) annually toward covering the fixed costs of the business. Consequently, its elimination could be a costly mistake unless there is a more profitable use for the vacated facilities.

	<b>Art Supplies Keep</b>	<b>Department Close</b>	<b>Differential</b>
Revenues	\$100,000	\$-0-	\$100,000
Variable costs	80,000	-0-	80,000
Fixed costs	30,000	30,000	-0-
Net benefit of keeping art supplies department			\$ 20,000

Exhibit 178: Differential analysis: Decision whether to close a department

If the company has a profitable alternative use for the vacated facilities, the potential income from that alternative represents an opportunity cost of retaining the product, segment, or customer. Assume, for example, that the bookstore could use the facilities currently occupied by the art supplies department to open a new department to display and sell personal computers, printers, and software. This new department would contribute USD 35,000 to the bookstore's income.

The relevant costs in the decision to retain the art supplies department are USD 115,000 (USD 80,000 of variable manufacturing costs and USD 35,000 of opportunity cost), while the relevant revenues are still USD 100,000. Therefore, the bookstore has a net disadvantage in keeping the art supplies department because it loses USD 15,000 compared to the computer department.

Sometimes two or more products result from a common raw material or production process; these products are called **joint products**. Companies can process these products further or sell them in their current condition. For instance, when Chevron refines crude oil, it produces a wide variety of fuels, solvents, lubricants, and residual petrochemicals.

Management can use differential analysis to decide whether to process a joint product further or to sell it in its present condition. **Joint costs** are those costs incurred up to the point where the joint products split off from each other. These costs are sunk costs and are not considered when deciding whether to process a joint product further before selling it or to sell it in its condition at the split-off point.

The following example illustrates the issue of whether to process or sell joint products. Assume that Pacific Paper, Inc., produces two paper products, A and B, from a common manufacturing process. Each of the products could either be sold in its present form or processed further and sold at a higher price. Data for both products follow:

<b>Product</b>	<b>Selling price per unit at split-off point</b>	<b>Cost per unit of further processing</b>	<b>Selling price per unit after further processing</b>
A	\$10	\$6	\$21
B	12	7	18

The differential revenues and costs of further processing of the two products are as follows:

<b>Product</b>	<b>Differential revenue of further processing</b>	<b>Differential cost of further processing</b>	<b>Net advantage (disadvantage) of further processing</b>
A	\$11	\$6	\$5
B	6	7	(1)

Based on this analysis, Pacific Paper should process product A further to increase income by USD 5 per unit sold. The company should not process product B further because that would decrease income by USD 1 per unit sold.

Companies use this same form of differential analysis to decide whether they should discard their by-products or process them further. **By-products** are additional products resulting from the production of a main product and generally have a small market value compared to the main product. Sometimes companies consider by-products to be waste materials. For example, the bark from trees cut into lumber is a by-product of lumber production. Although a by-product, companies convert this bark into fuel or landscaping material. When the differential revenue of further processing exceeds the differential cost, firms should do further processing. As concerns increase about the effects of waste on the environment, companies find more and more waste materials that can be converted into by-products.

Managers also apply differential analysis to make-or-buy decisions. A **make-or-buy decision** occurs when management must decide whether to make or purchase a part or material used in manufacturing another product. Management must compare the price paid for a part with the additional costs incurred to manufacture the part. When most of the manufacturing costs are fixed and would exist in any case, it is likely to be more economical to make the part rather than buy it.

To illustrate the application of differential analysis to make-or-buy decisions, assume that Small Motor Company manufactures a part costing USD 6 for use in its toy automobile engines. Cost components are: materials, USD 3.00; labor, USD 1.50; fixed overhead costs, USD 1.05; and variable overhead costs, USD 0.45. Small could purchase the part for USD 5.25. Fixed overhead would presumably continue even if the part were purchased. The added costs of manufacturing amount to only USD 4.95 (USD 3.00 + USD 1.50 + USD 0.45). This amount is 30 cents per unit less than the purchase price of the part. Therefore, manufacturing the part should be continued as shown in the following analysis:

	<b>Make</b>	<b>Buy</b>	<b>Differential</b>
Costs	\$4.95	\$5.25	\$0.30
Net advantage of making			\$0.30

In make-or-buy decisions, management also should consider the opportunity cost of not utilizing the space for some other purpose. In the previous example, if the opportunity costs of not using this space in its best alternative use is more than 30 cents per unit times the number of units produced, the part should be purchased.

In some manufacturing situations, firms avoid a portion of fixed costs by buying from an outside source. For example, suppose eliminating a part would reduce production so that a supervisor's salary could be saved. In such a situation, firms should treat these fixed costs the same as variable costs in the analysis because they would be relevant costs.

Sometimes the cost to manufacture may be only slightly less than the cost of purchasing the part or material. Then management should place considerable weight on other factors such as the competency of existing personnel to undertake manufacturing the part or material, the availability of working capital, and the cost of any loans that may be necessary.

### Applying differential analysis to quality

High quality is essential to success in a competitive environment. Therefore, companies use differential analysis to make decisions about the quality of their products.

## 22. Short-term decision making: Differential analysis

Assume Erie Waters produces bottled water. The variable cost of a case (12 one-liter bottles) is as follows:

Water and bottles	\$2.00
Inspection and rework costs	1.00
All other variable costs	3.00
Total variable cost per case	\$6.00

In addition, the company has USD 150,000 of fixed costs per year.

The company inspects the product at various stages. When inspectors find the water is below standard or the bottles have defects, production workers replace the water and/or the bottles. The cost of inspecting the product and replacing water and/or bottles averages USD 1.00 per case, and is shown as inspection and rework costs.

Management of Erie Waters is concerned about product quality. Despite the inspection just noted, management has learned that dissatisfied customers are switching to competitive products. Management is considering purchasing a high-quality water product. This product would increase water and bottle costs to USD 2.50 per case while decreasing inspection and rework costs to USD .40 per case. All other variable costs would remain at USD 3.00 per case. Erie Waters would sell this water for USD 8.00 per case. If the high-quality water is purchased, Erie Waters expects to sell 100,000 cases of water this year at USD 8.00 per case. If Erie continues to use the current low-quality water, the company expects to sell 90,000 cases of water this year at USD 8.00 per case. Fixed costs are USD 150,000 per year whether the company buys high-quality water or low-quality water. Should Erie Waters buy the high-quality water? We compare the two alternatives in Exhibit 179.

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### An accounting perspective:

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#### Business insight

The 1950s through 1970s were boom periods for manufacturing companies in the United States. As one of the few industrial countries left intact after World War II, the United States had little competition from manufacturers in other countries. But, countries such as Japan, Taiwan and Korea made a comeback and dominated in steel, automobiles, and electronics.

By the end of the 20th century, US industry realized that without a substantial improvement in quality, it could not compete in worldwide markets.

	<b>Low-quality water (90,000 cases)</b>	<b>High-quality water (100,000 cases)</b>
Revenue at \$8.00 per case	\$ 720,000	\$ 800,000
Water and bottles at \$2.00 per case for low quality and \$2.50 per case for high quality	(180,000)	(250,000)
Inspection and rework at \$1.00 per case for low quality and \$0.40 per case for high quality	(90,000)	(40,000)
All other variable costs at \$3.00 per case	(270,000)	(300,000)
Fixed costs	(150,000)	(150,000)
Net income	\$ 30,000	\$ 60,000

Exhibit 179: Decision whether to improve quality

Erie Waters should purchase the high-quality water because it increases net income from USD 30,000 to USD 60,000 per year. In addition, a high-quality product improves the company's prospects for maintaining or even increasing its market share in years to come. Many companies have learned the hard way that letting quality slip creates a bad reputation that is hard to overcome.

The focus of this chapter has been short-term decision making. Part of decision making involves planning through the use of budgets. The topic of Chapter 23 is budgeting—an important tool for company management.

### Understanding the learning objectives

- The contribution margin format separates fixed costs from variable costs; the traditional method does not.
- The contribution margin format reports contribution margin; the traditional method reports gross margin.

In a manufacturing company:

(a) Contribution margin = Revenue - Variable manufacturing costs - Variable nonmanufacturing costs

(b) Gross margin = Revenue - Cost of goods sold (where cost of goods sold equals Variable manufacturing cost of goods sold + Fixed manufacturing cost of goods sold)

• Differential analysis involves analyzing the different costs and benefits that would arise from alternative solutions to a particular situation.

• The components are: (1) differential revenue, the difference in revenue between two alternatives; and (2) differential cost or expense, the difference between relevant costs for two alternatives.

• In selecting a price for a product, the goal is to select the price at which total future revenues exceed total future variable costs by the greatest amount or, in other words, the price that results in the greatest total contribution margin.

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### A broader perspective: Differential analysis in sports

When the major sports teams acquire stars, many observers think the price is too high. By using differential analysis, the teams figure that the acquisition will be profitable for the club based on the increased ticket sales and other revenues that would follow the acquisition.

When the a major league baseball team acquires an expensive super-star many people in the baseball world wonder if it is a wise financial decision. In many cases, the team becomes a pennant contender after the acquisition, and attendance at their games increases dramatically compared to the previous year. The differential costs of acquiring the super-star appears to have been justified.

Sports teams routinely face make-or-buy decisions concerning their players. Some teams, such as the New York Yankees, have extensive farm systems. They usually develop players by bringing them up through the system. Teams also buy players by waiting until young players have proven themselves with other teams, then acquiring them. Variable costs set a floor for the selling price in cost analyses. Such pricing should be appraised concerning their long-range effects on company and industry price structures. In the long run, full costs must be covered.

• Costs must be reclassified as those that would be changed by the elimination and those that would not. In effect, one must simply assume elimination and compare the reduction in revenues with the eliminated costs.

## 22. Short-term decision making: Differential analysis

- Joint costs are those costs incurred up to the point where the joint products split off from each other. These costs are sunk costs in deciding whether to process a joint product further before selling it or to sell it in its condition at the split-off point.
- A make-or-buy decision concerns whether to manufacture or purchase a part or material used in manufacturing of another product. The price that would be paid for the part if it were purchased is compared with the additional costs that would be incurred if the part were manufactured.
- High quality is essential to success in a competitive environment. Therefore, companies use differential analysis to make decisions about the quality of their products.

### Demonstration problem

National Express, an international delivery service, is considering eliminating operations in Eastern Europe. If the company dropped the East European market, it would lose revenues of USD 1,000,000 annually. Management assigns costs of USD 1,200,000 (USD 800,000 variable and USD 400,000 fixed) to the East European market. Therefore, the East European market has an apparent annual loss of USD 200,000 per year (USD 1,000,000 revenue minus USD 1,200,000 costs). Careful cost analysis reveals that if East European operations were dropped, the reduction in costs would be only USD 800,000 of variable and USD 250,000 of fixed costs. The remaining USD 150,000 of fixed costs were general fixed costs the company allocated to the East European market. These costs would continue to be incurred and would not be saved by shutting down the East European market.

### Solution to demonstration problem

The differential analysis for National Express's analysis of its East European operations is as follows:

	<b>East European Operations</b>		
	<b>Keep</b>	<b>Eliminate</b>	<b>Differential</b>
Revenues	\$1,000,000	\$ -0-	\$1,000,000
Variable costs	800,000	-0-	800,000
Fixed costs	400,000	150,000	250,000
Net advantage of keeping East European operations open			\$ (50,000)

Elimination of the East European market is justified according to this analysis. By eliminating this market, National Express would reduce revenues by USD 1,000,000 and would reduce costs by USD 1,500,000 (USD 800,000 + USD 250,000), resulting in a USD 50,000 benefit of closing the operations (or a USD 50,000 differential loss by keeping the operations open).

### Key terms\*

**By-products** Additional products resulting from the production of a main product. By-products generally have a small market value compared to the main product.

**Committed fixed costs** Costs relating to the basic facilities and organizational structure that a company must have to continue operations.

**Differential analysis** An analysis of the different costs and benefits that would arise from alternative solutions to a particular problem.

**Differential cost or expense** The difference between the amounts of relevant costs for two alternatives.

**Differential revenue** The difference between the amounts of relevant revenues for two alternatives.

**Discretionary fixed costs** Fixed costs subject to management control from year to year; an example is advertising expense.

**Joint costs** Those production costs incurred up to the point where the joint products split off from each other.

**Joint products** Two or more products resulting from a common raw material or production process.

**Make-or-buy decision** A decision concerning whether to manufacture or purchase a part or material used in manufacturing another product.

**Opportunity cost** The potential benefit that is forgone from not following the next best alternative course of action.

**Relevant revenues or costs** Revenues or costs that will differ in the future depending on which alternative course of action is selected.

**Sunk costs** Past costs that are not relevant in decision making because they have already been incurred.

\*Some terms listed in earlier chapters are repeated here for your convenience.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

Opportunity costs are recorded in the accounting records because they are the costs of not following a certain alternative.

Only variable costs can be differential costs.

Contribution margin is often more valuable to management than gross margin when making decisions.

It is important to estimate sunk costs for decision making.

The decision whether to sell at the split-off point or process further is one that a petroleum company might make.

A restaurant's chef must decide whether to make soup from dry soup mix purchased at a store or to make the soup from scratch using vegetables, meats, and pasta. This decision is an example of a make-or-buy decision.

#### Multiple choice

Select the best answer for each of the following questions.

Differential analysis is best described by which of the following statements:

- Determines only the difference in revenues between two alternatives.
- Analyzes opportunity costs.
- Determines only the difference between relevant costs for two alternatives.
- Analyzes future revenues and costs that differ depending on the course of action selected.

In selecting a price for a product using differential analysis, which of the following decisions should be made?

- The highest price should always be selected.
- The price that will result in the greatest total contribution margin, assuming fixed costs are the same for each price-quantity combination, should be selected.
- Total future revenues should exceed total future variable and fixed costs.
- All of the above.

Which of the following decisions involve differential analysis?

- The decision to close a segment of a business.
- The decision by a record store to add videotapes to its product line.
- The decision by a university to drop its intercollegiate football program.
- All of the above.

Assume Mikey Shoe Company is considering making special shoes just for Olympic athletes. In making this decision, how would you categorize the salary of the president of Mikey?

- Differential variable cost.

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- b. Differential revenue.
- c. Discretionary fixed cost.
- d. Committed fixed cost.

Now turn to “Answer to self-test” at the end of the chapter to check your answers.

### Questions

- Identify types of decisions that can be made using differential analysis.
- What is a committed fixed cost? Give some examples.
- What is a discretionary fixed cost? Give some examples.
- Give an example of a fixed cost that might be considered committed for one company and discretionary for another.
- What is the disadvantage of a company having all committed fixed costs? Explain.
- What is an opportunity cost? Give some examples.
- What essential feature distinguishes the contribution margin income statement from the traditional income statement?
- **Real world question** Give an example of a make-or-buy decision that you have made or someone you know has made.
- **Real world question** Give an example in which your campus bookstore replaces one of its departments with another it currently does not have. (For example, it stops selling magazines and starts selling cameras.) What revenues and costs would be differential?
- **Real world question** Assume that McDonald's, of McDonald's fast-food restaurants, currently buys its french fries from agricultural growers and food processors. In doing so, McDonald's has decided to buy the materials for its french fries instead of "make" them. (Assume that making french fries includes growing the potatoes.) What factors would go into McDonald's decision to buy instead of make french fries?
- **Real world question** Suppose that Wal-Mart, one of the fastest growing companies in the world, were to close one of its stores. Which differential revenues and costs would be affected by that decision?

### Exercises

**Exercise A** The following data are for Paso Robles Company for the year ended 2009 December 31:

Costs:	
Direct material	\$ 90,000
Direct labor	130,000
Manufacturing overhead:	
Variable	45,000
Fixed	90,000
Sales commissions (variable)	25,000
Sales salaries (fixed)	20,000
Administrative expenses (fixed)	35,000
Selling price per unit	\$ 10
Units produced and sold	60,000

Assume direct materials and direct labor are variable costs. Prepare a contribution margin income statement and a traditional income statement.

**Exercise B** Assume you had invested USD 1,000 in a lawn mower to set up a lawn mowing business for the summer. During the first week, you could choose either to mow the grounds at a housing development for USD

1,400 or to help paint a garage for USD 1,360. Each job would take one week. You cannot do both. You would incur additional costs of USD 160 for lawn mowing and USD 80 for garage painting. These costs include USD 60 under each alternative for transportation to the job. Prepare a schedule showing the net benefit or advantage of selecting one alternative over the other.

**Exercise C** The marketing department of Specialty Coffees estimates the following monthly demand for espresso in these four price-quantity relationships:

	<b>Demand</b>
1	9,000 cups at \$1.00 per cup
2	8,000 cups at \$1.25 per cup
3	6,000 cups at \$1.50 per cup
4	4,000 cups at \$1.75 per cup

The fixed costs of USD 3,000 per month are not affected by the different price-volume alternatives. Variable costs are USD 0.25 per cup. What price should Specialty Coffees set for espresso?

**Exercise D** Viking Corporation is operating at 80 per cent of capacity, which means it produces 8,000 units. Variable cost is USD 100 per unit. Wholesaler Y offers to buy 2,000 additional units at USD 120 per unit. Wholesaler Z proposes to buy 1,500 additional units at USD 140 per unit. Which offer, if either, should Viking Corporation accept? Fixed costs are not affected by accepting either offer.

**Exercise E** Analysis of Hair Care Company's citrus hair conditioner reveals that it is losing USD 5,000 annually. The company sells 5,000 units of citrus hair conditioner each year at USD 10 per unit. Variable costs are USD 6 per unit. None of the company's fixed costs would be saved if the citrus hair conditioner were eliminated. What would be the increase or decrease in company net income if citrus hair condition were eliminated?

**Exercise F** The luggage department of Sampson Company has revenues of USD 1,000,000; variable expenses of USD 250,000; direct fixed costs of USD 500,000; and allocated, indirect fixed costs of USD 300,000 in an average year. If the company eliminates this department, what would be the effect on net income?

**Exercise G** Raiders Company manufactures two joint products. At the split-off point, they have sales values of:

Product 1	\$18 per unit
Product 2	12 per unit

After further processing, the company can sell them for USD 36 and USD 16, respectively. Product 1 costs USD 12 per unit to process further and Product 2 costs USD 8 to process further. Should further processing be done on either or both of these products? Why or why not?

**Exercise H** Gopherit Corporation currently is manufacturing 40,000 units per year of a part used in its final product. The cost of producing this part is USD 50 per unit. The variable portion of this cost consists of direct materials of USD 25, direct labor of USD 15, and variable manufacturing overhead of USD 3. The company could earn USD 100,000 per year from the space now used to manufacture this part. Assuming equal quality and availability, what is the maximum price per unit that Gopherit Corporation should pay to buy the part rather than make it? (The total fixed costs would not be affected by this decision.)

**Exercise I** Ortez Company buys strawberries and produces strawberry jam. The variable cost of a case of strawberry jam is as follows:

Materials (strawberries and jars)	\$10.00
Inspection and rework costs	4.00
All other variable costs	8.00
Total variable cost per case	\$22.00

In addition, the company has USD 1,000,000 of fixed costs per year.



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The company inspects the product at various stages. The cost of inspecting the product and replacing jam and/or jars averages USD 4.00 per case, shown as in the inspection and rework costs.

Management is considering purchasing high-quality strawberries. This would increase materials costs to USD 12.00 per case, while decreasing inspection and rework costs to USD 2.00 per case. All other costs would remain at USD 8.00 per case for variable costs and USD 1,000,000 for fixed costs whether or not the high-quality strawberries were purchased. Ortez's jam sells for USD 40 per case. If the high-quality strawberries were purchased, the company could sell 100,000 cases of jam this year at USD 40 per case. If the company continued to use the current low-quality berries, it could sell 80,000 cases of jam this year at USD 40 per case.

Should Ortez purchase the high-quality strawberries?

### Problems

**Problem A** Montonya Company has the following selected data for the current year:

Sales (10,000 units)	\$90,000
Direct materials	30,000
Direct labor costs	10,000
Variable manufacturing overhead	3,500
Fixed manufacturing overhead	7,500
Variable selling and administrative expenses	2,500
Fixed selling and administrative expenses	15,000

The company produced and sold 10,000 units. Direct materials and direct labor are variable costs.

- Prepare an income statement for the current year using the contribution margin format.
- Prepare an income statement for the current year using the traditional format.
- What additional information do you learn from the contribution margin format?

**Problem B** Pick-Me-Up Company is introducing a new coffee in its stores and must decide what price to set for the coffee beans. An estimated demand schedule for the product follows:

Price	One-pound units demanded
\$ 5	80,000
6	72,000
7	56,000
8	48,000
9	36,000
10	30,000

Estimated costs follow:

Variable manufacturing costs	\$2 per unit
Fixed manufacturing costs	\$40,000 per year
Variable selling and administrative costs	\$1 per unit
Fixed selling and administrative costs	\$20,000 per year

- Prepare a schedule showing management the total revenue, total cost, and total profit or loss for each selling price.
- Which price do you recommend to the management of Pick-Me-Up? Explain your answer.

**Problem C** Ocean View Company operates tour boats. Its predicted operations for the year are as follows:

Sales (1,000 tours per year)	\$400,000
Costs:	
Variable	\$250 per tour
Fixed	\$100,000 per year

The company has received a request to offer 100 tours for USD 300 each. Ocean View has plenty of capacity to do these tours in addition to its regular business. Doing these tours would not affect the company's regular sales or its fixed costs.

- Should the company do the special tours for USD 300 per tour?
- What is the effect of the decision on the company's operating profit?

**Problem D** Following are sales and other operating data for the three products made and sold by Ranger Company:

	Product			Total
	A	B	C	
Sales	\$ 600,000	\$ 300,000	\$ 200,000	\$ 1,100,000
Manufacturing costs:				
Fixed	\$ 60,000	\$ 20,000	\$ 60,000	\$ 140,000
Variable	280,000	220,000	100,000	600,000
Selling and administrative expenses:				
Fixed	20,000	20,000	12,000	52,000
Variable	40,000	20,000	30,000	90,000
Total costs	\$ 400,000	\$ 280,000	\$ 202,000	\$ 882,000
Net income	\$ 200,000	\$ 20,000	\$ (2,000)	\$ 218,000

In view of the net loss for Product C, Ranger's management is considering dropping that product. All variable costs are direct costs and would be eliminated if Product C were dropped. Fixed costs are indirect costs; no fixed costs would be eliminated. Assume that the space used to produce Product C would be left idle.

Would you recommend the elimination of Product C? Give supporting computations.

**Problem E** Sierra Lumber Company produces lumber. The company has two grades of lumber at the split-off point, A and B. Grade A sells for USD 4 per board foot and Grade B sells for USD 2 per board foot. This lumber is suitable for framing and most exterior work but not for the interior of buildings. Either grade can be further processed to make it suitable for interior work at a cost of USD 1.20 per board foot. After this further processing, the firm can sell Grade A lumber for USD 5.50 per board foot and Grade B for USD 3.00 per board foot.

Would you recommend the company sell the lumber at the split-off point or process it further to make it suitable for interior work? Explain and give supporting computations.

**Problem F** Skate-Right Company, a skateboard manufacturer, is currently operating at 60 per cent capacity and producing about 8,000 units a year. To use more capacity, the manager has been considering the research and development department's suggestion that the company manufacture its own wheels.

Currently the company purchases wheels from a supplier at a unit price of USD 20. (Each unit is a set of wheels for a skateboard.) Estimates show the company can manufacture its own wheels at USD 10 for direct materials costs and USD 4 for direct labor cost per unit. The variable factory overhead is USD 1 per unit. The company's accountants would probably allocate another USD 6 per unit to the wheels.

- Should Skate-Right make or buy the wheels?
- Suppose Skate-Right could rent out the factory space needed to make the wheels for USD 30,000 a month. How would this affect your decision in (a), if at all?

**Problem G** Quality Calc, Inc., purchases calculator components and assembles them into handheld calculators. The variable cost of one Model A-25 is as follows:

Materials	\$10
Inspection and rework costs	2
All other variable costs	5

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Total variable cost per case     \$17

In addition, this product incurs USD 5,000,000 of fixed costs per year.

The company inspects the product at various stages. The cost of inspecting the product and replacing components averages USD 2 per calculator, shown as the inspection and rework costs.

Management is considering purchasing better components that would both increase quality and expand the calculator's capacity. These new components would increase materials costs to USD 12.50 per calculator, but would decrease inspection and rework costs to USD 1.50 per calculator. All other variables cost would remain at USD 5 per calculator. Fixed costs would remain at USD 5,000,000 per year.

Quality Calc currently sells each A-25 calculator for USD 25 at a volume of 1 million calculators per year. Management believes it can increase the price of the calculator (which would now be called the A-25 STAR) to USD 30 per calculator because of its increased capability. Sales volume would remain at 1 million calculators per year for the improved A-25 STAR. Should Quality Calc purchase the better components?

### Alternate problems

**Alternate problem A** The following data are for Nets Company for the current year:

Sales (20,000 units)	\$750,000
Direct materials	270,000
Direct labor cost	90,000
Variable manufacturing overhead	27,000
Fixed manufacturing overhead	36,000
Variable selling and administrative expenses	45,000
Fixed selling and administrative expenses	150,000

The company produced and sold 20,000 units.

- Prepare an income statement for the current year using the contribution margin format.
- Prepare an income statement for the current year using the traditional format.
- What additional information does the contribution margin format provide compared to the traditional format?

**Alternate problem B** The Havana Company is introducing a new product and must decide its price. An estimated demand schedule for the product is as follows:

Price	Units demanded
\$ 5	20,000
6	18,000
7	14,000
8	12,000
9	9,000
10	8,000

Estimated costs are as follows:

Variable manufacturing costs	\$2.20 per unit
Fixed manufacturing costs	\$20,000 per year
Variable selling and administrative costs	\$1.00 per unit
Fixed selling and administrative costs	\$5,000 per year

- Prepare a schedule showing the total revenue, total cost, and total profit or loss for each selling price.
- Which price should Havana select? Explain.

**Alternate problem C** Following are sales and other operating data for the three products made and sold by Marine Enterprises:

### Product

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	<b>A</b>	<b>B</b>	<b>C</b>	<b>Total</b>
Sales	\$150,000	\$90,000	\$240,000	\$480,000
Manufacturing costs:				
Fixed	\$ 15,000	\$25,000	\$ 30,000	\$ 70,000
Variable	120,000	35,000	134,000	289,000
Selling and administrative expenses:				
Fixed	5,000	30,000	10,000	45,000
Variable	2,500	5,000	6,000	13,500
Total costs	\$142,500	\$95,000	\$180,000	\$417,500
Net income (loss)	\$ 7,500	\$(5,000)	\$ 60,000	\$ 62,500

In view of the net loss shown for Product B, company management is considering dropping that product. All variable costs are direct costs and would be eliminated if Product B were dropped; all fixed costs are indirect costs and would not be eliminated. Assume that the space used to produce Product B would be left idle.

Would you recommend the elimination of Product B? Give supporting computations.

**Alternate problem D** Sailboard Enterprises, a wind sailing board manufacturer, is currently operating at 70 per cent capacity and producing about 20,000 units a year. To use more capacity, the manager has been considering the research and development department's suggestion that Sailboard manufacture its own sails. Currently Sailboard purchases sails from a supplier at a unit price of USD 100. Estimates show that Sailboard can manufacture its own sails for a USD 40 direct materials cost and a USD 32 direct labor cost per unit. The variable factory overhead is USD 8 per sail. The company's accountants would allocate fixed manufacturing overhead of USD 30 per sail to the sail production.

- Should Sailboard Enterprises make or buy the sails?
- Suppose that Sailboard Enterprises could rent out the part of the factory that would otherwise be used for sail manufacturing for USD 8,000 a month. How would this affect the decision in (a)?

**Alternate problem E** Cool-Snacks Company produces and sells ice cream for ice cream shops. Management is considering purchasing better ingredients. The variable cost of producing a gallon of ice cream is as follows:

Materials (cream, containers, etc.)	\$1.40
Inspection and replacement costs	.40
All other variable costs	.70
Total variable cost per gallon	\$2.50

In addition, the company has USD 1,000,000 of fixed costs per year.

The company inspects the product at various stages. The cost of inspecting the product and replacing ice cream averages USD 0.40 per gallon, shown as the inspection and replacement costs.

Management is considering purchasing high-quality ingredients, in particular, high-quality dairy products. These high-quality ingredients would increase materials costs to USD 1.80 per gallon, but would decrease inspection and replacement costs to USD 0.30 per gallon. All other costs would remain at USD 0.70 per gallon for variable costs and USD 1,000,000 for fixed costs whether or not the high-quality ingredients are purchased. If the high-quality ingredients are purchased, the company expects to sell 1,200,000 gallons of ice cream this year at USD 4 per gallon. If the company continues to use the current low-quality ingredients, the company expects to sell 1,000,000 gallons of ice cream at USD 3.50 per gallon. Should Cool-Snacks Company buy the high-quality ingredients for its ice cream?

**Beyond the numbers—Critical thinking**

**Business decision case A** Prior to 2011, Starks Wholesalers Company had not kept department income statements. To achieve better management control, the company decided to install department-by-department

## 22. Short-term decision making: Differential analysis

accounts. At the end of 2011, the new accounts showed that although as a whole the business was profitable, the dry goods department had a substantial loss. The following income statement for the dry goods department reports on operations for 2011:

<b>Starks wholesalers company</b>		
<b>Dry goods department</b>		
<b>Partial income statement for 2011</b>		
Sales		\$1,200,000
Cost of goods sold		800,000
Gross margin		\$ 400,000
Costs:		
Payroll, direct labor, and supervision	\$120,000	
Commissions of sales staff <sup>a</sup>	60,000	
Rent <sup>b</sup>	40,000	
Insurance on inventory	20,000	
Depreciation <sup>c</sup>	80,000	
Administration and general office <sup>d</sup>	80,000	
Interest for inventory carrying costs <sup>e</sup>	10,000	
Total costs		410,000
Net income (loss)		\$ (10,000)

<sup>A</sup> All sales staff are compensated on straight commission on sales.

<sup>B</sup> Rent charged to departments on a square-foot basis. The company rents an entire building, and the dry goods department occupies 15% of the building.

<sup>C</sup> Depreciation is 8.5% of the cost of the departmental equipment.

<sup>D</sup> Allocated on basis of departmental sales as a fraction of total company sales.

<sup>E</sup> Based on average inventory quantity multiplied by the company's borrowing rate for three-month loans.

Analysis of these results has led management to suggest closing the dry goods department. Members of the management team agree that keeping the dry goods department is not essential to maintaining good customer relations and supporting the rest of the company's business. In other words, eliminating the dry goods department is expected to have no effect on the amount of business done by the other departments.

Prepare a written report recommending whether or not Starks should close the dry goods department. Explain why. State your assumptions.

**Business decision case B** After working for a software company for several years, Chris and Terry quit their jobs and set up their own consulting firm called C & T Software, Inc. Major customers include corporate, professional, and government organizations that are setting up information networks.

The cost per billable hour of service at the company's normal volume of 3,000 billable hours per month follows. (A billable hour is one hour billed to a client.)

Average cost per hour billed to client:		
Variable labor – consultants	\$50	
Variable overhead, including supplies and clerical support	20	
Fixed overhead, including allowance for unbilled hours	80	
		\$150
Marketing and administrative costs per billable hour (all fixed)	40	
Total hourly cost		\$190

Treat each of the following questions independently. Unless given otherwise, the regular fee per hour is USD 200.

a. How many hours must the firm bill per month to break even? (You may need to refer to Chapter 21 to answer this question.)

b. Market research estimates that a fee increase to USD 250 per hour would decrease monthly volume to 2,000 hours. The accounting department estimates that fixed overhead costs would be USD 120 per hour, while variable cost per hour would remain unchanged. What effect would a fee increase have on profits?

c. Assume C & T Software is operating at its normal volume of 3,000 hours per month. It has received a special request from one of its long-time customers to provide services on a special-order basis. Because of the long-term nature of the contract (four months) and the magnitude (1,000 hours per month), the customer believes a fee reduction is in order. C & T Software has a capacity limitation of 4,000 hours per month. Fixed costs would not change if the firm accepts the special order. What is the lowest fee C & T Software would be willing to charge?

**Business decision case C** Refer to "A broader perspective: Differential analysis in sports". In a memorandum to your instructor identify which costs and revenues you think would be differential for a sports team acquiring a major star like Bonds. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project D** In teams of two or three students, visit a local department store and imagine the types of costs that it would save if it closed a significant department (for example, the housewares department). List the types of costs that would be saved, but do not attempt to assign numbers to those costs. For example, would rent be saved? Would security be saved? What about taxes on inventories? Consider the effects of closing the department on the people who work there. As a team, write a memorandum describing the costs saved and the effects of closing a department in a local department store. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project E** A manager in your organization just received a special order at a price that is "below cost". The manager points to the document and says, "These are the kinds of orders that will get you in trouble. Every sale must bear its share of the full costs of running the business. If we sell below our full cost, we will be out of business in no time." In groups of two or three students, write a memorandum to your instructor stating whether you agree with this comment or not and explain why. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project F** Form a group of two or three students. Assume you are considering driving to a weekend resort for a quick break from school. What are the differential costs of operating your car for the drive? Write a memorandum to your instructor addressing this question. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

#### Using the Internet—A view of the real world

Visit the website for Intel Corporation, a high technology manufacturing company.

<http://www.intel.com>

Go to the company's most recent financial statements and review the consolidated statement of income. Looking at the most recent year on the statement of income, assume 70 per cent of the cost of sales are variable costs and the remaining 30 per cent are fixed costs. Furthermore, assume all other costs and expenses (research and development, marketing, general and administrative, interest, taxes, etc.) are 60 per cent variable and 40 per cent fixed. Prepare an income statement using the contribution margin format. Be sure to submit a copy of Intel's consolidated statement of income with the contribution margin income statement.

Visit the following website for Wal-Mart, a retail company.

<http://www.walmart.com>

Go to the company's most recent financial statements and review the statement of income. Looking at the most recent year on the statement of income, assume 45 per cent of the cost of sales are variable costs and the remaining 55 per cent are fixed costs. Furthermore, assume all other costs and expenses (research and development,

## 22. Short-term decision making: Differential analysis

marketing, general and administrative, interest, taxes, etc.) are 30 per cent variable and 70 per cent fixed. Prepare an income statement using the contribution margin format. Be sure to submit a copy of Wal-Mart's income statement with the contribution margin income statement.

### Answers to self-test

#### True-false

**False.** Opportunity costs are not recorded in the accounting records. However, opportunity costs are relevant costs in many decisions because they represent real sacrifices that come about because one alternative is chosen instead of another.

**False.** Fixed costs also can be differential costs. For example, the differential cost between operating at a production level of 40,000 units compared to 60,000 units might include increases in both variable and fixed costs.

**True.** The contribution margin is often more important to management because it is needed to calculate break-even points and make decisions.

**False.** Sunk costs are not relevant for decision making.

**True.** Petroleum companies make this decision; for example, they might decide whether to sell crude oil or refine it further into gasoline or other petroleum products.

**True.** A decision to make the soup from scratch is a make decision; deciding to make the soup from purchased mix is a buy decision.

#### Multiple-choice

**d.** Differential analysis estimates future revenues and costs that differ depending on the course of action.

**b.** This is the best answer. Assuming fixed costs remain the same for each price-quantity combination, maximizing the total contribution margin maximizes net income. We did not choose (c) because it does not result in net income maximization, merely that net income be greater than zero.

**d.** All of these decisions involve differential analysis.

**d.** The president's salary would be a committed fixed cost. (Those who believe the salary should be a discretionary fixed cost have a good point.)

# 23. Budgeting for planning and control

## A manager's perspective

Jim Wardlaw

Regional Vice President and General Manager

Atlanta Region

The Coca-Cola Company

I began my career with The Coca-Cola Company as an account manager supplying product to local stores and restaurants in my territory. I then spent some time as Area Marketing Manager and Area Sales Development Manager before reaching my current position.

As Regional Vice President and General Manager, I oversee the administration and operations of a region spanning 150,000 square miles, and one of my primary objectives is to maintain a successful return on investment. I manage three division vice presidents and four regional vice presidents, and I try to spend about 60 percent of my time working with account managers who call on retail trade accounts.

In fact, a lot of my job is providing training and inspiration. We hold monthly meetings with each division to assess sales and provide motivation for the account managers. I also monitor daily key indicator reports to track sales performance in the region.

Behind increasing sales, a strong emphasis on training is one of my most important objectives. For example, Coca-Cola recently instituted a six-week training program for new account managers. The program brings new members of the sales team up to speed on the company and sales techniques, then puts them out in the field. Our sales base is constantly expanding, and we are starting to call on different buyers, so we need ongoing training to stay competitive.

All of this training helps the region achieve its number one objective—increasing sales and making the "bottom line". Sales for each division are closely monitored, and we measure employees' performances against the sales budget established for the region.

In managing your personal finances, you may prepare a written plan of your anticipated cash inflows and outflows. In fact, financial advisors often recommend that we prepare a written plan of cash inflows and outflows, then—here is the hard part—follow it. Such a written plan is a budget.

Companies prepare budgets to plan for and then control their revenues (inflows) and expenses (outflows). Failure to prepare a budget could lead to significant cash flow problems or even financial disaster for a company. In fact, one of the leading causes of failure in small businesses is failing to plan and control operations through the use of budgets.

This chapter first provides a conceptual foundation for budgeting. Then we describe and illustrate a master budget. The chapter concludes with special topics relating to budgeting.



## 23. Budgeting for planning and control

### The budget—For planning and control

Time and money are scarce resources to all individuals and organizations; the efficient and effective use of these resources requires planning. Planning alone, however, is insufficient. Control is also necessary to ensure that plans actually are carried out. A **budget** is a tool that managers use to plan and control the use of scarce resources. A budget is a plan showing the company's objectives and how management intends to acquire and use resources to attain those objectives.

Companies, nonprofit organizations, and governmental units use many different types of budgets. Responsibility budgets, discussed in Chapter 25, are designed to judge the performance of an individual segment or manager. Capital budgets, discussed in Chapter 26, evaluate long-term capital projects such as the addition of equipment or the relocation of a plant. This chapter examines the **master budget**, which consists of a planned operating budget and a financial budget. The **planned operating budget** helps to plan future earnings and results in a projected income statement. The **financial budget** helps management plan the financing of assets and results in a projected balance sheet.

The budgeting process involves planning for future profitability because earning a reasonable return on resources used is a primary company objective. A company must devise some method to deal with the uncertainty of the future. A company that does no planning whatsoever chooses to deal with the future by default and can react to events only as they occur. Most businesses, however, devise a blueprint for the actions they will take given the foreseeable events that may occur.

A budget: (1) shows management's operating plans for the coming periods; (2) formalizes management's plans in quantitative terms; (3) forces all levels of management to think ahead, anticipate results, and take action to remedy possible poor results; and (4) may motivate individuals to strive to achieve stated goals.

Companies can use budget-to-actual comparisons to evaluate individual performance. For instance, the standard variable cost of producing a personal computer at IBM is a budget figure. This figure can be compared with the actual cost of producing personal computers to help evaluate the performance of the personal computer production managers and employees who produce personal computers. Chapter 24 illustrates this type of comparison.

Many other benefits result from the preparation and use of budgets. For example: (1) businesses can better coordinate their activities; (2) managers become aware of other managers' plans; (3) employees become more cost conscious and try to conserve resources; (4) the company reviews its organization plan and changes it when necessary; and (5) managers foster a vision that otherwise might not be developed.

The planning process that results in a formal budget provides an opportunity for various levels of management to think through and commit future plans to writing. In addition, a properly prepared budget allows management to follow the management-by-exception principle by devoting attention to results that deviate significantly from planned levels. For all these reasons, a budget must clearly reflect the expected results.

Failing to budget because of the uncertainty of the future is a poor excuse for not budgeting. In fact, the less stable the conditions, the more necessary and desirable is budgeting, although the process becomes more difficult. Obviously, stable operating conditions permit greater reliance on past experience as a basis for budgeting. Remember, however, that budgets involve more than a company's past results. Budgets also consider a company's future plans and express expected activities. As a result, budgeted performance is more useful than past performance as a basis for judging actual results.

A budget should describe management's assumptions relating to: (1) the state of the economy over the planning horizon; (2) plans for adding, deleting, or changing product lines; (3) the nature of the industry's competition; and (4) the effects of existing or possible government regulations. If these assumptions change during the budget period, management should analyze the effects of the changes and include this in an evaluation of performance based on actual results.

Budgets are quantitative plans for the future. However, they are based mainly on past experience adjusted for future expectations. Thus, accounting data related to the past play an important part in budget preparation. The accounting system and the budget are closely related. The details of the budget must agree with the company's ledger accounts. In turn, the accounts must be designed to provide the appropriate information for preparing the budget, financial statements, and interim financial reports to facilitate operational control.

Management should frequently compare accounting data with budgeted projections during the budget period and investigate any differences. Budgeting, however, is not a substitute for good management. Instead, the budget is an important tool of managerial control. Managers make decisions in budget preparation that serve as a plan of action.

The period covered by a budget varies according to the nature of the specific activity involved. Cash budgets may cover a week or a month; sales and production budgets may cover a month, a quarter, or a year; and the general operating budget may cover a quarter or a year.

**Budgeting** involves the coordination of financial and nonfinancial planning to satisfy organizational goals and objectives. No foolproof method exists for preparing an effective budget. However, budget makers should carefully consider the conditions that follow:

**Top management support** All management levels must be aware of the budget's importance to the company and must know that the budget has top management's support. Top management, then, must clearly state long-range goals and broad objectives. These goals and objectives must be communicated throughout the organization. Long-range goals include the expected quality of products or services, growth rates in sales and earnings, and percentage-of-market targets. Overemphasis on the mechanics of the budgeting process should be avoided.

**Participation in goal setting** Management uses budgets to show how it intends to acquire and use resources to achieve the company's long-range goals. Employees are more likely to strive toward organizational goals if they participate in setting them and in preparing budgets. Often, employees have significant information that could help in preparing a meaningful budget. Also, employees may be motivated to perform their own functions within budget constraints if they are committed to achieving organizational goals.

**Communicating results** People should be promptly and clearly informed of their progress. Effective communication implies (1) timeliness, (2) reasonable accuracy, and (3) improved understanding. Managers should effectively communicate results so employees can make any necessary adjustments in their performance.

**Flexibility** If significant basic assumptions underlying the budget change during the year, the planned operating budget should be restated. For control purposes, after the actual level of operations is known, the actual revenues and expenses can be compared to expected performance at that level of operations.

**Follow-up** Budget follow-up and data feedback are part of the control aspect of budgetary control. Since the budgets are dealing with projections and estimates for future operating results and financial positions, managers must continuously check their budgets and correct them if necessary. Often management uses performance reports as a follow-up tool to compare actual results with budgeted results.

### 23. Budgeting for planning and control

The term budget has negative connotations for many employees. Often in the past, management has imposed a budget from the top without considering the opinions and feelings of the personnel affected. Such a dictatorial process may result in resistance to the budget. A number of reasons may underlie such resistance, including lack of understanding of the process, concern for status, and an expectation of increased pressure to perform. Employees may believe that the performance evaluation method is unfair or that the goals are unrealistic and unattainable. They may lack confidence in the way accounting figures are generated or may prefer a less formal communication and evaluation system. Often these fears are completely unfounded, but if employees believe these problems exist, it is difficult to accomplish the objectives of budgeting.

Problems encountered with such imposed budgets have led accountants and management to adopt participatory budgeting. **Participatory budgeting** means that all levels of management responsible for actual performance actively participate in setting operating goals for the coming period. Managers and other employees are more likely to understand, accept, and pursue goals when they are involved in formulating them.

Within a participatory budgeting process, accountants should be compilers or coordinators of the budget, not preparers. They should be on hand during the preparation process to present and explain significant financial data. Accountants must identify the relevant cost data that enables management's objectives to be quantified in dollars. Accountants are responsible for designing meaningful budget reports. Also, accountants must continually strive to make the accounting system more responsive to managerial needs. That responsiveness, in turn, increases confidence in the accounting system.

Although many companies have used participatory budgeting successfully, it does not always work. Studies have shown that in many organizations, participation in the budget formulation failed to make employees more motivated to achieve budgeted goals. Whether or not participation works depends on management's leadership style, the attitudes of employees, and the organization's size and structure. Participation is not the answer to all the problems of budget preparation. However, it is one way to achieve better results in organizations that are receptive to the philosophy of participation.

A **master budget** consists of a projected income statement (planned operating budget) and a projected balance sheet (financial budget) showing the organization's objectives and proposed ways of attaining them. In Exhibit 180, we depict a flowchart of the financial planning process that you can use as an overview of the elements in a master budget. The remainder of this chapter describes how a company prepares a master budget. We emphasize the master budget because of its prime importance to financial planning and control in a business entity.

**Illustration 23.1** Flowchart of the Financial Planning Process

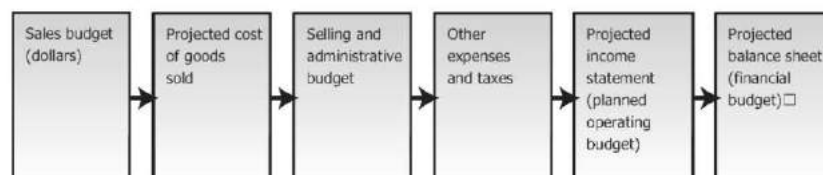


Exhibit 180: Flowchart of the financial planning process

The budgeting process starts with management's plans and objectives for the next period. These plans take into consideration various policy decisions concerning selling price, distribution network, advertising expenditures, and

environmental influences from which the company forecasts its sales for the period (in units by product or product line). Managers arrive at the sales budget in dollars by multiplying sales units times sales price per unit. They use expected production, sales volume, and inventory policy to project cost of goods sold. Next, managers project operating expenses such as selling and administrative expenses.

This chapter cannot cover all areas of budgeting in detail—entire books have been written on budgeting. However, the following presentation provides an overview of a budgeting procedure that many successful companies have used. We begin by discussing the planned operating budget or projected income statement.

The projected balance sheet, or financial budget, depends on many items in the projected income statement. Thus, the logical starting point in preparing a master budget is the projected income statement, or planned operating budget. However, since the planned operating budget shows the net effect of many interrelated activities, management must prepare several supporting budgets (sales, production, and purchases, to name a few) before preparing the planned operating budget. The process begins with the sales budget.

**Sales budget** The cornerstone of the budgeting process is the sales budget because the usefulness of the entire operating budget depends on it. The sales budget involves estimating or forecasting how much demand exists for a company's goods and then determining if a realistic, attainable profit can be achieved based on this demand. Sales forecasting can involve either formal or informal techniques, or both.

Formal sales forecasting techniques often involve the use of statistical tools. For example, to predict sales for the coming period, management may use economic indicators (or variables) such as the gross national product or gross national personal income, and other variables such as population growth, per capita income, new construction, and population migration.

To use economic indicators to forecast sales, a relationship must exist between the indicators (called independent variables) and the sales that are being forecast (called the dependent variable). Then management can use statistical techniques to predict sales based on the economic indicators.

Management often supplements formal techniques with informal sales forecasting techniques such as intuition or judgment. In some instances, management modifies sales projections using formal techniques based on other changes in the environment. Examples include the effect on sales of any changes in the expected level of advertising expenditures, the entry of new competitors, and/or the addition or elimination of products or sales territories. In other instances, companies do not use any formal techniques. Instead, sales managers and salespersons estimate how much they can sell. Managers then add up the estimates to arrive at total estimated sales for the period.

Usually, the sales manager is responsible for the sales budget and prepares it in units and then in dollars by multiplying the units by their selling price. The sales budget in units is the basis of the remaining budgets that support the operating budget.

**Production budget** The **production budget** considers the units in the sales budget and the company's inventory policy. Managers develop the production budget in units and then in dollars. Determining production volume is an important task. Companies should schedule production carefully to maintain certain minimum quantities of inventory while avoiding excessive inventory accumulation. The principal objective of the production budget is to coordinate the production and sale of goods in terms of time and quantity.

Companies using a just-in-time inventory system, which we discussed in Chapter 20, need to closely coordinate purchasing, sales, and production. In general, maintaining high inventory levels allows for more flexibility in coordinating purchases, sales, and production. However, businesses must compare the convenience of carrying

### 23. Budgeting for planning and control

inventory with the cost of carrying inventory; for example, they must consider storage costs and the opportunity cost of funds tied up in inventory.

Firms often subdivide the production budget into budgets for materials, labor, and manufacturing overhead. Usually materials, labor, and some elements of manufacturing overhead vary directly with production within a given relevant range of production. Fixed manufacturing overhead costs do not vary directly with production but are constant in total within a relevant range of production. For example, fixed manufacturing overhead costs may be USD 150,000 when production ranges from 60,000 to 80,000 units. However, when production is 80,001 to 95,000 units, the fixed manufacturing overhead costs might be USD 250,000. To determine fixed manufacturing overhead costs accurately, management must determine the relevant range for the expected level of operations.

**Selling, administrative, and other expense budgets (schedules)** The costs of selling a product are closely related to the sales forecast. Generally, the higher the forecast, the higher the selling expenses. Administrative expenses are likely to be less dependent on the sales forecast because many of the items are fixed costs (e.g. salaries of administrative personnel and depreciation of administrative buildings and office equipment). Managers must also estimate other expenses such as interest expense, income tax expense, and research and development expenses. Once management has prepared the planned operating budget, the next task is to prepare the financial budget (or projected balance sheet).

Preparing a projected balance sheet, or financial budget, involves analyzing every balance sheet account. The beginning balance for each account is the amount on the balance sheet prepared at the end of the preceding period. Then, managers consider the effects of any planned activities on each account. Many accounts are affected by items appearing in the operating budget and by either cash inflows or outflows. Cash inflows and outflows usually appear in a cash budget discussed later in the chapter.

The complexities encountered in preparing the financial budget often require the preparation of detailed schedules. These schedules analyze such things as planned accounts receivable collections and balances, planned material purchases, planned inventories, changes in all accounts affected by operating costs, and the amount of federal income taxes payable. Dividend policy, inventory policy, financing policy and constraints, credit policy, and planned capital expenditures also affect the amounts in the financial budget.

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#### An accounting perspective:

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#### Business insight

To a manager, a budget is like an architect's blueprints or a house builder's plans. Like the blueprints, a budget shows the details of each part of the plan and how the various parts fit together into the overall plan. Production people focus on production plans, salespeople focus on sales plans, and financial people focus on projected cash receipts and disbursements. The general manager, like the house builder, must be able to see the big picture and tie all of the pieces together.

## The master budget illustrated

Earlier this chapter discussed general concepts relating to the preparation of a master budget. This section illustrates the step-by-step preparation of a master budget for 2010 for Leed Company, which manufactures low-priced running shoes.

A company develops its planned operating budget in units rather than dollars. Because revenues and many expenses vary with volume, they can be forecasted more easily after the company estimates sales and production quantities.

To illustrate this step, assume that Leed's management forecasts sales for the year 2010 at 100,000 units (each pair of shoes is one unit). Quarterly sales are expected to be 20,000, 35,000, 20,000, and 25,000 units, reflecting higher demand for shoes in the late spring and again around Christmas.

Assuming the company's policy is to stabilize production, it would produce 100,000 units uniformly throughout the year. Therefore, production would be 25,000 units per quarter (100,000 units/four quarters). To simplify our example, assume the company has no beginning or ending work in process inventories (although it would be equivalent to assume that work in process inventories would remain at a constant amount throughout the year). Finished goods inventory on 2010 January 1, is 10,000 units. From these data, we can prepare the schedule of planned production and sales. Exhibit 181 shows the first two quarters.

### Leed Company Planned production and Sales (in units)

	Quarter 2010 March 31	Ending 2010 June 30
Beginning finished goods inventory	10,000*	15,000
Add: Planned production	25,000	25,000
Units available for sale	35,000	40,000
Less: sales forecast	20,000	35,000
Ending finished goods inventory	15,000	5,000

\* Actual on January 1

Exhibit 181: Leed Company: Planned production and sales (in units) for the first two quarters of 2010

Notice that if Leed wants to maintain a stable production of running shoes, it must allow the ending inventory to fluctuate if sales vary. Thus, the finished goods inventory is affected by the difference between production and sales. When establishing inventory policy, Leed's management has decided that it is less costly to deal with fluctuating inventories than with fluctuating production.

Sometimes we receive sales and ending inventory data described as a certain percentage of the next period's sales, and we must calculate the required level of production. Assume Leed Company wishes to have ending inventory of 15,000 units. We could use the following format to calculate planned production:

Sales forecast (units) – current quarter	20,000
Add: Planned ending finished goods inventory	15,000
Total units required for the period	35,000
Deduct: Beginning finished goods inventory	10,000
Planned production (units)	25,000

Next, Leed's management must introduce dollars into the analysis. To do this, management forecasts the expected selling price and costs. Exhibit 182, shows Leed's forecasted selling price and costs. Note that Leed's management classifies costs into variable or fixed categories and budgets accordingly. As noted earlier, **variable costs** vary in total directly with production or sales. **Fixed costs** are unaffected in total by the relative level of production or sales.

## 23. Budgeting for planning and control

### Leed Company Budget Estimates of selling price and costs For quarters ending March 31 and 2010 June 30

Forecasted selling price	\$ 20
Manufacturing costs:	
Variable (per unit manufactured):	
Direct materials	2
Direct labor	6
Manufacturing overhead	1
Fixed overhead (total each quarter)	75,000
Selling and administrative expenses:	
Variable (per unit sold)	2
Fixed (total each quarter)	100,000

#### Exhibit 182: Leed Company: Budget estimate of selling price and costs

Management must now prepare a schedule to forecast cost of goods sold, the next major amount in the planned operating budget. Exhibit 183, shows this schedule. Notice that the beginning finished goods inventory amount for the quarter ending March 31 is the amount shown on the 2009 December 31, year-end balance sheet (see Exhibit 188). From the data in Exhibit 182, management calculates the cost of goods manufactured using the variable costs of production plus an allocated amount of fixed manufacturing overhead (USD 75,000/25,000 units). The amount of ending finished goods inventory is the number of units determined to be in ending inventory (from Exhibit 181) times the cost per unit manufactured during the period.

### Leed Company Planned cost of goods sold

	Quarter 2010 March 31	Ending 2010 June 30
Beginning finished goods inventory	\$130,000*	\$180,000
Cost of goods manufactured:		
Direct materials (25,000 x \$2)	\$ 50,000	\$ 50,000
Direct labor (25,000 x \$6)	150,000	150,000
Variable manufacturing overhead (25,000 x \$1)	25,000	25,000
Fixed manufacturing overhead (per Exhibit 182)	75,000	75,000
Cost of goods manufactured (25,000 units at \$12)	\$300,000	\$300,000
Cost of goods available for sale	\$430,000	\$480,000
Ending finished goods inventory:		
(15,000 at \$12)†	180,000	
(5,000 at 12)		60,000
Cost of goods sold	\$250,000	\$420,000

\* Actual on January 1 (10,000 at \$13);  
see balance sheet Exhibit 188.

† First in, first-out procedure assumed.

#### Exhibit 183: Leed Company: Planned cost of goods sold

After managers forecast cost of goods sold, they prepare a separate budget for all selling and administrative expenses. Several supporting schedules may be prepared for items such as advertising expense, office expense, and payroll department expense. Although we do not show the schedules to support budgeted selling and administrative expenses here, note the total selling and administrative expenses for each of the first two quarters in the planned operating budget in Exhibit 184.

Exhibit 184 shows the operating budget for Leed Company. We have discussed and explained all of the items appearing in the planned operating budget except the income tax accrual. State and federal income taxes are budgeted for Leed Company at an assumed rate of 40 per cent of income before income taxes.

If the planned operating budget does not show the desired net income, managers must formulate new operating plans and develop a new budget. The purpose of preparing a planned operating budget is to gain some knowledge of the results of a period's activities before they actually occur.

A company seldom operates at the level of operations assumed in preparing the planned operating budget. After the company knows the results of actual operations, management compares actual expenses with budgeted expenses at the actual level of operations. To facilitate adjusting the budgeted items to the actual level of operations, management sometimes prepares in advance flexible budgets for the entire operating budget or for certain expenses. The next section discusses these flexible operating budgets and shows how companies prepare budget variances.

Early in the chapter, you learned that a budget should be adjusted for changes in assumptions or variations in the level of operations. Managers use a technique known as flexible budgeting to deal with budgetary adjustments. A **flexible operating budget** is a special kind of budget that provides detailed information about budgeted expenses (and revenues) at various levels of output.

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### A broader perspective: Planning in a changing environment

Few industries have changed as much in the past decade as the telephone industry. The old-fashioned phone company monopoly is over; it now faces intense competition from new technologies ranging from wireless telephones to free audio and video calls over the Internet. Many people no longer have land line phones and only use wireless phones. Indeed, the industry has been transformed by rapidly changing technology and accompanying changes in consumer behavior.

Verizon Communications, Inc. provides telecommunications services. Its old approach to planning and budgeting was not dynamic and creative enough to deal with the new competitive environment. To start thinking about planning in the new environment, the company's managers met to discuss the company's basic values. These managers developed such values as respect and trust in each other, excellence, profitable growth, individual fulfillment, and integrity as the foundation for the company's goals and plans. Management then established corporate goals along the lines of these values, such as profit growth goals, and goals for achieving excellence in customer service, taking the changing competitive environment into account.

Employee participation in setting goals, planning, and budgeting has been key to Verizon Communications, Inc. in communicating corporate values and goals. To communicate the company's goals, top management wrote down the company's basic business problems and the steps they wanted to take to solve these problems. This action put Verizon's goals in terms that employees could understand. After this communication step, employees knew better how to relate their day-to-day work activities to the big picture, namely, ultimate corporate objectives.



## 23. Budgeting for planning and control

<b>Leed Company</b>			
<b>Planned operating budgets</b>			
	<b>Quarter</b>	<b>Ending</b>	
	<b>2010 March</b>	<b>2010 June 30</b>	
	<b>31</b>		
Forecasted sales (20,000 and 35,000 at \$20, per Exhibit 181 and Exhibit 182)	\$400,000	\$700,000	
Cost of goods sold (per Exhibit 183)	250,000	420,000	
Gross margin	\$150,000	\$280,000	
Selling and administrative expenses:			
Variable (20,000 and 35,000 at \$2,, per Exhibit 182)	\$ 40,000	\$ 70,000	
Fixed (per Exhibit 182)	100,000	100,000	
Total selling and administrative expenses	\$140,000	\$170,000	
Income before income taxes	\$ 10,000	\$110,000	
Deduct: Estimated income taxes (assumed to be 40%)	4,000	44,000	
Net income	\$ 6,000	\$ 66,000	

Exhibit 184: Leed Company: Planned operating budgets

Exhibit 185 shows a flexible budget for Leed Company's manufacturing overhead costs at various levels of output. To keep the example simple, we assume that the first four costs are strictly variable, starting at zero. On the other hand, the last two costs, depreciation and supervision, are fixed costs in this example because they are assumed to be constant over the entire relevant range of activity.

<b>Leed Company</b>					
<b>Flexible budget for</b>					
<b>manufacturing overhead</b>					
<b>Element of</b>	<b>Volume (per cent Of Capacity)*</b>				
<b>manufacturing overhead</b>	70%	80%	90%	100%	
Units	17,500	20,000	22,500	25,000	
Supplies	\$ 1,400	\$ 1,600	\$ 1,800	\$ 2,000	
Power	7,000	8,000	9,000	10,000	<---Variable portion is \$25,000
Insurance	4,200	4,800	5,400	6,000	
Maintenance	4,900	5,600	6,300	7,000	
Depreciation	18,000	18,000	18,000	18,000	<--- Fixed portion is \$75,000
Supervision	57,000	57,000	57,000	57,000	
	\$ 92,500	\$ 95,000	\$ 97,500	\$ 100,000	

\*Capacity is 25,000 units per three-month period.

Exhibit 185: Leed Company: Flexible budget for manufacturing overhead

Leed's management could prepare a similar flexible budget for selling and administrative expenses with supporting schedules for each expense item. Using flexible budgeting, a company calculates variable expenses for various levels of sales volume, while fixed costs remain constant within the relevant range.

**Budget variances** When management uses a flexible budget to appraise a department's performance, it bases the evaluation on the amounts budgeted for the level of activity actually experienced. The difference between actual costs incurred and the flexible budget amount for that same level of operations is called a **budget variance**. Budget variances can indicate a department's or company's degree of efficiency, since they emerge from a comparison of what was with what should have been.

To illustrate the computation of budget variances, assume that Leed's management prepared an overhead budget based on an expected volume of 100 per cent, or 25,000 units. At this level of production, the budgeted amount for supplies is USD 2,000. By the end of the period, Leed has used USD 1,900 of supplies. Our first impression is that a favorable variance of USD 100 exists.

However, if Leed's actual production for the period was only 22,500 units (90 per cent of capacity), the company actually has an unfavorable variance of USD 100. Why? Because at 90 per cent of capacity, according to the flexible operating budget, only USD 1,800 of supplies should have been used. Consequently, it appears that Leed used supplies inefficiently.

To give another example using the data in Exhibit 185, Leed's management may have budgeted maintenance at USD 5,600 for a given period assuming the company planned to produce 20,000 units (80 per cent of operating capacity). However, Leed's actual maintenance costs may have been USD 6,200 for the period. This result does not necessarily mean that Leed had an unfavorable variance of USD 600. The variance depends on actual production volume.

Assume once again that Leed actually produced 22,500 units during the period. The company had budgeted maintenance costs at USD 6,300 for that level of production. Therefore, there would actually be a favorable variance of USD 100 (USD 6,300 - USD 6,200).

Flexible budgets often show budgeted amounts for every 10 per cent change in the level of operations, such as at the 70 per cent, 80 per cent, 90 per cent, and 100 per cent levels of capacity. However, actual production may fall between the levels shown in the flexible budget. If so, the company can find the budgeted amounts at that level of operations using the following formula:

Budgeted amount = Budgeted fixed portion of costs + [Budgeted variable portion of cost per unit X Actual units of output]

**Flexible operating budget and budget variances illustrated** As stated earlier, a flexible operating budget provides detailed information about budgeted expenses at various levels of activity. The main advantage of using a flexible operating budget along with a planned operating budget is that management can appraise performance on two levels. First, management can compare the actual results with the planned operating budget, which enables management to analyze the deviation of actual output from expected output. Second, given the actual level of operations, management can compare actual costs at actual volume with budgeted costs at actual volume. The use of flexible operating budgets gives a valid basis for comparison when actual production or sales volume differs from expectations.

Using the data from Exhibit 182, Exhibit 186 and Exhibit 187, present Leed's detailed planned operating budget and flexible operating budget for the quarter ended 2010 March 31. The planned operating budget was based on a sales forecast of 20,000 units and a production forecast of 25,000 units. Exhibit 186 and Exhibit 187 show actual sales of 19,000 units and actual production of 25,000 units. (As is typically the case, the budgeted and actual amounts are not equal.) The actual selling price was USD 20 per unit, the same price that management had forecasted.

## 23. Budgeting for planning and control

### Leed Company Comparison of planned operating budget and actual results For quarter ended 2010 March 31

	Planned budget	Actual
Sales (budgeted 20,000 units, actual 19,000 units)	\$400,000	\$380,000
Cost of goods sold:		
Beginning finished goods inventory	\$130,000	\$130,000
Cost of goods manufactured (25,000 units):		
Direct materials	\$ 50,000	\$ 62,500
Direct labor	150,000	143,750
Variable manufacturing overhead	25,000	31,250
Fixed manufacturing overhead	75,000	75,000
Cost of goods manufactured	\$300,000	\$312,500
Cost of goods available for sale	\$430,000	\$442,500
Ending finished goods inventory	180,000	200,000
Cost of goods sold	\$250,000	\$242,500
Gross margin	\$150,000	\$137,500
Selling and administrative expenses:		
Variable	\$ 40,000	\$ 28,500
Fixed	100,000	95,000
Total selling and administrative expenses	\$ 140,000	\$123,500
Income before income taxes	\$ 10,000	\$ 14,000
Deduct: Estimated income taxes (40%)	4,000	5,600
Net income	\$ 6,000	\$ 8,400

#### Exhibit 186: Leed Company: Comparison of planned operating budget and actual results

In Exhibit 186 we compare the actual results with the planned operating budget. Comparison of actual results with the planned operating budget yields some useful information because it shows where actual performance deviated from planned performance. For example, sales were 1,000 units lower than expected, sales revenue was USD 20,000 less than expected, gross margin was USD 12,500 less than expected, and net income was USD 2,400 more than expected.

The comparison of actual results with the planned operating budget does not provide a basis for evaluating whether or not management performed efficiently at the actual level of operations. For example, in Exhibit 186, the cost of goods sold was USD 7,500 less than expected. The meaning of this difference is not clear, however, because the actual cost of goods sold relates to the 19,000 units actually sold, while the planned cost of goods sold relates to the 20,000 units expected.

A company makes a valid analysis of expense controls by comparing actual results with a flexible operating budget based on the levels of sales and production that actually occurred. Exhibit 187 shows the comparison of Leed's flexible operating budget with the actual results. Note that the flexible budget in Exhibit 187 is made up of several pieces. The flexible budget amounts for sales revenue and selling and administrative expenses come from a flexible sales budget (not shown) for 19,000 units of sales.

<b>Leed Company</b>			
<b>Comparison of flexible operating budget and actual results</b>			
<b>For quarter ended 2010 March 31</b>			
	<b>Flexible budget</b>	<b>Actual</b>	<b>Budget variance over (under)</b>
Sales (19,000 units)	\$ 380,000	\$ 380,000	\$ -0-
Cost of goods sold:			
Beginning finished goods inventory	\$ 130,000	\$ 130,000	\$ -0-
Cost of goods manufactured (25,000 units):			
Direct materials	\$ 50,000	\$ 62,500	\$ (12,500)
Direct labor	150,000	143,750	(6,250)
Variable manufacturing overhead	25,000	31,250	6,250
Fixed manufacturing overhead	75,000	75,000	-0-
Cost of goods manufactured)	\$300,000	\$312,500	\$ 12,500
Cost of goods available for sale	\$430,000	\$442,500	\$ 12,500
Ending finished goods inventory	192,000	200,000	8,000
Cost of goods sold (19,000 units)	\$238,000	\$242,500	\$ 4,500
Gross margin	\$ 142,000	\$ 137,500	\$ (4,500)
Selling and administrative expenses:			
Variable	\$ 38,000	\$ 28,500	\$ (9,500)
Fixed	100,000	95,000	(5,000)
Total selling and administrative expenses	\$138,000	\$123,500	\$ (14,500)
Income before income taxes	\$ 4,000	\$ 14,000	\$ 10,000
Deduct: estimated taxes (40%)	1,600	5,600	4,000
Net income	\$ 2,400	\$ 8,400	\$ 6,000

### Exhibit 187: Leed Company: Comparison of flexible operating budget and actual results

In comparisons such as these, if the number of units produced is equal to the number sold, many companies do not show their beginning and ending inventories in their flexible operating budgets. Instead, the flexible operating budget may show the number of units actually sold multiplied by the budgeted unit cost of direct materials, direct labor, and manufacturing overhead. This budget also shows actual costs for direct materials, direct labor, and manufacturing overhead for the number of units sold.

The comparison of the actual results with the flexible operating budget (Exhibit 187) reveals some inefficiencies for items in the cost of goods manufactured section. For instance, direct materials and variable overhead costs were considerably higher than expected. Direct labor costs, on the other hand, were somewhat lower than expected. Both variable and fixed selling and administrative expenses were lower than expected. Net income was USD 6,000 more than expected at a sales level of 19,000 units.

Now that Leed's management has prepared the operating budget (or projected income statement), it can prepare its financial budget. Remember that the financial budget is a projected balance sheet.

To prepare a projected balance sheet, Leed's management must analyze each balance sheet account. Managers take the beginning balance from the balance sheet at the end of the preceding period. Look at Exhibit 188, Leed Company's balance sheet as of 2009 December 31. Management must consider the effects of planned activities on these balances. Many accounts are affected by items in the planned operating budget, by cash inflows and outflows, and by policy decisions. Management uses the planned operating budget in Exhibit 184 and the other illustrations previously given to prepare Leed Company's financial budget for the first two quarters of 2010.

<b>Leed Company</b>	
<b>Balance sheet</b>	
<b>2009 December 31</b>	
<b>Assets</b>	
Current assets:	
Cash	\$ 130,000
Accounts receivable	200,000

## 23. Budgeting for planning and control

Inventories:		
Materials	\$ 40,000	
Finished goods	130,000	170,000
Prepaid expenses		20,000
Total current assets		\$ 520,000
<b>Property, plant, and equipment:</b>		
Land		\$ 60,000
Buildings	\$1,000,000	
Less: accumulated depreciation	400,000	600,000
Equipment	\$ 600,000	
Less: accumulated depreciation	180,000	420,000
Total property, plant, and equipment		\$ 1,080,000
Total assets		\$ 1,600,000
<b>Liabilities and stockholders' equity</b>		
Current liabilities:		
Accounts payable	\$ 80,000	
Accrued liabilities payable	160,000	
Income taxes payable	100,000	
Total current liabilities	\$ 340,000	
Stockholders' equity:		
Capital stock 100,000 shares of \$10 par value)	\$ 1,000,000	
Retained earnings	260,000	
Total stockholders' equity	\$ 1,260,000	
Total liabilities and stockholders' equity	\$ 1,600,000	

Exhibit 188: Leed Company: Balance sheet at beginning of period

**Accounts receivable** Leed must prepare several new schedules to prepare a financial budget. The first of these schedules is the accounts receivable schedule in Exhibit 189. Assume that Leed will collect 60 per cent of the current quarter's sales in that quarter, and the remaining 40 per cent will be collected in the following quarter. Thus, collections for the first quarter will be USD 440,000. The USD 440,000 equals 60 per cent of budgeted sales of USD 400,000 for the first quarter plus the uncollected sales of the previous quarter [(0.6 X USD 400,000) + USD 200,000]. Second quarter collections would be USD 580,000 [(0.6 X USD 700,000) + USD 160,000]. We have simplified the illustration by assuming all sales are on credit, and that there are no sales returns or allowances, no discounts, and no uncollectible accounts.

### Leed company Planned accounts receivable collections and balances

	Quarter 2010 March 31	Ending 2010 June 30
Planned balance at beginning of quarter	\$200,000*	\$160,000
Planned sales for period (per Exhibit 184)	400,000	700,000
Total	\$600,000	\$860,000
Projected collections during quarter (per discussion in text)	440,000	580,000
Planned balance at end of quarter	\$160,000	\$280,000

\*Actual on January 1

Exhibit 189: Leed Company: Planned accounts receivable collections and balances

**Inventories** Leed's management must prepare a schedule of planned materials purchases and inventories. Planned usage and cost per unit of materials are from the planned cost of goods sold schedule (Exhibit 183). We assume no work in process inventories to simplify the illustration; there are only materials and finished goods inventories.

In Exhibit 190, we show a schedule of planned purchases and inventories of materials for Leed Company. Leed normally maintains its materials inventory at a level of one-half of next quarter's planned usage. The USD 40,000 beginning inventory was greater than normal because of a strike threat in the supplier company. This threat has

now passed, and the materials inventory is reduced at the end of the first quarter to the normal planned level. In Exhibit 183, we calculated the planned ending finished goods inventories.

**Leed Company  
Planned materials purchases  
and inventories**

	<b>Quarter 2010 March 31</b>	<b>Ending 2010 June 30</b>
Planned usage (25,000 x \$2) (per Exhibit 183)	\$50,000	\$50,000
Planned ending inventory (1/2 x 25,000 x2) (per discussion in text)	25,000	25,000
Planned materials available for use	\$ 75,000	\$75,000
Inventory at beginning of quarter	40,000*	25,000
Planned purchases for the quarter	\$35,000	\$50,000

\*Actual on January 1

Exhibit 190: Leed Company: Planned materials purchases and inventories

**Accounts affected by operating costs** Leed's management would prepare individual schedules for each of the accounts affected by operating costs. For illustrative purposes, however, we prepare a schedule that combines all the accounts affected by materials purchases or operating costs. We assume that:

- All purchases of materials are made on account.
- Direct labor incurred is credited to Accrued Liabilities Payable.
- Manufacturing overhead incurred is credited to the following accounts:

	<b>Quarter March 31</b>	<b>Ending June 30</b>
Accounts payable	\$ 16,000	\$ 13,000
Accrued liabilities payable	60,000	64,000
Prepaid expenses	6,000	5,000
Accumulated depreciation – Building	5,000	5,000
Accumulated depreciation – Equipment	13,000	13,000
Total	\$100,000	\$100,000

- Selling and administrative expenses incurred are credited to the following accounts:

	<b>Quarter March 31</b>	<b>Ending June 30</b>
Accounts payable	\$ 5,000	\$ 10,000
Accrued liabilities payable	130,000	154,000
Prepaid expenses	2,000	3,000
Accumulated depreciation – Building	1,000	1,000
Accumulated depreciation – Equipment	2,000	2,000
Total	\$140,000	\$170,000

- Planned cash payments are as follows:

	<b>Quarter March 31</b>	<b>Ending June 30</b>
Accounts payable	\$ 80,000	\$ 56,000
Accrued liabilities payable	330,000	354,000
Prepaid expenses	-0-	10,000
Total	\$410,000	\$420,000

Exhibit 191, shows analyses of the accounts credited as a result of these data. The illustration provides a considerable amount of information needed in constructing financial budgets for the quarters ended 2010 March 31, and 2010 June 30. The balances on both dates for Accounts Payable, Accrued Liabilities Payable, Prepaid Expenses (the only debit balance account shown), Accumulated Depreciation—Building, and Accumulated Depreciation—Equipment are computed in the schedule.

**Income taxes payable** A separate schedule could be prepared showing the changes in the state and federal Income Taxes Payable account, but in this example, a brief discussion suffices. Balances reported in the financial budgets assume that Leed pays one-half of the USD 100,000 liability in the 2009 December 31, balance sheet in

### 23. Budgeting for planning and control

each of the first two quarters of 2010 (shown in Exhibit 194). The accrual for the current quarter is added (Exhibit 184). Thus, the balance on 2010 March 31, is USD 54,000, calculated as (USD 100,000 - USD 50,000 + USD 4,000). The balance on 2010 June 30, is USD 48,000, calculated as (USD 54,000 - USD 50,000 + USD 44,000). On June 30, the balance equals the accrual for the current year, USD 4,000 for the first quarter and USD 44,000 for the second quarter.

Analysis of accounts For quarters ending March 31 and 2010	Credited for materials Total debits	Leed Company	costs		Accumulated depreciation	
		Purchases and operating June 30 Accounts payable	Accrued liabilities payable	Prepaid expenses	Building	Equipment
Beginning balances, January 1 (per Exhibit 188)		\$ 80,000	\$ 160,000	\$ 20,000*	\$ 400,000	\$ 180,000
Purchases or operating costs, quarter ending March 31 (credits made to accounts shown at right):						
Direct materials (per Exhibit 190)	\$ 35,000*	\$ 35,000				
Direct labor (per Exhibit 183)	150,000*		\$ 150,000			
Manufacturing overhead (per Exhibit 183 and above schedules)	100,000*	16,000	60,000	\$ 6,000	\$ 5,000	\$ 13,000
Selling and administrative expenses (per Exhibit 184 and above schedules)	140,000*	5,000	130,000	2,000	1,000	2,000
Total	\$425,000	\$ 56,000	\$ 340,000	\$ 8,000	\$ 6,000	\$ 15,000
Total including January 1 balances		\$136,000	\$ 500,000	\$ 12,000*	\$ 406,000	\$ 195,000
Planned cash payments (debits made to accounts shown)		80,000*	330,000*			
Planned balances, March 31		\$ 56,000	\$ 170,000	\$ 12,000*	\$ 406,000	\$ 195,000
Purchases or operating costs, quarter ending June 30 (credits made to accounts shown at right):						
Direct materials (per Exhibit 190)	\$ 50,000*	\$ 50,000				
Direct labor (per Exhibit 183)	150,000*		\$ 150,000			
Manufacturing overhead (per Exhibit 183 and above schedules)	100,000*	13,000	64,000	\$ 5,000	\$ 5,000	\$ 13,000
Selling and administrative expenses (per Exhibit 184 and above schedules)	170,000*	10,000	154,000	3,000	1,000	2,000
Total	\$470,000	\$ 73,000	\$368,000	\$ 8,000	\$ 6,000	\$ 15,000
Total including March 31 balances		\$129,000	\$538,000	\$ 4,000*	\$412,000	\$210,000
Planned cash payments (debits made to accounts shown)		56,000*	354,000*	10,000*		
Planned balances, June 30		\$ 73,000	\$ 184,000	\$ 14,000*	\$ 412,000	\$ 210,000

\*Debit balance or debit to account.

Exhibit 191: Leed Company: Analyses of accounts credited for materials purchases and operating costs

**Cash budget** After the preceding analyses have been prepared, sufficient information is available to prepare the cash budget and compute the balance in the Cash account on March 31 and 2010 June 30. Preparing a cash budget requires information about cash receipts and cash disbursements.

**Cash receipts** We can prepare the cash receipts schedule from the information used to compute the accounts receivable schedule (Exhibit 189). In Exhibit 192, we show the schedule of planned cash receipts for Leed Company.

**Cash disbursements** Companies need cash to pay for purchases, wages, rent, interest, income taxes, cash dividends, and most other expenses. We can obtain the amount of each cash disbursement from other budgets or schedules. Look at Exhibit 193, the cash disbursements schedule for Leed Company. You can see where the information came from, except for the payment of income taxes and dividends. Income taxes are assumed to be 40 per cent of income before income taxes. We assume that USD 20,000 of dividends will be paid in the first quarter and USD 40,000 in the second quarter.

**Leed Company  
Planned Cash receipts**

	<b>Quarter 2010 March 31</b>	<b>ending 2010 June 30</b>
Collections on accounts receivable:		
From preceding quarter's sales	\$200,000	\$160,000 (0.4 x \$400,000)
From current quarter's sales	240,000 (0.6 x \$400,000)	420,000 (0.6 x \$700,000)
Total cash receipts (per Exhibit 189)	\$440,000	\$580,000

Exhibit 192: Leed Company: Planned cash receipts

**Leed Company  
Planned cash disbursements**

	<b>Quarter 2010 March 31</b>	<b>Ending 2010 June 30</b>
Payment of accounts payable (per Exhibit 191)	\$ 80,000	\$ 56,000
Payment of accrued liabilities payable (per Exhibit 191)	330,000	354,000
Payment of income tax liability	50,000	50,000
Payment of dividends	20,000	40,000
Expenses prepaid (per Exhibit 191)	-0-	10,000
Total cash disbursements	\$480,000	\$510,000

Exhibit 193: Leed Company: Planned cash disbursements

Once cash receipts and disbursements have been determined, we can prepare a cash budget for Leed Company, as shown in Exhibit 194. The **cash budget** is a plan indicating expected inflows and outflows of cash.

**Leed company  
Planned cash flows and cash balances**

	<b>Quarter 2010 March 31</b>	<b>ending 2010 June 30</b>
Planned balance at beginning of quarter	\$130,000*	\$ 90,000
Planned cash receipts:		
Collections of accounts receivable (per Exhibit 192)	440,000	580,000
	\$570,000	\$670,000
Planned cash disbursements:		
Payment of accounts payable (per Exhibit 191)	\$ 80,000	\$ 56,000
Payment of accrued liabilities payable (per Exhibit 191)	330,000	354,000
Payment of income tax liability	50,000	50,000
Payment of dividends	20,000	40,000
Expenses prepaid (per Exhibit 191)	-0-	10,000
Total cash disbursements	\$480,000	\$510,000
Planned balance at end of quarter	\$ 90,000	\$ 160,000

\*Actual on January 1.

Exhibit 194: Leed Company: Planned cash flows and cash balances

This cash budget helps management to decide whether enough cash will be available for short-term needs. If a company's cash budget indicates a cash shortage at a certain date, the company may need to borrow money on a



### 23. Budgeting for planning and control

short-term basis. If the company's cash budget indicates a cash excess, the company may wish to invest the extra funds for short periods to earn interest rather than leave the cash idle. Knowing in advance that a possible cash shortage or excess may occur allows management sufficient time to plan for such occurrences and avoid a cash crisis.

The preparation of Leed's financial budget for the quarters ending March 31 and June 30 (Exhibit 195) completes the master budget. Management now has information to help appraise the policies it has adopted before implementing them. If the master budget shows the results of these policies to be unsatisfactory, the company can change its policies before serious problems arise.

**Leed Company**  
**Projected balance sheet**  
**As of March 31 and 2010 June 30**

	2010 March 31	2010 June 30
Assets		
Current assets:		
Cash (per Exhibit 194)	\$ 90,000	\$ 160,000
Accounts receivable (per Exhibit 189)	160,000	280,000
Inventories:		
Materials (per Exhibit 190)	25,000	25,000
Finished goods (per Exhibit 183)	180,000	60,000
Prepaid expenses (per Exhibit 191)	12,000	14,000
Total current assets	\$ 467,000	539,000
Property, plant, and equipment:		
Land (per Exhibit 188)	\$ 60,000	\$ 60,000
Buildings, net (\$1,000,000 less accumulated depreciation of \$406,000 and \$412,000) (per Exhibit 188 and Exhibit 191)	594,000	588,000
Equipment, net (\$600,000 less accumulated depreciation of \$195,000 and \$210,000) (per Exhibit 188 and Exhibit 191)	405,000	390,000
Total property, plant, and equipment	\$1,059,000	\$1,038,000
Total assets	\$1,526,000	\$1,577,000
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable (per Exhibit 191)	\$ 56,000	\$ 73,000
Accrued liabilities payable (per Exhibit 191)	170,000	184,000
Income taxes payable (per discussion in the text)	54,000	48,000
Total current liabilities	\$ 280,000	\$ 305,000
Stockholders' equity:		
Capital stock (100,000 shares of \$10 par value) (per Exhibit 188)	\$1,000,000	\$1,000,000
Retained earnings (see footnotes below)	246,000*	272,000†
Total stockholders' equity	\$1,246,000	\$1,272,000
Total liabilities and stockholders' equity	\$1,526,000	\$ 1,577,000
*\$260,000 (per Exhibit 188) + Income of \$6,000 – Dividends of \$20,000.		
†\$246,000 + Income of \$66,000 – Dividends of \$40,000.		

Exhibit 195: Leed Company: Projected balance sheet

For example, Leed Company's management had a policy of stable production each period. The master budget shows that production can be stabilized even though sales fluctuate widely. However, the planned ending inventory at June 30 may be considered somewhat low in view of the fluctuations in sales. Management now knows this in advance and can take corrective action if necessary.

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## An accounting perspective:

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### Uses of technology

Imagine the difficulty of coordinating budgets in companies having worldwide operations, companies such as PepsiCo and BP. BP has oil and gas exploration, production, and marketing facilities in various countries. The BP plant in Singapore, for example, has to transmit its budget information to corporate headquarters in London, where managers coordinate the budgets of various operations worldwide, request additional information, require revisions in the budgets, and otherwise interact constantly with far-flung operations. Recent advances in telecommunications networks and collaboration software have made this process much faster and easier. Managers in the Singapore plant of BP can get reactions from corporate headquarters almost immediately. Corporate headquarters can get answers to its questions fast and can coordinate the budgets from various worldwide operations quickly.

### Budgeting in merchandising companies

Budget preparation for merchandising companies and service companies is similar to budgeting for manufacturing companies. This section discusses budgeting in merchandising companies.

Throughout this chapter, we have focused on budgeting in a manufacturing company. Suppose managers in a retail merchandising business, such as a dress shop or a furniture store, prepare a budget. In this case, the company prepares a purchases budget instead of a production budget. To compute the purchases for each quarter, management must estimate the cost of the goods to be sold during the quarter and the inventory required at the end of the quarter.

Suppose Strobel Furniture Company prepared a sales budget like the one in Exhibit 196. Assume the company maintains sufficient inventory to cover one-half of the next quarter's sales. Cost of goods sold is 55 per cent of sales. The ending inventory on 2009 December 31, was USD 8,250. The purchases budget can now be prepared, as shown in Exhibit 197. For the first quarter of 2010, notice that the ending inventory is one-half of the second quarter's cost of goods sold [ $0.5 \times (0.55 \times \text{USD } 80,000) = \text{USD } 22,000$ ].

Strobel can now use the information in its purchases budget to prepare the cost of goods sold section of the operating budget, to prepare cash disbursements schedules, and to prepare the inventory and accounts payable amounts in the financial budget.

<b>Strobel Furniture Sales budget</b>		<b>Company</b>		
<b>For quarters ending through 2011 March 31</b>		<b>2010 March 31,</b>		
<b>2010 March 31</b>	<b>2010 June 30</b>	<b>2010 September 30</b>	<b>2010 December 31</b>	<b>2011 March 31</b>
\$30,000	\$80,000	\$50,000	\$90,000	\$40,000

Exhibit 196: Strobel furniture company: Sales budget

## 23. Budgeting for planning and control

	Strobel Furniture Purchase budget For quarters ending 2010 December 31		Company March 31 Through	
	2010 March 31	2010 June 30	2010 September 30	2010 December 31
Ending inventory desired*	\$22,000	\$13,750	\$24,750	\$11,000
Cost of goods sold (55% of sales)	16,500	44,000	27,500	49,500
Total	\$38,500	\$57,750	\$52,520	\$60,500
Less: beginning inventory	8,250	22,000	13,750	24,750
Purchases required	\$30,250	\$35,750	\$38,500	\$35,750
*Next period's sales x 55% x 50%				

Exhibit 197: Strobel furniture company: Purchases budget

### Budgeting in service companies

The concepts discussed in this chapter are equally applicable to service companies. Service firms have service revenues and operating expenses that must be budgeted. Projected income statements and balance sheets can be prepared for service companies using the techniques described in this chapter.

### Additional concepts related to budgeting

Two additional concepts that affect budgeting are sometimes used in industry. These concepts are just-in-time inventory systems and zero-base budgeting.

Chapter 20 described **just-in-time inventory**. Recall that the just-in-time inventory system provides that materials are bought just in time to be put into the manufacturing process; small parts, or subparts, are purchased just in time to be assembled into a final product; and goods are produced and delivered just in time to be sold.

The overall purpose of the just-in-time inventory system is to decrease, or in some cases eliminate, inventories in a company. By eliminating inventory, companies reduce the buffer stock between purchasing, production, and sales. Consequently, companies using just-in-time inventory must budget purchasing, production, and sales so the goods are purchased just in time for production and produced just in time for sales.

Zero-base budgeting became popular in the 1970s, particularly when President Jimmy Carter supported it for state and federal governmental units. It has received less attention since then.

Under **zero-base budgeting**, managers in a company start each year with zero budget levels and must justify every dollar that appears in the budget. Managers do not assume any costs incurred in previous years should be incurred this year. Each manager prepares decision packages that describe the nature and cost of tasks that can be performed by that unit and the consequences of not performing each task. Top organization officials rank the decision packages and approve those that they believe are most worthy. A major drawback to the use of this concept is the massive amounts of paperwork and time needed to prepare and rank decision packages, especially in large organizations.

This chapter discussed the general concepts of budgeting. In Chapter 26, we will discuss another type of budgeting known as capital budgeting.

The next chapter discusses standard costs, which are used in budgeting and are important in controlling operations.

## Understanding the learning objectives

- A budget is a plan showing the company's objectives and how management intends to acquire and use resources to attain those objectives.
- Several kinds of budgets are responsibility, capital, master, planned operating, and financial budgets.
- A budget: (1) shows management's operating plans for the coming periods; (2) formalizes management's plans in quantitative terms; (3) forces all levels of management to think ahead, anticipate results, and take action to remedy possible poor results; and (4) may motivate individuals to strive to achieve stated goals.
- Other benefits are: business activities are better coordinated; managers become aware of other managers' plans; employees may become cost conscious and try to conserve resources; the company reviews its organization plan and changes it when necessary; and managers foster a vision that might not otherwise be developed.
- Top management support: All management levels must be aware of the budget's importance to the company and must know that the budget has top management's support.
- Participation in goal setting: Employees are generally more likely to strive toward organizational goals if they participate in setting them.
- Communicating results: People should be promptly and clearly informed of their progress.
- Flexibility: The operating budget should be restated if the basic assumptions underlying the budget change during the year. For control purposes, after the actual level of operations is known, the actual revenues and expenses should be compared to the expected performance at that level of operations.
- Follow-up: Managers should check budgets continuously and correct them whenever necessary because budgets deal with projections and estimates of future operating results, cash flows, and financial position.
- Managers develop a planned operating budget in units rather than dollars. Managers forecast sales units for the year. Then, based on the sales forecast and the company's inventory policy, they forecast production requirements in units.
- Next, dollars must be introduced into the analysis. A forecast of expected selling prices must be made, and costs must be analyzed.
- Management then prepares a schedule to forecast cost of goods sold.
- After forecasting the cost of goods sold, management prepares a separate budget for all selling and administrative expenses. Several supporting schedules may be involved for other various expenses.
- The totals on the separate budgets are combined to form the planned operating budget, which shows the budgeted income after income taxes for a certain period.
- A flexible operating budget is a special kind of budget that provides detailed information about budgeted expenses (and revenues) at various levels of output.
- This budget shows the effect that different volume changes, in per cents of capacity, have on the expenses of a company.
- Preparing a financial budget involves analyzing every balance sheet account in light of the planned activities expressed in the income statement.
- Managers usually prepare a separate cash budget to show sources, uses, and net changes in cash for the period.

## 23. Budgeting for planning and control

- Supporting budgets also may be developed for accounts receivable, inventories, accounts affected by operating costs, and federal income taxes payable.

### Demonstration problem

During January 2010, Ramos Company plans to sell 40,000 units of its product at a price of USD 30 per unit. The company estimates selling expenses to be USD 120,000 plus 2 per cent of sales revenue. Administrative expenses are estimated to be USD 90,000 plus 1 per cent of sales revenue. Federal income tax expense is estimated to be 40 per cent of income before federal income taxes.

Ramos plans to produce 50,000 units during January with estimated variable costs per unit as follows: USD 3 for material, USD 7.50 for labor, and USD 4.50 for variable overhead. Estimated fixed overhead cost is USD 60,000 per month. The finished goods inventory at 2010 January 1, is 8,000 units with a cost per unit of USD 15. The company uses FIFO inventory procedure.

Prepare a projected income statement for January 2010.

### Solution to demonstration problem

		<b>Ramos Company Projected income statement For January 2010</b>
Sales (40,000 x \$30)		\$1,200,000
Cost of goods sold (see planned cost of goods sold)		638,400
Gross margin		\$561,600
Selling expenses:		
Fixed	\$120,000	
Variable (0.02 x \$120,000)	24,000	
Administrative expenses:		
Fixed	90,000	
Variable (0.01 x \$1,200,000)	12,000	246,000
Income before federal income taxes		\$315,600
Deduct: Federal income tax expense (40%)		126,600
Net income		\$189,360
		<b>Ramos Company Planned cost of goods sold</b>
Beginning finished goods inventory (8,000 x \$15)		\$ 120,000
Cost of goods manufactured:		
Direct materials (50,000 x \$3)	\$150,000	
Direct labor (50,000 x \$7.50)	375,000	
Variable manufacturing overhead (50,000 x \$4.50)	225,000	
Fixed manufacturing overhead	60,000	
Cost of goods manufactured (50,000 x \$16,20)		810,000
Cost of goods available for sale		\$ 930,000
Ending finished goods inventory (18,000 x \$16,20)		291,600
Cost of goods sold		\$ 638,400

### Key terms\*

**Budget** A plan showing a company's objectives and proposed ways of attaining the objectives. Major types of budgets are (1) master budget, (2) responsibility budget, and (3) capital budget.

**Budgeting** The coordination of financial and nonfinancial planning to satisfy an organization's goals.

**Budget variance** The difference between an actual cost incurred (or revenue earned) at a certain level of operations and the budgeted amount for the same level of operations.

**Cash budget** A plan indicating expected inflows (receipts) and outflows (disbursements) of cash; it helps management decide whether enough cash will be available for short-term needs.

**Financial budget** The projected balance sheet portion of a master budget.

**Fixed costs** Costs that are unaffected in total by the relative level of production or sales.

**Flexible operating budget** A special budget that provides detailed information about budgeted expenses (and revenues) at various levels of output.

**Just-in-time inventory system** Provides that goods are produced and delivered just in time to be sold.

**Master budget** The projected income statement (planned operating budget) and projected balance sheet (financial budget) showing the organization's objectives and proposed ways of attaining them; includes supporting budgets for various items in the master budget; also called master profit plan. The master budget is the overall plan of the enterprise and ideally consists of all of the various segmental budgets.

**Participatory budgeting** A method of preparing the budget that includes the participation of all levels of management responsible for actual performance.

**Planned operating budget** The projected income statement portion of a master budget.

**Production budget** A budget that takes into account the units in the sales budget and the company's inventory policy.

**Variable costs** Costs that vary in total directly with production or sales and are a constant dollar amount per unit of output over different levels of output or sales.

**Zero-base budgeting** Managers in a company start each year with zero budget levels and must justify every dollar that will appear in the budget.

\*Some terms listed in earlier chapters are repeated here for your convenience.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

Budgets are based on more than past results.

Cash budgets may cover a week or a month, sales and production budgets a month, a quarter, or a year, and general operating budgets may cover a quarter or a year.

The planned operating budget is developed first in units and then in dollars.

Planned operating budgets based on planned activity levels and flexible budgets are the same if planned activity levels and actual activity levels are not the same.

#### Multiple-choice

Select the best answer for each of the following questions.

Which of the following best describes some of the benefits related to the preparation and use of budgets:

- Business activities are better coordinated.
- Managers become aware of other managers' plans.
- Employees may become cost conscious and try to conserve resources.
- Managers may review the organizational plan and make necessary changes more often.
- All of the above.

When preparing a projected income statement, which of the following budgets is prepared first?

- Projected cost of goods sold budget.
- Selling and administrative budget.
- Sales budget.
- Financial budget.

Fixed costs are USD 60,000, variable cost per unit is USD 1.20, and budgeted units of output are 200,000 units. Determine the budgeted production costs.

- USD 300,000.

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- b. USD 360,000.
- c. USD 240,000.
- d. USD 276,000.

Production costs (including USD 30,000 of fixed costs) are budgeted at USD 150,000 for an expected output of 100,000 units. Actual output was 90,000 units, while actual costs were USD 142,500. What is the budget variance and is it favorable or unfavorable?

- a. USD 5,500 unfavorable.
- b. USD 6,500 favorable.
- c. USD 6,500 unfavorable.
- d. USD 4,500 unfavorable.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

### Questions

- What are three purposes of budgeting?
- What are the purposes of a master, planned operating, and financial budget?
- How does the management by exception concept relate to budgeting?
- What are five basic principles which, if followed, should improve the probability of preparing a meaningful budget? Why is each important?
- What is the difference between an imposed budget and a participatory budget?
- Define and explain a budget variance.
- What are the two major budgets in the master budget? Which should be prepared first? Why?
- Distinguish between a master budget and a responsibility budget.
- The budget established at the beginning of a given period carried an item for supplies expense in the amount of USD 40,000. At the end of the period, the supplies used amounted to USD 44,000. Can it be concluded from these data that there was an inefficient use of supplies or that care was not exercised in purchasing the supplies?
- Management must make certain assumptions about the business environment when preparing a budget. What areas should be considered?
- Why is budgeted performance better than past performance as a basis for judging actual results?
- Describe the concepts of just-in-time inventory systems and zero-base budgeting.
- **Real world question** Refer to the financial statements for a publicly traded company. An industry analyst has asked you to forecast sales for each of the next five years (after the current year). Assume sales increase each year by the same percentage. That is, the percentage increase for next year is expected to be the same as it was last year. What is your estimate of sales in each of the next five years?
- **Real world question** Refer to your forecasts of sales for the company in the previous question. Evaluate the simple forecasting method you were asked to use in that question. What additional factors should be used in forecasting sales?

- **Real world question** Do you think the sales for a particular grocery store in your neighborhood will go up, go down, or stay the same next year compared to this year? Give your answer in sales volume, then give it in sales dollars.
- **Real world question** The text refers to the benefits of participation in budgeting. Assume your college bookstore is preparing a budget for next year and wants to include employees in the budgeting process. Give examples of the people who should be included and state what information they could provide.

### Exercises

**Exercise A** Hike n' Run Company has decided to produce 288,000 pairs of socks at a uniform rate throughout 2010. The sales department of Hike n' Run has estimated sales for 2010 according to the following schedule:

	<b>Sales of pairs of socks</b>
First quarter	76,800
Second quarter	62,400
Third quarter	72,000
Fourth quarter	100,800
Total for 2010	312,000

Assume the 2009 December 31, inventory is estimated to be 38,400 pairs of socks. Prepare a schedule of planned sales and production for the first two quarters of 2010.

**Exercise B** DePaul Company projects sales of 25,000 units during May at USD 6 per unit. Production costs are USD 1.80 per unit. Variable selling and administrative expenses are USD 0.60 per unit; fixed selling and administrative expenses are USD 60,000. Compute the budgeted income before income taxes.

**Exercise C** Skaters Plus Company plans to sell 90,000 skateboards next quarter at a price of USD 36 per unit. Production costs are USD 14.40 per unit. Selling and administrative expenses are: variable, USD 7.20 per unit; and fixed, USD 604,800 per quarter. What are the budgeted earnings for next quarter? (Do not consider federal income taxes.)

**Exercise D** Duke Corporation considers materials and labor to be completely variable costs. Expected production for the year is 50,000 units. At that level of production, direct materials cost is budgeted at USD 198,000, and direct labor cost is budgeted at USD 450,000. Prepare a flexible budget for materials and labor for possible production levels of 52,500, 60,000, and 67,500 units of product.

**Exercise E** Assume that in the previous exercise the actual production was 60,000 units, materials cost was USD 247,000, and labor cost was USD 510,000. What are the budget variances?

**Exercise F** Fixed production costs for Alexia Company are budgeted at USD 576,000, assuming 40,000 units of production. Actual sales for the period were 35,000 units, while actual production was 40,000 units. Actual fixed costs used in computing cost of goods sold amounted to USD 504,000. What is the budget variance?

**Exercise G** The shoe department of Noardstone's Department Store has prepared a sales budget for April calling for a sales volume of USD 75,000. The department expects to begin in April with a USD 50,000 inventory and to end the month with an USD 42,500 inventory. Its cost of goods sold averages 70 per cent of sales.

Prepare a purchases budget for the department showing the amount of goods to be purchased during April.

### Problems

**Problem A** Joyce Corporation prepares monthly operating and financial budgets. The operating budgets for June and July are based on the following data:

<b>Units produced</b>	<b>Units sold</b>
-----------------------	-------------------



## 23. Budgeting for planning and control

June	400,000	360,000
July	360,000	400,000

All sales are at USD 30 per unit. Direct materials, direct labor, and variable manufacturing overhead are estimated at USD 3, USD 6, and USD 3 per unit, respectively. Total fixed manufacturing overhead is budgeted at USD 1,080,000 per month. Selling and administrative expenses are budgeted at USD 1,200,000 plus 10 per cent of sales, while federal income taxes are budgeted at 40 per cent of income before federal income taxes. The inventory at June 1 consists of 200,000 units with a cost of USD 17.10 each.

- Prepare monthly budget estimates of cost of goods sold assuming that FIFO inventory procedure is used.
- Prepare planned operating budgets for June and July.

**Problem B** The computation of operating income for Frisco Company for 2008 follows:

Sales		\$1,800,000
Cost of goods manufactured and sold:		
Direct materials	\$360,000	
Direct labor	240,000	
Variable manufacturing overhead	120,000	
Fixed manufacturing overhead	240,000	960,000
Gross margin		\$ 840,000
Selling expenses:		
Variable	\$132,000	
Fixed	168,000	300,000
Administrative expenses:		
Variable	\$156,000	
Fixed	192,000	348,000
Net operating income		\$ 192,000

An operating budget is prepared for 2009 with sales forecasted at a 25 per cent increase in volume. Direct materials, direct labor, and all costs labeled as variable are completely variable. Fixed costs are expected to continue except for a USD 24,000 increase in fixed administrative costs. Actual operating data for 2009 are:

Sales	\$2,160,000
Direct materials	444,000
Direct labor	288,000
Variable manufacturing overhead	148,800
Fixed manufacturing overhead	246,000
Variable selling expenses	186,000
Fixed selling expenses	157,200
Variable administrative expenses	198,000
Fixed administrative expenses	218,200

- Prepare a budget report comparing the 2009 planned operating budget with actual 2009 data.
- Prepare a budget report that would be useful in appraising the performance of the various persons charged with responsibility to provide satisfactory income. (Hint: Prepare budget data on a flexible basis and use the percentage by which sales were actually experienced.)
- Comment on the differences revealed by the two reports.

**Problem C** Use the following data to prepare a planned operating budget for Hi-Lo Company for the year ending 2009 December 31:

Plant capacity	100,000 units
Expected sales volume	90,000 units
Expected production	90,000 units
Actual production	90,000 units
Forecasted selling price	\$ 12,00 per unit
Actual selling price	\$ 13,50 per unit
Manufacturing costs:	
Variable (per unit):	
Direct materials	\$3.60
Direct labor	\$1.50
Manufacturing overhead	\$2.25

Fixed manufacturing overhead	\$108,000
Selling and administrative expenses:	
Variable (per unit)	\$1.20
Fixed	\$60,000

Assume no beginning or ending inventory. Federal income taxes are budgeted at 40 per cent of income before federal income taxes.

The actual operating data for the year ending 2009 December 31, follow:

Sales		\$1,080,000
Cost of goods sold:		
Direct materials	\$337,500	
Direct labor	135,000	
Variable manufacturing overhead	202,500	
Fixed manufacturing overhead	108,000	
Total	\$783,000	
Less: Ending inventory ( $\$783,000 \times 10/90$ )	87,000	696,000
Gross margin		\$384,000
Selling expenses:		
Variable	102,000	
Fixed	72,000	174,000
Income before federal income taxes		\$210,000
Deduct: Federal income taxes at 40%		84,000
Net income		\$126,000

- Prepare a planned operating budget for the year ended 2009 December 31, for part (1).
- Using a flexible operating budget, analyze the efficiency of operations and comment on the company's sales policy for part (2).

**Problem D** Kim Company wants you to prepare a flexible budget for selling and administrative expenses. The general manager and the sales manager have met with all the department heads, who provided the following information regarding selling and administrative expenses:

The company presently employs 30 full-time salespersons with a base of USD 3,600 each per month plus commissions and 10 full-time salespersons with a salary of USD 6,000 each per month plus commissions. In addition, the company employs nine regional sales managers with a salary of USD 21,600 per month, none of whom is entitled to any commissions.

If sales volume exceeds USD 80 million per year, the company must hire four more salespersons, each at a salary of USD 3,600 per month plus commissions.

Sales commissions are either 10 per cent or 5 per cent of the selling price, depending on the product sold. Typically, a 10 per cent commission applies on 60 per cent of sales, and a 5 per cent commission applies on the remaining 40 per cent of sales.

Salespersons' travel allowances average USD 1,500 per month per salesperson (excluding managers).

Advertising expenses average USD 150,000 per month plus 3 per cent of sales.

Selling supplies expense is estimated at 1 per cent of sales.

Administrative salaries are USD 300,000 per month.

Other administrative expenses include the following:

Rent—USD 48,000 per month

Office supplies—2 per cent of sales

Other administrative expenses (telephone, etc.)—USD 12,000 per month

Prepare a flexible budget for selling and administrative expenses for sales volume of USD 36 million, USD 48 million, and USD 60 million per year.

### 23. Budgeting for planning and control

**Problem E** Galaxy Lighting Company manufactures and sells lighting fixtures. Estimated sales for the next three months are:

September	\$350,000
October	500,000
November	400,000

Sales for August were USD 400,000. All sales are on account. Galaxy Lighting Company estimates that 60 per cent of the accounts receivable are collected in the month of sale with the remaining 40 per cent collected the following month. The units sell for USD 30 each. The cash balance for September 1 is USD 100,000.

Generally, 60 per cent of purchases are due and payable in the month of purchase with the remainder due the following month. Purchase cost per unit for materials is USD 18. The company maintains an end-of-the-month inventory of 1,000 units plus 10 per cent of next month's unit sales.

Prepare a cash receipts schedule for September and October and a purchases budget for August, September, and October.

**Problem F** Refer to the previous problem. In addition to the information given, selling and administrative expenses paid in cash are USD 120,000 per month.

Prepare a monthly cash budget for September and October for Galaxy Lighting Company.

#### Alternate problems

**Alternate problem A** Cougars Company prepares monthly operating and financial budgets. Estimates of sales in units are made for each month. Production is scheduled at a level high enough to take care of current needs and to carry into each month one-half of the next month's unit sales. Direct materials, direct labor, and variable manufacturing overhead are estimated at USD 12, USD 6, and USD 4 per unit, respectively. Total fixed manufacturing overhead is budgeted at USD 480,000 per month. Sales for April, May, June, and July 2009 are estimated at 100,000, 120,000, 160,000, and 120,000 units. The inventory at 2009 April 1, consists of 50,000 units with a cost of USD 28.80 per unit.

- Prepare a schedule showing the budgeted production in units for April, May, and June 2009.
- Prepare a schedule showing the budgeted cost of goods sold for the same three months assuming that the FIFO method is used for inventories.

**Alternate problem B** Following is a summary of operating data of Bugs Company for the year 2008:

Sales		\$ 7,00,000
Cost of goods manufactured and sold:		
Direct materials	\$1,200,000	
Direct labor	1,100,000	
Variable manufacturing overhead	300,000	
Fixed manufacturing overhead	800,000	3,400,000
Gross margin		\$ 3,600,000
Selling expenses:		
Variable	\$ 300,000	
Fixed	400,000	700,000
		2,900,000
General and administrative expenses:		
Variable	\$ 100,000	
Fixed	1,200,000	1,300,000
Net operating income		\$ 1,600,000

Sales volume for 2009 is budgeted at 90 per cent of 2008 sales volume. Prices are not expected to change. The 2009 budget amounts for the various other costs and expenses differ from those reported in 2008 only for the expected volume change in the variable items. Actual operating data for 2009 follow:

Sales	\$5,800,000
Direct materials	1,300,000
Direct labor	1,100,000
Variable manufacturing overhead	300,000
Fixed manufacturing overhead	780,000
Variable selling expenses	270,000
Fixed selling expenses	290,000
Variable administrative expenses	110,000
Fixed administrative expenses	1,100,000

a. Prepare a budget report comparing the planned operating budget for 2009 with the actual results for that year.

b. Prepare a budget report that would be useful in pinpointing responsibility for the poor showing in 2009. (Hint: Prepare a flexible operating budget.)

**Alternate problem C** Use the following data for Andrea Company in preparing its 2009 planned operating budget:

Plant capacity	500,000 units
Expected sales volume	450,000 units
Expected production	500,000 units
Forecasted selling price	\$72 per unit
Variable manufacturing costs per unit:	
Direct materials	\$ 27.00
Direct labor	9.00
Manufacturing overhead	6.00
Fixed manufacturing overhead per period	\$900,000
Selling and administrative expenses:	
Variable (per unit)	\$ 3.00
Fixed (per period)	\$ 750,000

Assume no beginning inventory. Federal income taxes are budgeted at 40 per cent of income before income taxes.

The actual results for Andrea Company for the year ended 2009 December 31, follow. (Note: The actual sales price was USD 80 per unit. Actual unit production was equal to actual unit sales.)

Sales (500,000 units @ \$80 per unit)		\$40,000,000
Cost of goods sold:		
Direct materials	\$12,000,000	
Direct labor	4,400,000	
Variable manufacturing overhead	4,000,000	
Fixed manufacturing overhead	1,000,000	21,400,000
Gross margin		\$18,600,000
Selling and administrative expenses:		
Variable	\$ 1,400,000	
Fixed	800,000	2,200,000
Income before federal income taxes		\$16,400,000
Deduct: Federal income taxes		6,560,000
Net income		\$ 9,840,000

a. Prepare a planned operating budget for the year ended 2009 December 31, for (1).

b. Using a flexible operating budget, analyze the efficiency of operations. Comment on the results of 2009 and on the company's sales policy in (2).

**Alternate problem D** Rocklin Company gathered the following budget information for the quarter ending 2009 September 30:

Sales	\$540,000
Purchases	450,000

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Salaries and wages	194,000
Rent	10,000
Supplies	8,000
Insurance	2,000
Other cash expenses	12,000

A cash balance of USD 36,000 is planned for July 1. Accounts receivable are expected to be USD 60,000 on July 1. All but one-half of 1 per cent of the July 1 Accounts Receivable balance will be collected in the quarter ending September 30. The company's sales collection pattern is 95 per cent in the quarter of sale and 5 per cent in the quarter after sale. Accounts payable will be USD 30,000 on July 1 and will be paid during the coming quarter. The company's purchases payment pattern is 75 per cent in the quarter of purchase and 25 per cent in the quarter after purchase. Expenses are paid in the quarter in which they are incurred.

Prepare a cash budget for the quarter ending 2009 September 30.

#### Beyond the numbers—Critical thinking

**Business decision case A** Golden State Company has applied at a local bank for a short-term loan of USD 150,000 starting on 2009 October 1. The bank's loan officer has requested a cash budget from the company for the quarter ending 2009 December 31. The following information is needed to prepare the cash budget:

Sales	\$600,000
Purchases	350,000
Salaries and wages to be paid	125,000
Rent payments	7,000
Supplies (payments for)	4,500
Insurance payments	1,500
Other cash payments	22,000

A cash balance of USD 24,000 is planned for October 1. Accounts receivable are expected to be USD 48,000 on October 1. All of these accounts will be collected in the quarter ending December 31. In general, sales are collected as follows: 90 per cent in the quarter of sale, and 10 per cent in the quarter after sale. Accounts payable will be USD 480,000 on October 1 and will be paid during the quarter ending December 31. All purchases are paid in the quarter after purchase.

a. Prepare a cash budget for the quarter ending 2009 December 31. Assume that the USD 150,000 loan will be made on October 1 and will be repaid with interest at 10 per cent on December 31.

b. Will the company be able to repay the loan on December 31? If the company desires a minimum cash balance of USD 18,000, will the company be able to repay the loan as planned?

**Ethics case B** The state of California, USA faced large budget deficits. Meanwhile, officials in a particular community college district were looking for ways to spend the money that had been budgeted for the district. The community college was entering the last three months of the fiscal year with excess funds because the area had experienced a mild winter resulting in lower than usual utilities and maintenance costs.

At a budget meeting, one official commented, "You know what will happen if we do not spend all of our budget. The state will claim we do not need as much money next year. What happens if we have a hard winter next year? We will need every cent we can get!"

The community college's accounting manager commented, "We are legally entitled to spend all of the money this year that has been budgeted to us. I am concerned about the memorandum that we received requesting that we cut expenditures wherever possible to help reduce the state's deficit."

The first official responded, "That deficit is the state's problem, not ours. We would not have a deficit in the first place if the state administrators were able to estimate taxes and do a better job of budgeting. Let us deal with our problems and let them deal with theirs!"

Write a response from the point of view of the taxpayers of the state of California. Should the community college spend all of the money that had been budgeted for it?

**Broader perspective C** Refer to the Broader perspective, "Planning in a changing environment". Describe and evaluate Verizon Communications, Inc.'s new approach to planning. How would you advise company management to communicate the company's values and plans to employees?

**Group project D** In groups of three, develop a budget for an organization that publishes financial statements, such as The Coca-Cola Company or Maytag Corporation. Your budget should include three different types of projected income statements for the coming month, quarter, or year. These three income statements should be for optimistic, pessimistic, and expected scenarios. Collect or develop as much information as possible to prepare the budget. For example, to prepare a budgeted income statement for a publicly traded company such as Coca-Cola, look at previous annual reports and collect whatever additional information you can from news reports. Be sure to state the assumptions used in preparing the budget in a memorandum you write as a team. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter. Do not forget to include the three different projected income statements.

**Group project E** The chief executive officer (CEO) of Rigid Plastics Corporation remarked to a colleague, "I do not understand why other companies waste so much time in the budgeting process. I set our company goals, and everyone strives to meet them. What is wrong with that approach?" In groups of two or three students, write a memorandum to your instructor stating whether you agree with this comment or not and explain why. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project F** Multigoal Corporation has established a bonus plan for its employees. An employee receives a bonus if his or her department meets or is below the cost levels specified in the annual budget plan. If the department's costs exceed the budget, its employees earn no bonus. In groups of two or three students, write a memorandum to your instructor stating the problems that might arise with this bonus plan. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

#### **Using the Internet—A view of the real world**

Visit the website for a high technology company that provides recent annual reports. Examples include Intel Corporation, IBM, and Dell. Develop a budgeted income statement (operating budget) for the coming year and include three categories for optimistic, pessimistic, and expected scenarios. Collect or develop as much information as possible to prepare the budget. For example, look at previous annual reports and collect whatever additional information you can from news reports. Be sure to state the assumptions used in preparing the budget in a memorandum. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter. Do not forget to include the three different projected income statements.

Visit the website for a retail company that provides recent annual reports. Develop a budgeted income statement (operating budget) for the coming year and include three categories for optimistic, pessimistic, and expected scenarios. Collect or develop as much information as possible to prepare the budget. For example, look at previous annual reports and collect whatever additional information you can from news reports. Be sure to state the assumptions used in preparing the budget in a memorandum. The heading of the memorandum should contain the

### 23. Budgeting for planning and control

date, to whom it is written, from whom, and the subject matter. Do not forget to include the three different projected income statements.

#### Comprehensive problems

Wimerick Corporation prepares annual budgets by quarters. The company's post-closing trial balance as of 2010 December 31, is as follows:

	<b>Debits</b>	<b>Credits</b>
Cash	\$138,000	
Accounts receivable	360,000	
Allowance for uncollectible accounts		\$ 12,000
Inventories	156,000	
Prepaid expenses	12,000	
Furniture and equipment	180,000	
Accumulated depreciation – Furniture and equipment		12,000
Accounts payable		120,000
Accrued liabilities payable		36,000
Notes payable, 5% (due 2008)		480,000
Capital stock		300,000
Retained earnings (deficit)	114,000	
	\$960,000	\$960,000

All of the capital stock of the company was recently acquired by Juan Jackson. After the purchase, Jackson loaned substantial sums of money to the corporation, which still owes him USD 480,000 on a 5 per cent note. There are no accrued federal income taxes payable, but future earnings will be subject to income taxation.

Jackson is anxious to withdraw USD 120,000 from the corporation (as a payment on the note payable to him) but will not do so if it reduces the corporation's cash balance below USD 120,000. Thus, he is quite interested in the budgets for the quarter ending 2011 March 31.

Sales for the coming quarter ending 2011 March 31, are forecasted at USD 1,200,000; for the following quarter they are forecasted at USD 1,500,000. All sales are priced to yield a gross margin of 40 per cent. Inventory is to be maintained on hand at the end of any quarter in an amount equal to 20 per cent of the goods to be sold in the next quarter. All sales are on account, and 95 per cent of the 2010 December 31, receivables plus 70 per cent of the current quarter's sales will be collected during the quarter ending 2011 March 31.

Selling expenses are budgeted at USD 48,000 plus 6 per cent of sales; USD 24,000 will be incurred on account, USD 66,000 accrued, USD 27,000 from expiration of prepaid rent and prepaid insurance, and USD 3,000 from allocated depreciation.

Purchasing expenses are budgeted at USD 34,800 plus 5 per cent of purchases for the quarter; USD 9,000 will be incurred on account, USD 48,000 accrued, USD 13,800 from expired prepaid expenses, and USD 1,200 from allocated depreciation.

Administrative expenses are budgeted at USD 42,000 plus 2 per cent of sales; USD 3,000 will be incurred on account, USD 36,000 accrued, USD 13,200 from expired prepayments, and USD 1,800 from allocated depreciation. Uncollectible accounts are estimated at 1 per cent of sales.

Interest accrues at 5 per cent annually on the notes payable and is credited to Accrued Liabilities Payable.

All of the beginning balances in Accounts Payable and Accrued Liabilities Payable, plus 80 per cent of the current credits to Accounts Payable, and all but USD 30,000 of the current accrued liabilities will be paid during the quarter. An USD 18,000 insurance premium is to be paid prior to March 31, and a full year's rent of USD 144,000 is due on January 2.

Federal income taxes are budgeted at 40 per cent of the income before federal income taxes. The taxes should be accrued, and no payments are due in the first quarter.

a. Prepare a planned operating budget for the quarter ending 2011 March 31, including supporting schedules for planned purchases and operating expenses.

b. Prepare a financial budget for 2011 March 31. Supporting schedules should be included that (1) analyze accounts credited for purchases and operating expenses, (2) show planned accounts receivable collections and balance, and (3) show planned cash flows and cash balance.

c. Will Jackson be able to collect the USD 120,000 on his note?

Davis Corporation is a rapidly expanding company. The company's post-closing balance as of 2010 December 31, is as follows:

<b>Davis corporation</b>		
<b>Post-closing trial</b>		
<b>balance</b>		
<b>2010 December 31</b>		
	<b>Debits</b>	<b>Credits</b>
Cash	\$240,000	
Accounts receivable	480,000	
Allowance for uncollectible accounts		\$ 36,000
Inventories	600,000	
Prepaid expenses	72,000	
Land	600,000	
Buildings and equipment	1,800,000	
Accumulated depreciation – Buildings and equipment		240,000
Accounts payable		360,000
Accrued liabilities payable (including income taxes)		240,000
Capital stock		2,400,000
Retained earnings		516,000
	<b>\$3,792,000</b>	<b>\$3,792,000</b>

Sales in the last quarter of 2010 amounted to USD 2,400,000 and are projected at USD 3,000,000 and USD 4,800,000 for the first two quarters of 2011. This expansion has created a need for cash. Management is especially concerned about the probable cash balance of 2011 March 31, since a payment of USD 360,000 for some new equipment must be made on delivery on April 2. The current cash balance of USD 240,000 is considered to be the minimum workable balance.

Purchases, all on account, are to be scheduled so that the inventory at the end of any quarter is equal to one-third of the goods expected to be sold in the coming quarter. Cost of goods sold averages 60 per cent of sales.

Selling expenses are budgeted at USD 120,000 plus 8 per cent of sales; USD 24,000 is expected to be incurred on account, USD 288,000 accrued, USD 33,600 from expired prepayments, and USD 14,400 from allocated depreciation.

Purchasing expenses are budgeted at USD 84,000 plus 5 per cent of purchases; USD 12,000 will be incurred on account, USD 156,000 accrued, USD 13,200 from expired prepayments, and USD 10,800 from allocated depreciation.

Administrative expenses are budgeted at USD 150,000 plus 3 per cent of sales; USD 24,000 will be incurred on account, USD 132,000 accrued, USD 13,200 from expired prepayments, and USD 10,800 from allocated depreciation.



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Federal income taxes are budgeted at 40 per cent of income before federal income taxes and are recorded as accrued liabilities. Payments on these taxes are included in the payments on accrued liabilities discussed in item 6.

All 2010 December 31, accounts payable plus 80 per cent of current credits to this account will be paid in the first quarter. All of the 2010 December 31, accrued liabilities payable (except for USD 72,000) will be paid in the first quarter. Of the current quarter's accrued liabilities, all but USD 288,000 will be paid during the first quarter.

Cash outlays for various expenses normally prepaid will amount to USD 96,000 during the quarter.

All sales are made on account; 80 per cent of the sales are collected in the quarter in which made, and all of the remaining sales are collected in the following quarter, except for 2 per cent which is never collected. The Allowance for Uncollectible Accounts account shows the estimated amount of accounts receivable at 2010 December 31, arising from 2010 sales that will not be collected.

a. Prepare an operating budget for the quarter ending 2011 March 31. Supporting schedules for planned purchases and operating expenses should be included.

b. Prepare a financial budget for 2011 March 31. Include supporting schedules that (1) analyze accounts credited for purchases and expenses, (2) show planned cash flows and cash balance, and (3) show planned collections of accounts receivable and the accounts receivable balance.

c. Will sufficient cash be on hand April 2 to pay for the new equipment?

#### Answers to self-test

##### True-false

**True.** Budgets are estimates of the future and should consider future plans and conditions.

**True.** Cash budgets may cover a week or a month; sales and production budgets a month, a quarter, or a year; and general operating budgets may cover a quarter or a year.

**True.** The planned operating budget is developed first in units, then in dollars.

**False.** Flexible budgets are based on actual activity and planned operating budgets are based on planned activity. Planned operating budgets based on planned activity levels and flexible budgets are not the same if planned activity levels and actual activity levels are not the same.

##### Multiple-choice

**e.** The benefits of budgeting include a through d.

**c.** The sales budget is first. We need to know sales before we predict cost of goods sold, selling and administrative expenses, and the financial budget.

**a.** Budgeted amount = Fixed cost + (Variable cost per unit x Units of output)

$$= \text{USD } 60,000 + (\text{USD } 1.20 \times 200,000)$$

$$= \text{USD } 60,000 + \text{USD } 240,000$$

$$= \text{USD } 300,000 \text{ budgeted amount}$$

**d.** USD 150,000 – USD 30,000 = USD 120,000 variable cost

$$\frac{\text{USD } 120,000}{100,000 \text{ units}} = \text{USD } 1.20 \text{ per unit variable cost}$$

Budgeted costs at 90,000 units:

90,000 x USD 1.20	USD 108,000
Fixed costs	30,000
	USD 138,000

Actual costs 142,500

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Unfavorable budget variance      USD 4,500

# 24. Control through standard costs

## Learning objectives

After studying this chapter, you should be able to:

- Discuss the nature of standard costs, including how standards are set.
- Define budgets and discuss how budgets are used in a standard cost system.
- Discuss the advantages and disadvantages of using standard costs.
- Calculate the six variances from standard and determine if the variance is favorable or unfavorable.
- Discuss what each of the six variances shows and prepare journal entries to record the variance.
- Discuss the three selection guidelines used to investigate variances from standard.
- Discuss theoretical and practical methods for disposing of variances from standard.

This chapter discusses the uses of standard costs, the advantages and disadvantages of using standard costs, and how to compute the difference, or variance, between an actual cost and a standard cost. We discuss how managers can improve efficiency by investigating variances and taking corrective action.

## Uses of standard costs

Whenever you have set goals that you have sought to achieve, these goals could have been called standards. Periodically, you might measure your actual performance against these standards and analyze the differences to see how close you are to your goal. Similarly, management sets goals, such as standard costs, and compares actual costs with these goals to identify possible problems.

This section begins with a discussion of the nature of standard costs. Next, we explain how managers use standard costs to establish budgets. Then we describe how management uses the concept of **management by exception** to investigate variances from standards. We also explain setting standards and how management decides whether to use ideal or practical standards. The section closes with a discussion of the other uses of standard costs.

## Nature of standard costs

A **standard cost** is a carefully predetermined measure of what a cost should be under stated conditions. Standard costs are not only estimates of what costs will be but also goals to be achieved. When standards are properly set, their achievement represents a reasonably efficient level of performance.

Usually, effective standards are the result of engineering studies and of time and motion studies undertaken to determine the amounts of materials, labor, and other services required to produce a product. Also considered in setting standards are general economic conditions because these conditions affect the cost of materials and other services that must be purchased by a manufacturing company.

Manufacturing companies determine the standard cost of each unit of product by establishing the standard cost of direct materials, direct labor, and manufacturing overhead necessary to produce that unit. Determining the

## 24. Control through standard costs

standard cost of direct materials and direct labor is less complicated than determining the standard cost of manufacturing overhead.

The standard direct materials cost per unit of a product consists of the standard amount of material required to produce the unit multiplied by the standard price of the material. You must distinguish between the terms standard price and standard cost. Standard price usually refers to the price per unit of inputs into the production process, such as the price per pound of raw materials.

Standard cost, however, is the standard quantity of an input required per unit of output times the standard price per unit of that input. For example, if the standard price of cloth is USD 3 per yard and the standard quantity of material required to produce a dress is 3 yards, the standard direct materials cost of the dress is 3 yards x USD 3 per yard = USD 9. Similarly, a company computes the standard direct labor cost per unit for a product as the standard number of hours needed to produce one unit multiplied by the standard labor or wage rate per hour.

**Standard manufacturing overhead cost** To find the standard manufacturing overhead cost of a unit, use the following steps. First, determine the expected level of output for the year. This level of output is called the **standard level of output**. Second, determine the total budgeted manufacturing overhead cost at the standard level of output. The total budgeted overhead cost includes both fixed and variable components. Total fixed cost is the same at every level of output within a relevant range. Total variable overhead varies in direct proportion to the number of units produced. Third, compute the standard manufacturing overhead cost per unit by dividing the total budgeted manufacturing overhead cost at the standard level of output by the standard level of output. The result is standard overhead cost (or rate) per unit of output.

The formula to compute the standard overhead cost per unit is:

$$\text{Standard overhead cost (rate) per unit} = \frac{\text{Total budgeted overhead cost at the standard level of output}}{\text{Standard level of output}}$$

Sometimes accountants find the standard overhead rate per unit of input, such as direct labor-hour instead of per unit. To find the standard overhead cost per unit, multiply the direct labor-hours per unit times the standard overhead cost per direct labor-hour. For instance, if the standard overhead costs per direct labor-hour is USD 5 and the standard number of direct labor-hours is two hours per unit, the standard overhead cost per unit is USD 5 x 2 hours = USD 10.

As discussed in Chapter 23, **budgets** are formal written plans that represent management's planned actions in the future and the impacts of these actions on the business. As a business incurs actual expenses and revenues, management compares them with the budgeted amounts. To control operations, management investigates any differences between the actual and budgeted amounts and takes corrective action.

When management compares actual expenses and revenues with budgeted expenses and revenues, differences—called variances—are likely to occur. The responsibility of management is to investigate significant variances. Obviously, management must determine when a variance is significant. This process of focusing on only the most significant variances is known as **management by exception**. The process of management by exception enables management to concentrate its efforts on those variances that could have a big effect on the company, ignoring those variances that are not significant.

In developing standards, management must consider the assumed conditions under which these standards can be met. Standards generally fall into two groups—ideal and practical.

A company attains **ideal standards** under the best circumstances—with no machinery problems or worker problems. The company can attain these unrealistic standards only when it has highly efficient, skilled workers who are working at their best effort throughout the entire period needed to complete the job.

**Practical standards** are strict but attainable standards that have allowances made for machinery problems and rest periods for workers. Companies can meet these standards if average workers are efficient at their work. These standards are generally used in planning.

Generally, management does not use ideal standards because ideal standards do not allow for normal repairs to machinery or rest periods for workers. A company rarely runs its operations under ideal conditions. Since planning under ideal standards is unrealistic, managers rarely use ideal standards in budgeting. Instead, management uses practical standards in planning because these standards are more realistic, allowing for machinery repairs and rest periods for workers. Any variances that result when practical standards are used indicate abnormal or unusual problems.

In addition to developing budgets, companies use standard costs in evaluating management's performance, evaluating workers' performance, and setting appropriate selling prices.

Firms evaluate management's and workers' performances through the use of a budget. When management compares actual results with budgeted amounts, it can see how well it is performing its own duties and managing its employees. Management also can evaluate workers based on how well they performed relative to the budgeted amounts pertaining to the activities they performed.

Standard costs are useful in setting selling prices. The budget shows the expected expenses incurred by the business. By considering these expenses, management can determine how much to charge for a product so that it can produce the desired net income. As the business actually incurs these expenses, management determines if the selling prices set are still reasonable and, when necessary, considers some price adjustments after taking competition into account.

### **Advantages and disadvantages of using standard costs**

Five of the benefits that result from a business using a standard cost system are:

- Improved cost control.
- More useful information for managerial planning and decision making.
- More reasonable and easier inventory measurements.
- Cost savings in record-keeping.
- Possible reductions in production costs.

**Improved cost control** Companies can gain greater cost control by setting standards for each type of cost incurred and then highlighting exceptions or variances—instances where things did not go as planned. Variances provide a starting point for judging the effectiveness of managers in controlling the costs for which they are held responsible.

Assume, for example, that in a production center, actual direct materials costs of USD 52,015 exceeded standard costs by USD 6,015. Knowing that actual direct materials costs exceeded standard costs by USD 6,015 is more useful than merely knowing the actual direct materials costs amounted to USD 52,015. Now the firm can investigate the cause of the excess of actual costs over standard costs and take action.

## 24. Control through standard costs

Further investigation should reveal whether the exception or variance was caused by the inefficient use of materials or resulted from higher prices due to inflation or inefficient purchasing. In either case, the standard cost system acts as an early warning system by highlighting a potential hazard for management.

**More useful information for managerial planning and decision making** When management develops appropriate cost standards and succeeds in controlling production costs, future actual costs should be close to the standard. As a result, management can use standard costs in preparing more accurate budgets and in estimating costs for bidding on jobs. A standard cost system can be valuable for top management in planning and decision making.

**More reasonable and easier inventory measurements** A standard cost system provides easier inventory valuation than an actual cost system. Under an actual cost system, unit costs for batches of identical products may differ widely. For example, this variation can occur because of a machine malfunction during the production of a given batch that increases the labor and overhead charged to that batch. Under a standard cost system, the company would not include such unusual costs in inventory. Rather, it would charge these excess costs to variance accounts after comparing actual costs to standard costs.

Thus, in a standard cost system, a company assumes that all units of a given product produced during a particular time period have the same unit cost. Logically, identical physical units produced in a given time period should be recorded at the same cost.

**Cost savings in record-keeping** Although a standard cost system may seem to require more detailed record-keeping during the accounting period than an actual cost system, the reverse is true. For example, a system that accumulates only actual costs shows cost flows between inventory accounts and eventually into cost of goods sold. It records these varying amounts of actual unit costs that must be calculated during the period. In a standard cost system, a company shows the cost flows between inventory accounts and into cost of goods sold at consistent standard amounts during the period. It needs no special calculations to determine actual unit costs during the period. Instead, companies may print standard cost sheets in advance showing standard quantities and standard unit costs for the materials, labor, and overhead needed to produce a certain product.

**Possible reductions in production costs** A standard cost system may lead to cost savings. The use of standard costs may cause employees to become more cost conscious and to seek improved methods of completing their tasks. Only when employees become active in reducing costs can companies really become successful in cost control.

Three of the disadvantages that result from a business using standard costs are:

- Controversial materiality limits for variances.
- Nonreporting of certain variances.
- Low morale for some workers.

**Controversial materiality limits for variances** Determining the materiality limits of the variances may be controversial. The management of each business has the responsibility for determining what constitutes a material or unusual variance. Because materiality involves individual judgment, many problems or conflicts may arise in setting materiality limits.

**Nonreporting of certain variances** Workers do not always report all exceptions or variances. If management only investigates unusual variances, workers may not report negative exceptions to the budget or may

try to minimize these exceptions to conceal inefficiency. Workers who succeed in hiding variances diminish the effectiveness of budgeting.

**Low morale for some workers** The management by exception approach focuses on the unusual variances. Management often focuses on unfavorable variances while ignoring favorable variances. Workers might believe that poor performance gets attention while good performance is ignored. As a result, the morale of these workers may suffer.

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### An accounting perspective:

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#### Business insight

A few forward-looking companies have succeeded in allowing employees to set their own work standards. In most cases, industrial engineers shut themselves in a room and ponder how to set standards. The industrial engineers ignored the workers, who in turn ignored the standards. In the alternative scenario, workers themselves hold the stopwatches and set the standards. Worker team members time each other, looking for the most efficient and safest way to do the work. They standardize each task so everyone in the team does it the same way. The workers are more informed about how to do the work than industrial engineers, and they are more motivated to meet the standards they set.

Source: Based on the authors' research.

### Computing variances

As stated earlier, standard costs represent goals. Standard cost is the amount a cost should be under a given set of circumstances. The accounting records also contain information about actual costs.

The amount by which actual cost differs from standard cost is called a **variance**. When actual costs are less than the standard cost, a cost variance is favorable. When actual costs exceed the standard costs, a cost variance is unfavorable. Do not automatically equate favorable and unfavorable variances with good and bad. You must base such an appraisal on the causes of the variance.

The following section explains how to compute the dollar amount of variances, a process called isolating variances, using data for Beta Company. Beta manufactures and sells a single product, each unit of which has the following standard costs:

Materials – 5 sheets at \$6	\$30
Direct labor – 2 hours at \$10	20
Manufacturing overhead – 2 direct labor hours at \$5	10
Total standard cost per unit	\$60

We present additional data regarding the production activities of the company as needed.

The standard materials cost of any product is simply the standard quantity of materials that should be used multiplied by the standard price that should be paid for those materials. Actual costs may differ from standard costs for materials because the price paid for the materials and/or the quantity of materials used varied from the standard amounts management had set. These two factors are accounted for by isolating two variances for materials—a price variance and a usage variance.

## 24. Control through standard costs

Accountants isolate these two materials variances for three reasons. First, different individuals may be responsible for each variance—a purchasing agent for the price variance and a production manager for the usage variance. Second, materials might not be purchased and used in the same period. The variance associated with the purchase should be isolated in the period of purchase, and the variance associated with usage should be isolated in the period of use. As a general rule, the sooner a variance can be isolated, the greater its value in cost control. Third, it is unlikely that a single materials variance—the difference between the standard cost and the actual cost of the materials used—would be of any real value to management for effective cost control. A single variance would not show management what caused the difference, or one variance might simply offset another and make the total difference appear to be immaterial.

**Materials price variance** In a manufacturing company, the purchasing and accounting departments usually set a standard price for materials meeting certain engineering specifications. They consider factors such as market conditions, vendors' quoted prices, and the optimum size of a purchase order when setting a standard price. A **materials price variance (MPV)** occurs when a company pays a higher or lower price than the standard price set for materials. Materials price variance (MPV) is the difference between actual price paid (AP) and standard price allowed (SP) multiplied by the actual quantity of materials purchased (AQ). In equation form, the materials price variance is:

$$\text{Materials price variance} = (\text{Actual price} - \text{Standard price}) \times \text{Actual quantity purchased}$$

To illustrate, assume that a new supplier entered the market enabling Beta Company to purchase 60,000 sheets of material at a price of USD 5.90 each. Since the standard price set by management is USD 6 per sheet, the materials price variance is computed as:

$$\begin{aligned} \text{Materials price variance} &= (\text{Actual price} - \text{Standard price}) \times \text{Actual quantity purchased} \\ &= (\text{USD } 5.90 - \text{USD } 6.00) \times 60,000 \\ &= \text{USD } -0.10 \times 60,000 \\ &= \text{USD } -6,000 \text{ (favorable)} \end{aligned}$$

The materials price variance of USD 6,000 is considered favorable since the materials were acquired for a price less than the standard price. If the actual price had exceeded the standard price, the variance would be unfavorable because the costs incurred would have exceeded the standard price. The journal entry to record the purchase of materials is:

(a) Materials inventory (+A)	360,000	
Materials price variance (-A)		6,000
Accounts payable (+L)		354,000
To record the purchase of materials at less than standard cost.		

Note that the Accounts Payable account shows the actual debt owed to suppliers, while the Materials Inventory account shows the standard price of the actual quantity of materials purchased. The Materials Price Variance account shows the difference between the actual price and standard price multiplied by the actual quantity purchased.

**Materials usage variance** Because the standard quantity of materials used in making a product is largely a matter of physical requirements or product specifications, usually the engineering department sets it. But if the quality of materials used varies with price, the accounting and purchasing departments may perform special studies to find the right quality.



The **materials usage variance** occurs when more or less than the standard amount of materials is used to produce a product or complete a process. The variance shows only differences from the standard quantity caused by the quantity of materials used; it does not include any effect of variances in price. Thus, the materials usage variance (MUV) is equal to actual quantity used (AQ) minus standard quantity allowed (SQ) multiplied by standard price (SP):

$$\text{Materials usage variance} = (\text{Actual quantity used} - \text{Standard quantity allowed}) \times \text{Standard price}$$

To illustrate, assume that Beta Company used 55,500 sheets of material to produce 11,000 units of a product for which the standard quantity allowed is 55,000 sheets (5 sheets per unit allowed x 11,000 units actually produced). Since the standard price of the material is USD 6 per sheet, the materials usage variance of USD 3,000 would be computed as follows:

$$\begin{aligned} \text{Materials usage variance} &= (\text{Actual quantity used} - \text{Standard quantity allowed}) \times \text{Standard price} \\ &= (55,500 - 55,000) \times \text{USD } 6 \\ &= 500 \times \text{USD } 6 \\ &= \text{USD } 3,000 \text{ (unfavorable)} \end{aligned}$$

The variance is unfavorable because more materials were used than the standard quantity allowed to complete the job. If the standard quantity allowed had exceeded the quantity actually used, the materials usage variance would have been favorable.

The journal entry to record the use of the materials is:

(b) Work in process inventory (+A)	330,000	
Materials usage variance (+A)	3,000	
Materials inventory (-A)		333,000
To record the use of materials and to establish the materials usage variance.		

The Materials Usage Variance account shows the standard cost of the excess materials used. Note also that the Work in Process Inventory account contains both standard quantity and standard prices.

In the equations for both the materials variances, positive amounts were unfavorable variances and negative amounts were favorable variances. Unfavorable variances are debits in variance accounts because they add to the costs incurred, which are recorded as debits. Similarly, favorable variances are shown as negative amounts because they are reductions in costs. Thus, favorable variances are recorded in variance accounts as credits. We use this format in this text, but a word of caution is in order. Far greater understanding is achieved if you determine whether a variance is favorable or unfavorable by reliance on reason or logic. If more materials were used than the standard quantity, or if a price greater than the standard price was paid, the variance is unfavorable. If the reverse is true, the variance is favorable.

Exhibit 198 below shows the relationship between standard and actual materials cost and the computation of the materials variances; it is based on the following data relating to Beta Company:

Standard price per sheet of material	\$6.00
Actual price per sheet of material	\$5.90
Number of sheets of material purchased	60,000
Standard number of sheets of material per unit 5 of product	
Units of product produced in period	11,000
Actual number of sheets of material used	\$5,500

## 24. Control through standard costs

### Purchase of materials

Actual cost of materials purchased:

Actual price	X actual quantity purchased	
5.90	X 60,000 sheets =	\$354,000

Standard cost of materials purchased:

Standard price	X actual quantity purchased	<--Price variance:
\$6.00	X 60,000 sheets =	\$354,000 - \$360,000
	\$360,000	= -\$6,000 (favorable)

Use of materials

Standard cost of Produce 11,000 units: materials used to

Actual number of sheets used	X standard price	
55,500	X \$6.00 = \$333,000	<--Usage variance:
Standard cost of materials allowed to	Produce 11,000 units:	\$333,000 - \$330,000
		=
Standard number of sheets allowed	X standard price	\$ 3,000 (unfavorable)
55,500*	X \$ 6.00 = \$330,000	

\*(11,000 x 5) = 55,000.

Exhibit 198: Materials price and usage variances

The standard labor cost of any product is equal to the standard quantity of labor time allowed multiplied by the wage rate that should be paid for this time. Here again, it follows that the actual labor cost may differ from standard labor cost because of the wages paid for labor, the quantity of labor used, or both. Thus, two labor variances exist—a rate variance and an efficiency variance.

**Labor rate variance** The **labor rate variance (LRV)** occurs when the average rate of pay is higher or lower than the standard cost to produce a product or complete a process. The labor rate variance is similar to the materials price variance.

To compute the labor rate variance (LRV), multiply the difference between the actual direct labor-hour rate paid (AR) and the standard direct labor-hour rate allowed (SR) by the actual hours of direct labor services worked (AH):

$$\text{Labor rate variance} = (\text{Actual rate} - \text{Standard rate}) \times \text{Actual hours worked}$$

To continue the Beta example, assume that the direct labor payroll of the company consisted of 22,200 hours at a total cost of USD 233,100 (an average actual hourly rate of USD 10.50). Because management has set a standard direct labor-hour rate of USD 10 per hour, the labor rate variance is:

$$\begin{aligned} \text{Labor rate variance} &= (\text{Actual rate} - \text{Standard rate}) \times \text{Actual hours worked} \\ &= (\text{USD } 10.50 - \text{USD } 10.00) \times 22,200 \\ &= \text{USD } 0.50 \times 22,200 \\ &= \text{USD } 11,100 \text{ (unfavorable)} \end{aligned}$$

The variance is positive and unfavorable because the actual rate paid exceeded the standard rate allowed. If the reverse were true, the variance would be favorable.

**Labor efficiency variance** Usually, the company's engineering department sets the standard amount of direct labor-hours needed to complete a product. Engineers may base the direct labor-hours standard on time and motion studies or on bargaining with the employees' union. The **labor efficiency variance (LEV)** occurs when employees use more or less than the standard amount of direct labor-hours to produce a product or complete a process. The labor efficiency variance is similar to the materials usage variance.

To compute the labor efficiency variance (LEV), multiply the difference between the actual direct labor-hours worked (AH) and the standard direct labor-hours allowed (SH) by the standard direct labor-hour rate per hour (SR):

$$\begin{aligned} \text{Labor efficiency variance} &= (\text{Actual rate} - \text{Standard rate}) \times \text{Actual hours worked} \\ &= (\text{USD } 10.50 - \text{USD } 10.00) \times 22,200 \\ &= \text{USD } 0.50 \times 22,200 \\ &= \text{USD } 11,100 \text{ (unfavorable)} \end{aligned}$$

The variance is positive and unfavorable because the actual rate paid exceeded the standard rate allowed. If the reverse were true, the variance would be favorable.

**Labor efficiency variance** Usually, the company's engineering department sets the standard amount of direct labor-hours needed to complete a product. Engineers may base the direct labor-hours standard on time and motion studies or on bargaining with the employees' union. The **labor efficiency variance (LEV)** occurs when employees use more or less than the standard amount of direct labor-hours to produce a product or complete a process. The labor efficiency variance is similar to the materials usage variance.

To compute the labor efficiency variance (LEV), multiply the difference between the actual direct labor-hours worked (AH) and the standard direct labor-hours allowed (SH) by the standard direct labor-hour rate per hour (SR):

$$\text{Labor efficiency variance} = (\text{Actual hours worked} - \text{Standard hours allowed}) \times \text{Standard rate}$$

To illustrate, assume that the 22,200 hours of direct labor-hours worked by Beta Company employees resulted in 11,000 units of production. Assume these units have a standard direct labor-hours of 22,000 hours (11,000 units at 2 hour unit). Since the standard direct labor rate is USD 10 per hour, the labor efficiency variance is USD 2,000, computed as follows:

$$\begin{aligned} \text{Labor efficiency variance} &= (\text{Actual hours worked} - \text{Standard hours allowed}) \times \text{Standard rate} \\ &= (22,200 - 20,000) \times \text{USD } 10 \\ &= 200 \times \text{USD } 10 \\ &= \text{USD } 2,000 \text{ (unfavorable)} \end{aligned}$$

The variance is unfavorable since more hours than the standard number of hours were required to complete the period's production. If the reverse were true, the variance would be favorable.

The standard direct labor-hours allowed for the period's output are 22,000 hours (11,000 units at 2 hours per unit). The standard direct labor cost is USD 10 per hour; therefore, the standard direct labor cost for the output achieved is assigned to inventory, regardless of the actual direct labor cost.

The journal entry to charge the direct labor cost to Work in Process Inventory is:

(c) Work in process inventory (+A)	220,000	
Labor rate variance (+A)	11,100	
Labor efficiency variance (+A)	2,000	
Payroll summary (+L)		233,100
To charge work in process with direct		

## 24. Control through standard costs

labor and to establish the two labor variances.

With this entry, gross wages earned by direct-production employees (USD 233,100) are distributed as follows: USD 220,000 (the standard labor cost of production) to Work in Process Inventory and the balance to the two labor variance accounts. The unfavorable labor rate variance is not necessarily caused by paying employees more wages than they are entitled to receive. More probable reasons are either that more highly skilled employees with higher wage rates worked on production than originally anticipated, or that employee wage rates increased after the standard was developed and the standard was not revised. Favorable rate variances, on the other hand, could be caused by using less-skilled, cheaper labor in the production process. Typically, the hours of labor employed are more likely to be under management's control than the rates that are paid. For this reason, labor efficiency variances are generally watched more closely than labor rate variances.

In Exhibit 199, at the top of the next page, we show the relationship between standard and actual direct labor cost and the computation of the labor variances. The illustration is based on the following data relating to Beta Company:

Standard direct labor-hours per unit	2 hours
Equivalent units produced in period	11,000 units
Standard labor rate per direct labor-hour	\$ 10
Total direct labor wages paid (at actual rate of \$10.50 per hour)	\$233,100
Actual direct labor-hours worked	22,200 hours

### Actual Labor Cost:

Actual labor rate	X actual hours worked	Labor rate variance:
\$ 10.50	X 22,200 = \$233,100	\$233,100 - \$222,000
Standard cost of actual hours worked:		=
Standard labor rate	X actual hours worked	\$11,100
\$10.00	X 22,200 = \$222,000	(unfavorable)
Standard cost of hours allowed to produce 11,000 units:		Labor efficiency variance:
Standard labor rate	X standard hours allowed	\$222,000 - \$220,000
\$10.00	X 22,000* = \$220,000	=
		\$2,000 (unfavorable)

\* 2 hours x 11,000 units = 22,000.

### Exhibit 199: Labor rate and efficiency variances

**Summary of labor variances** The accuracy of the two labor variances can be checked by comparing their sum with the difference between actual and standard labor cost for a period. In the Beta Company illustration, this difference was:

Actual labor cost incurred (22,200 hours x \$10.50)	\$233,100
Standard labor cost allowed (22,000 hours x \$10)	220,000
Total labor variance (unfavorable)	\$ 13,100

This USD 13,100 is made up of two labor variances, both unfavorable:

Labor rate variance (22,200 x \$0.50)	\$11,100
Labor efficiency variance (200 x \$10)	2,000
Total labor variance (unfavorable)	\$ 13,100

Labor costs are typically a major cost in service organizations. Banks, public accounting firms, law firms, hospitals, and parking enforcement agencies are just a few organizations that monitor labor costs closely.

University officials developed the following standards for a university's parking enforcement people. (The university's officials explained that they do not have ticket quotas, but they expect their parking ticket writers "to be enforcing parking laws, not hanging out at the coffee house".)

Standard direct labor time per ticket	12 minutes
Number of tickets written in March	2,000 tickets
Standard labor rate per hour	\$14
Total labor costs for ticket writing (at an average rate of \$13.50 per hour)	\$5,670
Actual ticket writing hours worked	420 hours

The university has calculated labor rate and efficiency variances as follows:

$$\text{Labor rate variance} = (\text{Actual rate} - \text{Standard rate}) \times \text{Actual hours}$$

$$= (\text{USD } 13.50 - \text{USD } 14.00) \times 420 \text{ hours}$$

$$= \text{USD } -0.50 \times 420 \text{ hours}$$

$$= \text{USD } -210 \text{ (favorable)}$$

$$\text{Labor rate variance} = (\text{Actual hours} - \text{Standard hours}) \times \text{Standard rate}$$

$$\text{Standard hours} = \frac{12 \text{ minutes}}{60 \text{ minutes}} \times 2,000 \text{ tickets}$$

$$= 0.2 \text{ hours} \times 2,000 \text{ tickets}$$

$$= 400 \text{ hours}$$

$$\text{Labor efficiency variance} = (420 \text{ hours} - 400 \text{ hours}) \times \text{USD } 14$$

$$= 20 \text{ hours} \times \text{USD } 14$$

$$= \text{USD } 280 \text{ (unfavorable)}$$

In a standard cost system, accountants apply the manufacturing overhead to the goods produced using a standard overhead rate. They set the rate prior to the start of the period by dividing the budgeted manufacturing overhead cost by a standard level of output or activity. Total budgeted manufacturing overhead varies at different levels of standard output, but since some overhead costs are fixed, total budgeted manufacturing overhead does not vary in direct proportion with output.

Managers use a **flexible budget** to isolate overhead variances and to set the standard overhead rate. Flexible budgets show the budgeted amount of manufacturing overhead for various levels of output.

Look at Beta Company's flexible budget for the period in Exhibit 200 below. Note that Beta's flexible budget shows the variable and fixed manufacturing overhead costs expected to be incurred at three levels of activity: 9,000 units, 10,000 units, and 11,000 units. For product costing purposes, Beta must estimate the expected level of activity in advance and set a rate based on that level. The level chosen is called the standard volume of output. This standard volume of output (or activity) may be expressed in terms of any of the activity bases used in setting standard overhead rates. These activity bases include percentage of capacity, units of output machine-hours, and direct labor-hours, among others. In our example, standard volume is assumed to be 10,000 units produced. Management expects to use 20,000 machine-hours of services.

## 24. Control through standard costs

<b>Beta Company</b>			
<b>Flexible manufacturing overhead budget</b>			
Machine-hours	18,000	20,000	22,000
Units of output	9,000	10,000	11,000
Variable overhead:			
Indirect materials	\$ 7,200	\$ 8,000	\$ 8,800
Power	9,000	10,000	11,000
Royalties	1,800	2,000	2,200
Other	18,000	20,000	22,000
Total variable overhead	\$36,000	\$40,000	\$44,000
Fixed overhead:			
Insurance	\$4,000	\$ 4,000	\$ 4,000
Property taxes	6,000	6,000	6,000
Depreciation	20,000	20,000	20,000
Other	30,000	30,000	30,000
Total fixed overhead	\$60,000	\$60,000	\$ 60,000
Standard overhead rate (\$100,000/20,000 hours)		\$5	

### Exhibit 200: Flexible manufacturing overhead budget

Assume that Beta applies manufacturing overhead using a rate based on machine-hours. According to the flexible manufacturing overhead budget, the expected manufacturing overhead cost at the standard volume (20,000 machine-hours) is USD 100,000, so the standard overhead rate is USD 5 per machine-hour (USD 100,000/20,000 machine-hours).

Knowing the separate rates for variable and fixed overhead is useful for decision making, as discussed in Chapters 21 and 22. The variable overhead rate is USD 2 per hour (USD 40,000/20,000 hours), and the fixed overhead rate is USD 3 per hour (USD 60,000/20,000 hours). If the expected volume had been 18,000 machine-hours, the standard overhead rate would have been USD 5.33 (USD 96,000/18,000 hours). If the standard volume had been 22,000 machine-hours, the standard overhead rate would have been USD 4.73 (USD 104,000/22,000 hours).

Note that the difference in rates is due solely to dividing fixed overhead by a different number of machine-hours. That is, the variable overhead cost per unit stays constant (USD 2 per machine-hour) regardless of the number of units expected to be produced, and only the fixed overhead cost per unit changes.

Continuing with the Beta Company illustration, assume that the company incurred USD 108,000 of actual manufacturing overhead costs in a period during which 11,000 units of product were produced. The actual costs would be debited to Manufacturing Overhead and credited to a variety of accounts such as Accounts Payable, Accumulated Depreciation, Prepaid Insurance, Property Taxes Payable, and so on. According to the flexible budget, the standard number of machine-hours allowed for 11,000 units of production is 22,000 hours. Therefore, USD 110,000 of manufacturing overhead is applied to production (USD 5 per machine-hour times 22,000 hours) by debiting Work in Process Inventory and crediting Manufacturing Overhead for USD 110,000. The journal entry to apply manufacturing overhead to production would be:

Work in process inventory (+A)	110,000	
Manufacturing overhead (+SE)		110,000
To apply manufacturing overhead to production (22,000 hours at \$5 per hour).		

These accounts show that manufacturing overhead has been overapplied to production by the USD 2,000 credit balance in the Manufacturing Overhead account. Because of its fixed component, manufacturing overhead tends to be over applied when actual production is greater than standard production.

Although various complex computations can be made for overhead variances, we use a simple approach in this text. In this approach, known as the two-variance approach to overhead variances, we calculate only two variances—an overhead budget variance and an overhead volume variance.

**Overhead budget variance** The **overhead budget variance (OBV)** shows in one amount how economically overhead services were purchased and how efficiently they were used. This overhead variance is similar to a combined price and usage variance for materials or labor. The overhead budget variance (OBV) is equal to the difference between total actual overhead costs (actual OH) and total budgeted overhead costs (BOH) for the actual output attained.

To calculate the total budgeted overhead costs, multiply the variable overhead rate times the standard machine-hours allowed for production achieved, plus the constant amount of fixed overhead. For Beta Company, this would be USD 2 variable overhead times 22,000 hours, or USD 44,000 variable overhead, plus USD 60,000 of fixed overhead—a total of USD 104,000. Since the total actual overhead was USD 108,000 and the total budgeted overhead was USD 104,000, the overhead budget variance is computed as follows:

$$\begin{aligned} \text{Overhead budget variance} &= \text{Actual overhead} - \text{Budgeted overhead at actual production volume level} \\ &= \text{USD } 108,000 - \text{USD } 104,000 \\ &= \text{USD } 4,000 \text{ (unfavorable)} \end{aligned}$$

The variance is unfavorable because actual overhead costs were USD 108,000, while according to the flexible budget, they should have been USD 104,000.

**Overhead volume variance** The **overhead volume variance (OVV)** is caused by producing at a level other than that used in setting the standard overhead application rate. The OVV shows whether plant assets produced more or fewer units than expected. Because fixed overhead is not constant on a per unit basis, any deviation from planned production causes the overhead application rate to be incorrect. The OVV is the difference between the budgeted amount of overhead for the actual volume achieved (BOH) and the applied overhead (Applied OH):

$$\text{Overhead volume variance} = \text{Budgeted overhead} - \text{Applied overhead}$$

In the Beta Company illustration, the 11,000 units produced in the period have a standard allowance of 22,000 machine-hours. We calculated budgeted overhead when computing the overhead budget variance. The flexible budget in Exhibit 200, at the top of the previous page, shows that the budgeted overhead for 22,000 machine-hours is USD 104,000. Overhead is applied to work in process on the basis of standard hours allowed for a particular amount of production; in this case, 22,000 hours at USD 5 per hour. The overhead volume variance then is:

$$\begin{aligned} \text{Overhead volume variance} &= \text{Budgeted overhead} - \text{Applied overhead} \\ &= \text{USD } 104,000 - \text{USD } 110,000 \\ &= \text{USD } -6,000 \text{ (favorable)} \end{aligned}$$

Note that the amount of the overhead volume variance is related solely to fixed overhead. As we show in Exhibit 200, fixed overhead at all levels of activity is USD 60,000. Since Beta Company used 20,000 machine-hours as its standard, the fixed overhead rate is USD 3 per machine-hour. Beta worked 2,000 more standard hours (22,000 - 20,000) than was expected. Beta also can calculate the overhead volume variance as follows:

(Number of hours used in setting predetermined overhead rates	- Number of standard hours allowed for production level achieved)	X Fixed overhead rate per hour	= Overhead volume variance
(20,000	- 22,000)	X USD 3	= USD -6,000 (favorable)

## 24. Control through standard costs

The variance is favorable because the company achieved a higher level of production than was expected.

**Recording overhead variances** These journal entries are related to overhead:

(d)	Work in Process (+A)	110,000	
	Manufacturing Overhead (+SE)		110,000
	To record the application of manufacturing overhead to work in process.		
(e)	Manufacturing overhead (-SE)	108,000	
	Various accounts (Varies)		108,000
	To record actual manufacturing overhead.		
(f)	Manufacturing overhead (-SE)	2,000	
	Overhead budget variance (-SE)	4,000	
	Overhead volume variance (+SE)		6,000
	To record the variances related to overhead and close the manufacturing overhead account.		

The first entry applies manufacturing overhead to Work in Process at the rate of USD 5 per standard machine-hour. The second entry records the actual manufacturing overhead costs incurred during the period by Beta Company. The final entry reduces the Manufacturing Overhead account balance to zero and sets up the two variances calculated for overhead; these two variance accounts reveal the causes of the overapplied manufacturing overhead for the period.

**Summary of overhead variances** To easily determine the accuracy of the two overhead variances, Beta would compare the sum of the budget and volume variances with the difference between the costs of actual manufacturing overhead and applied manufacturing overhead (the amount of over- or underapplied overhead). For Beta Company, the difference between actual and applied manufacturing overhead was:

Actual manufacturing overhead incurred	\$ 108,000
Applied manufacturing overhead allowed (22,000 machine-hours x \$5 per hour)	<u>110,000</u>
Total overhead variance (favorable)	\$ -2,000

This difference is made up of the two overhead variances:

Overhead budget variance – unfavorable (\$108,000 - \$104,000)	\$ 4,000
Overhead volume variance -favorable [\$104,000 – (22,000 x \$5)]	-6,000
Total overhead variance (favorable)	\$ -2,000

For a summary of the six variances from standard discussed in this chapter, see Exhibit 201 below.

Materials price variance =	(Actual price – Standard price) x Actual quantity purchased
Materials usage variance =	(Actual quantity used – Standard quantity allowed) x Standard price
Labor rate variance =	(Actual rate – standard rate) x Actual hours worked
Labor efficiency variance =	(Actual hours worked – standard hours allowed) x Standard rate
Overhead budget variance =	Actual overhead – budgeted overhead
Overhead volume variance =	Budgeted overhead – applied overhead

**Exhibit 201: Summary of variances from standard**



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## An accounting perspective:

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### Uses of technology

Although standard costing often appears more difficult than actual costing to students, standard costing is generally easier in the real world. The key to this simplicity is the computer's capability to store, retrieve, and update standards. Once a firm sets standards for a product, it is relatively simple to update these standards for changes in labor rates, product prices, and efficiency improvements.

### Goods completed and sold

To complete the standard cost system example, assume Beta Company completed and transferred 11,000 units to finished goods and sold on account 10,000 units at a price equal to 160 per cent of standard cost. Also, there were no beginning or ending work in process inventories, and no beginning finished goods inventory. Journal entry (g) transfers the standard cost of the units completed,  $11,000 \times \text{USD } 60 = \text{USD } 660,000$ , from Work in Process Inventory to Finished Goods Inventory. Entry (h) records the sales for the period,  $160 \text{ per cent} \times \text{USD } 60 \times 10,000 = \text{USD } 960,000$ . Entry (i) records the cost of goods sold,  $10,000 \times \text{USD } 60 = \text{USD } 600,000$ .

(g)	Finished goods inventory (+A)	660,000	
	Work in process inventory (-A)		660,000
	To record the transfer of completed units to finished goods inventory.		
(h)	Accounts receivable (+A)	960,000	
	Sales (+SE)		960,000
	To record sales for the period.		
(i)	Cost of goods sold (-SE)	600,000	
	Finished goods inventory (-A)		600,000
	To record cost of goods sold for the period.		

Beta debits the Work in Process Inventory with the standard cost of materials, labor, and manufacturing overhead for units put into production. Therefore, the entry recording the transfer of the standard cost of the completed units,  $11,000 \times \text{USD } 60 = \text{USD } 660,000$ , reduces Work in Process Inventory to a zero balance.

Sales for the period amount to 10,000 units at USD 96 each (160 per cent of USD 60). It is fairly common practice to base selling prices at least partially on standard costs. Note that Beta debited Finished Goods Inventory with the standard cost of goods completed and credited it with the standard cost of goods sold. Thus, the ending Finished Goods Inventory consists of the units actually on hand (1,000) at their standard cost of USD 60 each, or USD 60,000.

### Investigating variances from standard

Once all variances have been computed, management must decide which variances should be investigated further. Because numerous variances occur, managers cannot investigate all of them. Management needs some selection guidelines. Possible guidelines include the (1) amount of the variance; (2) size of the variance relative to the cost incurred; and (3) controllability of the cost associated with the variance—that is, whether it is considered

## 24. Control through standard costs

controllable or noncontrollable. Managers also may use statistical analysis in deciding which variances to investigate. For instance, they could determine the average value of actual costs for a period so that only those variances deviating from the average by more than a certain percentage would be investigated. To decide which selection guidelines are most useful, management should seek the opinions of knowledgeable operating personnel.

Any analysis of variances is likely to disclose some variances that are controllable within the company and others that are not. For instance, quantities used are generally controllable internally. Prices paid for materials purchased may or may not be controllable. Management may discover that the purchasing agent is not getting competitive bids; therefore, the price paid for materials would have been more controllable had the agents sought competitive bids. On the other hand, a raw materials shortage may exist that drives the price upward, and the price paid may be beyond the buyer's control.

Another point to remember about the analysis of variances is that separate variances are not necessarily independent. For example, an unfavorable labor rate variance may result from using higher paid employees in a certain task. However, higher paid employees may be more productive, resulting in a favorable labor efficiency variance. These employees also may be more highly skilled and may waste fewer materials, resulting in a favorable materials usage variance. Therefore, significant variances, both favorable and unfavorable, should be investigated.

At the end of a month or quarter, management may develop performance reports that compare the actual results and costs with the budgeted results and costs. These reports enable management to determine how well they and their workers were able to perform within the budget. At the bottom of the performance report, the supervisor or manager responsible for the elements mentioned in the report gives reasons for any variances. Management then investigates any variance not supported by an acceptable reason.

### Disposing of variances from standard

At the end of the year, variances from standard must be disposed of in the accounting records. The variances may be (1) viewed as losses due to inefficiency and closed to the Income Summary; (2) allocated as adjustments to the recorded cost of Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold; or (3) closed to Cost of Goods Sold. Theoretically, the alternative chosen should depend on whether the standards set were reasonably attainable and whether the variances were controllable by company employees. For instance, a firm may consider an unfavorable materials usage or labor efficiency variance caused by carelessness or inefficiency a loss and close it to the Income Summary because the standard was attainable and the variance was controllable. The business may consider an unfavorable materials price variance caused by an unexpected price change an added cost and allocate it to the inventory accounts and Cost of Goods Sold because the standard was unattainable and the variance was uncontrollable. As a practical matter, companies usually close small variances to the Cost of Goods Sold account rather than allocate them to the inventory accounts and to cost of goods sold.

Entry (j) reflects this practical disposition of Beta Company's variances by closing them to Cost of Goods Sold:

(j) Materials price variance (+A)	6,000	
Overhead volume variance (+A)	6,000	
Cost of goods sold (-SE)	8,100	
Materials usage variance (-A)		3,000
Labor rate variance (-A)		11,100
Labor efficiency variance (-A)		2,000
Overhead budget variance (-A)		4,000
To close the variance accounts.		

Companies do not report variances separately in financial statements released to the public but simply include them in the reported cost of goods sold amount. Reports prepared for internal use may list the variances separately after the cost of goods sold is shown at standard cost.

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### A broader perspective: Quality management and the Baldrige award

Many of the methods successfully used in the Japanese quality movement originated in the United States. The use of statistical controls in assessing processes originated in the United States, but Japanese managers applied the concept and had much greater employee involvement in quality improvement than US companies. Although lagging in implementing quality management programs, many US companies have jumped on the quality management bandwagon.

The US Congress created the Malcolm Baldrige National Quality Award in honor of a former secretary of commerce. The award is given to businesses that excel in major aspects of quality, such as quality planning, human resource development, and customer focus. Companies that have won this award include well-known manufacturing companies such as Motorola, Westinghouse (Commercial Nuclear Fuel Division), IBM, Texas Instruments (Defense Systems and Electronics Group), and General Motors (Cadillac Division). The award has also been given to large service organizations—Ritz-Carlton Hotels, Federal Express, and AT&T (Network Systems Group)—and to small businesses such as Granite Rock Co. in Watsonville, California, USA, and Globe Metallurgical in Cleveland, Ohio, USA. The Baldrige Award promotes sharing of information about effective quality management programs and identifies companies with role-model quality management systems.

Source: Authors' research.

### Nonfinancial performance measures

Although variances provide important measures of performance, nonfinancial performance measures are also important. Nonfinancial performance measures are particularly important for evaluating quality and customer service. Chapter 20 discussed various nonfinancial measures of performance.

Businesses measure quality by the number and type of customer complaints or by the number of product defects. If they reduce the number of product defects, firms are likely to reduce the number of customer complaints. The objective is to increase customer satisfaction with their products, increase repeat sales, reduce the costs of dealing with customer complaints, and reduce the costs of repairing products.

Managers can reduce materials waste by improving the quality of raw materials so there is less waste from defective materials. Managers also can increase employee training so workers make fewer mistakes and improve the production process. Materials waste may show up in the materials efficiency variance. Workers are generally motivated to find ways to reduce waste if companies keep track of materials waste every day. While reporting variances from standard costs is important to department heads and plant managers, workers are more likely to be motivated by immediate feedback in nonfinancial language.

## 24. Control through standard costs

### Activity-based costing, standards, and variances

Activity-based costing is commonly used with standard costing. Hewlett-Packard, a pioneer in the development of activity-based costing, uses it to develop standard costs. In our example, we applied overhead using just one cost driver—machine-hours. Using activity-based costing, a company uses multiple activity-bases, or cost drivers, as discussed in Chapter 20.

By striving to meet standards, management assumes responsibility for reducing the production costs of its products. In Chapter 25, you will learn about responsibility accounting in a broader sense. Many successful companies rely on responsibility accounting to make their business operations profitable.

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#### An accounting perspective:

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#### Business insight

Managers of many companies criticize standard costing because they believe it keeps workers from continuous improvement. These managers argue that workers who achieve standards do not try to improve beyond those standards. We believe workers can beat the standards and strive for continuous improvement if they are properly motivated.

#### Understanding the learning objectives

- A standard cost is a carefully predetermined measure of what a cost should be under stated conditions.
- Engineering studies and time and motion studies are undertaken to determine the amounts of materials, labor, and other services required to produce a product.
- Budgets are formal written plans that represent management's planned actions in the future and the impacts of these actions on the business.
- Comparison of actual amounts to the budgeted amounts allows management to evaluate their own performance and that of their workers.
- Advantages of using standard costs include improved cost control, more useful information for managerial planning and decision making, more reasonable inventory measurements, cost savings in record-keeping, and possible reductions in production costs incurred.
- Disadvantages of using standard costs include controversial materiality limits for variances, nonreporting of certain variances, and low morale for some workers.

- **Materials price variance:**

$(\text{Actual price} - \text{Standard price}) \times \text{Actual quantity purchased}$  .

- **Materials usage variance:**

$(\text{Actual quantity used} - \text{Standard quantity allowed}) \times \text{Standard price}$  .

- **Labor rate variance:**

$(\text{Actual rate} - \text{Standard rate}) \times \text{Actual hours worked}$  .

- **Labor efficiency variance:**

$(\text{Actual hours worked} - \text{Standard hours allowed}) \times \text{Standard rate}$  .

- **Overhead budget variance:**

Actual overhead - Budgeted overhead.

- **Overhead volume variance:**

Budgeted overhead - Applied overhead.

- The **materials price variance**, shows whether the price paid for materials purchased was higher or lower than the standard price. This journal entry records the purchase of materials:

Materials inventory (debit)  
Materials price variance (debit or credit)  
Accounts payable (credit)

The Materials Price Variance account is debited if the variance is unfavorable and credited if the variance is favorable.

- The **materials usage variance** shows whether the actual quantity of materials used was higher or lower than the standard quantity. The journal entry to record materials usage is:

Work in process inventory (debit)  
Materials usage variance (debit or credit)  
Materials inventory (credit)

The Materials Usage Variance account is debited if unfavorable and credited if favorable.

- The **labor rate variance** shows whether the actual direct labor-hour rate paid is higher or lower than the standard rate.
- The **labor efficiency variance** shows whether the actual direct labor-hours worked were greater or less than the standard hours. This journal entry charges the direct labor cost to Work in Process Inventory:

Work in process inventory (debit)  
Labor rate variance (debit or credit)  
Labor efficiency variance (debit or credit)  
Payroll Summary (credit)

The Labor Rate Variance account is debited if the variance is unfavorable and credited if the variance is favorable. The Labor Efficiency Variance account is debited if the variance is unfavorable and credited if the variance is favorable.

- The **overhead budget variance** shows the difference between total actual overhead costs and total budgeted overhead costs.
- The **overhead volume variance** shows the difference between the budgeted amount of overhead for the actual volume achieved and the applied overhead. This journal entry records the overhead variance:

Manufacturing overhead (debit or credit)  
Overhead budget variance (debit or credit)  
Overhead volume variance (debit or credit)

The debit or credit to Manufacturing Overhead closes that account. The Overhead Budget Variance account is debited if the variance is unfavorable and credited if the variance is favorable. The Overhead Volume Variance account is credited if the variance is favorable and debited if the variance is unfavorable.

- Three possible selection guidelines are (1) amount of variance, (2) size of the variance relative to cost incurred, and (3) controllability of the cost associated with the variance.
- Significant variances, both favorable and unfavorable, should be investigated.
- Variances may be viewed as losses due to inefficiency and closed to the Income Summary account; allocated as adjustments to the recorded cost of Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold; or closed to Cost of Goods Sold.
- Practically, variances are usually closed to Cost of Goods Sold.

## 24. Control through standard costs

### Demonstration problem

Gleim Company manufactures children's toys that are identical. The standard cost of each toy is:

#### Direct materials:

Three blocks of wood at \$0.24 \$0.72  
Direct labor (1 hour at \$6) 6.00

#### Overhead:

Fixed (\$21,600/60,000 units) 0.36  
Variable 0.48  
\$7.56

Gleim bases the standard overhead rate on a volume of 60,000 units per month. In May, it manufactured 50,000 units. Using the following detailed data relative to production, compute the six variances from standard for the month.

#### Materials purchased:

160,000 blocks of wood at \$ 0.26

#### Materials used:

152,000 blocks of wood  
Direct labor: 49,000 hours at \$ 6.12  
Fixed manufacturing overhead \$ 21,840  
Variable manufacturing \$ 24,420  
overhead

### Solution to demonstration problem

#### Materials price variance:

$(\$0.26 - \$0.24) \times 160,000$  \$ 3,200  
(unfavorable)

#### Materials usage variance:

$(152,000 - 150,000) \times \$0.24$  480 (unfavorable)  
Total materials variance \$ 3,680  
(unfavorable)

#### Labor rate variance:

$(\$6.12 - \$6.00) \times 49,000$  \$ 5,880  
(unfavorable)

#### Labor efficiency variance:

$(49,000 - 50,000) \times \$6.00$  -6,000 (favorable)  
Net labor variance \$ -120 (favorable)

#### Overhead budget variance:

Actual (\$21,840 + \$24,420) \$46,260  
Budgeted [ $\$21,600 \times (50,000 \times \$0.48)$ ] 45,600  
Overhead budget variance \$660 (unfavorable)

#### Overhead volume variance:

Budget - Applied [ $\$45,600 - (50,000 \times \$3.60)$   
\$0.84] (unfavorable)  
Total overhead variance \$ 4,260  
(unfavorable)

Total variance for month \$ 7,820  
(unfavorable)

\*50,000 units x 3 blocks per unit.

### Key terms

**Budgets** Formal written plans that represent management's planned actions in the future and the impacts of these actions on the business.

**Flexible budget** A budget that shows the budgeted amount of manufacturing overhead for various levels of output; used in isolating overhead variances and setting standard overhead rates.

**Ideal standards** Standards that can be attained under the best circumstances—that is, with no machinery problems or worker problems. These unrealistic standards can only be met when the company has highly efficient, skilled workers who are working at their best effort throughout the entire period needed to complete the job.

**Labor efficiency variance (LEV)** A variance from standard caused by using more or less than the standard amount of direct labor-hours to produce a product or complete a process; computed as (Actual hours worked - Standard hours allowed) x Standard rate per hour.

**Labor rate variance (LRV)** A variance from standard caused by paying a higher or lower average rate of pay than the standard cost to produce a product or complete a process; computed as (Actual rate - Standard rate) x Actual hours worked.

**Management by exception** The process where management only investigates those variances that are unusually favorable or unfavorable or that have a material effect on the company.

**Materials price variance (MPV)** A variance from standard caused by paying a higher or lower price than the standard for materials purchased; computed as (Actual price - Standard price) x Actual quantity purchased.

**Materials usage variance (MUV)** A variance from standard caused by using more or less than the standard amount of materials to produce a product or complete a process; computed as (Actual quantity used - Standard quantity allowed) x Standard price.

**Overhead budget variance (OBV)** A variance from standard caused by incurring more or less than the standard manufacturing overhead for the actual production volume achieved, as shown by a flexible budget; computed as Actual overhead - Budgeted overhead at the actual production volume level.

**Overhead volume variance (OVV)** A variance from standard caused by producing at a level other than that used in setting the standard overhead application rates; computed as Budgeted overhead - Applied overhead.

**Practical standards** Standards that are strict but attainable. Allowances are made for machinery problems and rest periods for workers. These standards are generally used in planning.

**Standard cost** A carefully predetermined measure of what a cost should be under stated conditions.

**Standard level of output** A carefully predetermined measure of what the expected level of output should be for a specified period of time, usually one year.

**Variance** A deviation of actual costs from standard costs; may be favorable or unfavorable. That is, actual costs may be less than or more than standard costs. Variances may relate to materials, labor, or manufacturing overhead.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

Standard cost usually refers to the standard price per unit of inputs into the production process.

Standard costs are useful in evaluating management's and workers' performance.

Under a standard cost system, all units of a given product produced during a particular period are typically in inventory at the same unit cost.

This journal entry records the use of materials and establishes a Materials Usage Variance account: debit Accounts Payable and Materials Usage Variance; credit Materials Inventory.

Favorable variances are credits in variance accounts.

#### Multiple-choice

Select the best answer for each of the following questions.

Which of the following explain why accountants separate materials variances into a purchase price variance and a usage variance?

- Different individuals may be responsible for each variance.
- Materials might not be purchased and used in the same period.
- These two variances are likely to be more informative to top management than one overall materials variance.
- All of the above.

Determine the materials usage variance and materials price variance from the following data:

Materials purchased	30,000 units
Price per unit purchased	\$3.00
Standard price per unit	\$3.10
Materials used	25,000 units

## 24. Control through standard costs

Standard quantity allowed                      22,000 units

- a. USD 9,300 favorable (MUV)  
USD 3,000 unfavorable (MPV).
- b. USD 9,300 unfavorable (MUV)  
USD 3,000 favorable (MPV).
- c. USD 9,000 unfavorable (MUV)  
USD 2,200 favorable (MPV).
- d. USD 9,000 favorable (MUV)  
USD 2,500 unfavorable (MPV).

To which account would an unfavorable materials usage or labor efficiency variance caused by carelessness or inefficiency be closed?

- a. Materials Inventory.
- b. Income Summary.
- c. Work in Process.
- d. Finished Goods Inventory.

Which of the following journal entries is correct for closing out the variance accounts?

- a. Sales

Materials Usage Variance

Labor Rate Variance

Materials Price Variance

Overhead Volume Variance

Labor Efficiency Variance

Overhead Budget Variance

- b. Materials Price Variance

Overhead Volume Variance

Accounts Payable

Materials Usage Variance

Labor Rate Variance

Labor Efficiency Variance

Overhead Budget Variance

- c. Materials Price Variance

Overhead Volume Variance

Cost of Goods Sold

Materials Usage Variance

Labor Rate Variance

Labor Efficiency Variance

Overhead Budget Variance

- d. Materials Price Variance

Overhead Budget Variance

Accounts Receivable



Materials Usage Variance

Overhead Volume Variance

Labor Efficiency Variance

Labor Rate Variance

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- Is a standard cost an estimated cost? What is the primary objective of employing standard costs in a cost system?
- What is a budget?
- What is the difference between ideal and practical standards? Which standard generally is used in planning?
- What is meant by the term management by exception?
- What are some advantages of using standard costs? What are some disadvantages?
- Describe how the materials price and usage variances would be computed from the following data:
- Standard—1 unit of material at USD 20 per unit. Purchased—1,200 units of material at USD 20.30; used—990 units. Production—1,000 units of finished goods.
- When might a given company have a substantial favorable materials price variance and a substantial unfavorable materials usage variance?
- What is the usual cause of a favorable or unfavorable labor rate variance? What other labor variance is isolated in a standard cost system? Of the two variances, which is more likely to be under the control of management? Explain.
- Identify the type of variance indicated by each of the following situations and indicate whether it is favorable or unfavorable:
  - The cutting department of a company during the week ending July 15 cut 12 size-S cogged wheels out of three sheets of 12-inch high-tempered steel. Usually three wheels of such size are cut out of each sheet.
  - A company purchased and installed an expensive new cutting machine to handle expanding orders. This purchase and the related depreciation had not been anticipated when the overhead was budgeted.
  - Edwards, the band saw operator, was on vacation last week. Lands took her place for the normal 40-hour week. Edwards' wage rate is USD 12 per hour, while Lands' is USD 10 per hour. Production was at capacity last week and the week before.
- Theoretically, how would an accountant dispose of variances from standard? How does an accountant typically dispose of variances?
- Why are variances typically isolated as soon as possible?
- Is it correct to consider favorable variances as always being desirable? Explain.
- How does the use of standard costs permit the application of the principle of management by exception?
- How do standards help in controlling production costs?

## 24. Control through standard costs

- **Real world question** Refer to the discussion of employees setting standards in "An accounting perspective: Business insight". What are the advantages and disadvantages of having employees set their own standards?
- **Real world question** Imagine you are making and selling pizzas for Domino's Pizza. How would you set standards for one pizza to be made and delivered?

### Exercises

**Exercise A** During July, the cutting department completed 8,000 units of a product that had a standard materials cost of 2 square feet per unit at USD 2.40 per square foot. The actual materials purchased consisted of 16,400 square feet at USD 2.20 per square foot, for a total cost of USD 36,080. The actual material used this period was 16,160 square feet. Compute the materials price and usage variances. Indicate whether each is favorable or unfavorable.

Direct materials – 4 pounds at \$5 per pound	\$20
Direct labor – 3 hours at \$6 per hour	18
Manufacturing overhead – 150% of direct labor	27
	<u>\$65</u>

**Exercise B** Whitewater's purchasing agent took advantage of a special offer from one of its suppliers to purchase 44,000 pounds of material at USD 4.10 per pound. Assume 5,500 units were produced and 34,100 pounds of material were used. Compute the variances for materials. Comment on the purchasing agent's decision to take the special offer.

**Exercise C** Compute the labor variances in the following situation:

Actual direct labor payroll (51,600 hours at \$18)	\$928,800
Standard direct labor allowed per unit, 4.20 hours at \$19.20	80.64
Production for month (in units)	10,000

**Exercise D** Blackman Company manufactures a product that has a standard direct labor cost of four hours per unit at USD 24 per hour. In producing 6,000 units, the foreman used a different crew than usual, which resulted in a total labor cost of USD 26 per hour for 22,000 hours. Compute the labor variances and comment on the foreman's decision to use a different crew.

**Exercise E** The following data relates to the manufacturing activities of Strauss Company for the first quarter of the current year:

Standard activity (in units)	30,000
Actual production (units)	24,000
Budgeted fixed manufacturing overhead	\$36,000
Variable overhead rate (per unit)	\$ 4.00
Actual fixed manufacturing overhead	\$37,200
Actual variable manufacturing overhead	\$88,800

Compute the overhead budget variance and the overhead volume variance. (Assume overhead is applied based on units produced.)

**Exercise F** Assume that the actual production in the previous exercise was 26,000 units rather than 24,000. What was the overhead volume variance?

**Exercise G** The standard cost variance accounts of Sun City Company at the end of its fiscal year had the following balances:

Materials price variance (unfavorable)	\$18,000
Materials usage variance (unfavorable)	14,400
Labor rate variance (favorable)	10,800
Labor efficiency variance (unfavorable)	39,600
Overhead budget variance (favorable)	2,000
Overhead volume variance (unfavorable)	21,600

Prepare one journal entry to record the closing of the variance accounts to Cost of Goods Sold.

### Problems

**Problem A** A product has a standard materials usage and cost of 4 pounds per unit at USD 7.00 per pound. During the month, 2,400 pounds of materials were purchased at USD 7.30 per pound. Production for the month totaled 550 units requiring 2,100 pounds of materials.

Compute the materials variances.

**Problem B** During December, a department completed 2,500 units of a product that has a standard materials usage and cost of 1.2 square feet per unit at USD 0.48 per square foot. The actual material used consisted of 3,050 square feet at an actual cost of USD 2,664.48. The actual purchase of this material amounted to 4,500 square feet at a total cost of USD 3,931.20.

Prepare journal entries (a) for the purchase of the materials and (b) for the issuance of materials to production.

**Problem C** Martin Company makes plastic garbage bags. One box of bags requires one hour of direct labor at an hourly rate of USD 6. The company produced 200,000 boxes of bags using 208,000 hours of direct labor at a total cost of USD 1,144,000.

Compute the labor variances.

**Problem D** The finishing department of Mozart Company produced 25,000 units during November. The standard number of direct labor-hours per unit is two hours. The standard rate per hour is USD 37.80. During the month, 51,250 direct labor-hours were worked at a cost of USD 1,742,500.

- Compute labor variances. Record the labor data in a journal entry.
- Record the journal entry to dispose of any variances (close to Cost of Goods Sold).

**Problem E** The standard amount of output for the Chicago plant of Worldworth Company is 50,000 units per month. Overhead is applied based on units produced. The flexible budget of the month for manufacturing overhead allows USD 180,000 for fixed overhead and USD 4.80 per unit of output for variable overhead. Actual overhead for the month consisted of USD 181,440 of fixed overhead; the actual variable overhead follows.

Compute the overhead budget variance and the overhead volume variance assuming the following actual production in units and actual variable overhead in dollars:

- 37,500 and USD 182,400.
- 55,000 and USD 270,480.

**Problem F** Based on a standard volume of output of 96,000 units per month, the standard cost of the product manufactured by Tahoe Company consists of:

Direct materials (0.25 pounds x \$8 per pound)	\$2.00
Direct labor (0.5 hours x \$7.60 per hour)	3.80
Variable manufacturing overhead	2.50
Fixed manufacturing overhead (\$144,000 in total)	1.50
Total	<u>\$9.80</u>

## 24. Control through standard costs

A total of 25,200 pounds of materials was purchased at USD 8.40 per pound. During May, 98,400 units were produced with the following costs:

Direct materials used (24,000 pounds at \$8.40)	\$201,600
Direct labor (50,000 hours at \$7.80)	390,000
Variable manufacturing overhead	249,000
Fixed manufacturing overhead	145,000

Compute the materials price and usage variances, the labor rate and efficiency variances, and the overhead budget and volume variances. (Overhead is applied based on units produced.)

### Alternate problems

**Alternate problem A** The following data apply to Roseanne Company for August, when 2,500 units were produced:

Materials used: 16,000 pounds  
standard materials per unit: 6 pounds at 5 per pound  
Materials purchased: 24,000 pounds at \$4.80 per pound  
Direct labor: 5,800 hours at a total cost of \$69,600

Standard labor per unit: 2 hours at \$11 per hour.

- Compute the materials and labor variances.
- Prepare journal entries to record the transactions involving these variances.

**Alternate problem B** During April, Shakespeare Company produced 15,000 units of a product called Creative. Creative has a standard materials cost of two pieces per unit at USD 8 per piece. The actual materials used consisted of 30,000 pieces at a cost of USD 230,000. Actual purchases of the materials amounted to 40,000 pieces at a cost of USD 300,000.

Compute the two materials variances.

**Alternate problem C** Some of the records of Gonzaga Company's repair and maintenance division were accidentally shredded. Salvaged records indicate that actual direct labor-hours for the period were 2,000 hours. The total labor variance was USD 6,000, favorable. The standard labor rate was USD 7 per direct labor-hour, and the labor rate variance was USD 2,000, unfavorable.

Compute the actual direct labor rate per hour and prepare the journal entry to record the labor rate and the labor efficiency variances.

**Alternate problem D** All Fixed Overhead Company computes its overhead rate based on a standard level of output of 20,000 units. Fixed manufacturing overhead for the current year is budgeted at USD 30,000. Actual fixed manufacturing overhead for the current year was USD 31,000. Overhead is applied based on units produced.

Compute the amount of overhead volume variance for the year under each of the following assumptions regarding actual output:

- 12,500 units.
- 22,500 units.

### Beyond the numbers—Critical thinking

**Business decision case A** Turn to the Sun City Company exercise in this chapter. For each of the variances listed, give a possible reason for its existence.

**Business decision case B** Diane La Hoya, the president of the Rebokk Company, has a problem that does not involve substantial dollar amounts but does involve the important question of responsibility for variances from standard costs. She has just received the following report:

Standard materials at standard price for the actual production in May	\$9,000
Unfavorable materials price variance ( $\$3.60 - \$3.00$ ) $\times$ 3,450 pounds	2,070
Unfavorable materials usage variance (3,450 – 3,000 pounds) $\times$ \$3	1,350
Total actual materials cost for the month of May (3,450 pounds at \$3.60 per pound)	<u>\$12,420</u>

La Hoya has discussed the unfavorable price variance with Jim Montel, the purchasing officer. Montel agrees that under the circumstances he should be held responsible for most of the materials price variance. But he objects to the inclusion of USD 270 (450 pounds of excess materials used at USD 0.60 per pound). This, he argues, is the responsibility of the production department. If the production department had not been so inefficient in the use of materials, he would not have had to purchase the extra 450 pounds.

On the other hand, Ken Kechum, the production manager, agrees that he is basically responsible for the excess quantity of materials used. But, he does not agree that the materials usage variance should be revised to include the USD 270 of unfavorable price variance on the excess materials used. "That is Jim's responsibility," he says.

La Hoya now turns to you for help. Specifically, she wants you to tell her:

- Who is responsible for the USD 270 in dispute?
- If responsibility cannot be clearly assigned, how should the accounting department categorize the variance (price or usage)? Why?
- Are there likely to be other circumstances where materials variances cannot be considered the responsibility of the manager most closely involved with them? Explain.

Prepare written answers to the three questions La Hoya asked.

**A broader perspective C** Refer to "A broader perspective: Quality management and Baldrige award". The Baldrige Award has been criticized for fostering a winner-versus-loser mentality, instead of encouraging every organization to improve its quality. Further, the award has been criticized for grading on the curve by awarding companies that are the best in US industry but still do not compete well against foreign competition.

Write a response to each of these criticisms of the Baldrige Award.

**Group project D** Many workers hate standards. Some people claim standards reduce morale and productivity. Others believe standards are necessary to motivate people. Based on your own experience in school or on a job, what do you think?

In groups of three, choose an organization or business to use as an example. List all the possible standards you could set for this organization or business. Then decide whether your group favors setting standards. If the group does, decide who should set each of the standards on your list. If the group does not favor standards, discuss your reasons. Choose one member to report for your group to the class.

**Group project E** The chief executive officer (CEO) of Tax Preparation Services, Incorporated, remarked to a colleague, "Establishing standard costs and performing variance analysis is only useful for companies with inventories. As a service organization, how could we possibly benefit from implementing such a system?" In groups of two or three students, write a memorandum to your instructor stating whether you agree with this comment or not and explain why. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project F** The controller of Plastics Manufacturing, Incorporated, states: "Let us figure the materials price variances when the materials are used rather than at the time of purchase. This way we can prepare the price

## 24. Control through standard costs

and usage variances at the same time and directly link the price variance to production." In groups of two or three students, write a memorandum to your instructor stating whether you agree with this suggestion or not and explain why. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

### Using the Internet—A view of the real world

Using any Internet search engine enter "standard costs" (be sure to include the quotation marks). Select an article that directly discusses standard costs and print a copy of the article. You are encouraged (but not required) to find an article that answers some of the following questions: When is the use of standard costing appropriate? How do certain industries use standard costing? How are standard costs established? How do standard costs help management in production?

Write a memorandum to your instructor summarizing the key points of the article. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter. Be sure to include a copy of the article used for this assignment.

Using any Internet search engine select one of the new terms at the end of the chapter and perform a key word search. Be sure to include quotation marks (for example: "Management by exception"). Select an article that directly discusses the new term used and print a copy of the article. Write a memorandum to your instructor summarizing the key points of the article. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter. Be sure to include a copy of the article used for this assignment.

### Answers to self-test

#### True-false

**False.** Standard cost is the standard quantity of an input required per unit of output times the standard price per unit **of that input**.

**True.** Standard costs are useful in evaluating the performance of management and workers.

**True.** Under a standard cost system all units of a given product are carried in inventory at the same unit cost.

**False.** The general journal entry to record the use of materials and establish the materials usage variance debits Work in Process Inventory (not Accounts Payable) and Materials Usage Variance and credits Materials Inventory.

**True.** Favorable variances are shown as credits.

#### Multiple-choice

**d.** All of these answers are correct. Different people are often responsible for the two variances, materials are sometimes purchased and used in different accounting periods, and the two separate variances are likely to provide more information to top management than just one materials variance.

**b.**

$$\begin{aligned}\text{Materials usage variance} &= (\text{Actual quantity used} - \text{Standard quantity allowed}) \times \text{Standard price} \\ &= (25,000 - 22,000) \times \text{USD } 3.10 \\ &= 3,000 \times \text{USD } 3.10 \\ &= \text{USD } 9,300 \text{ (unfavorable)}\end{aligned}$$

$$\begin{aligned}\text{Materials price variance} &= (\text{Actual price} - \text{Standard price}) \times \text{Actual quantity purchased} \\ &= (\text{USD } 3.00 - \text{USD } 3.10) \times 30,000 \\ &= -\text{USD } 0.10 \times 30,000\end{aligned}$$

= -USD 3,000 (favorable)

**b.** An unfavorable materials usage or labor efficiency variance caused by carelessness or inefficiency may be considered a loss and closed to Income Summary because the standard was attainable and the variance was controllable.

**c.** The other answers incorrectly close the variance accounts. The variance accounts are closed to Cost of Goods Sold.

# 25. Responsibility accounting: Segmental analysis

## Learning objectives

After studying this chapter, you should be able to:

- Explain responsibility accounting and its use in a business entity.
- Prepare responsibility accounting reports.
- Prepare a segmental income statement using the contribution margin format.
- Calculate return on investment, margin, and turnover for a segment.
- Calculate the residual income of a segment.
- Allocate costs from service departments to operating departments (Appendix).

When a business is small, the owner usually supervises many different activities in the business. As a business grows, responsibility for some of these activities must be given to other persons. Obviously, the success of a business depends to a great extent on the persons responsible for these activities.

In this chapter, you learn about delegating authority to lower level managers for managing various business activities and holding these lower level managers responsible for the activities under their control. You also learn how to assess the performance of these managers. A company's activities are grouped into responsibility centers. The company measures the performance of each center manager in terms of the items of revenue and expense over which that manager has control.

## Responsibility accounting

The term **responsibility accounting** refers to an accounting system that collects, summarizes, and reports accounting data relating to the responsibilities of individual managers. A responsibility accounting system provides information to evaluate each manager on the revenue and expense items over which that manager has primary control (authority to influence).

A responsibility accounting report contains those items controllable by the responsible manager. When both controllable and uncontrollable items are included in the report, accountants should clearly separate the categories. The identification of controllable items is a fundamental task in responsibility accounting and reporting.

To implement responsibility accounting in a company, the business entity must be organized so that responsibility is assignable to individual managers. The various company managers and their lines of authority (and the resulting levels of responsibility) should be fully defined. The organization chart in Exhibit 202 demonstrates lines of authority and responsibility that could be used as a basis for responsibility reporting.



## 25. Responsibility accounting: Segmental analysis

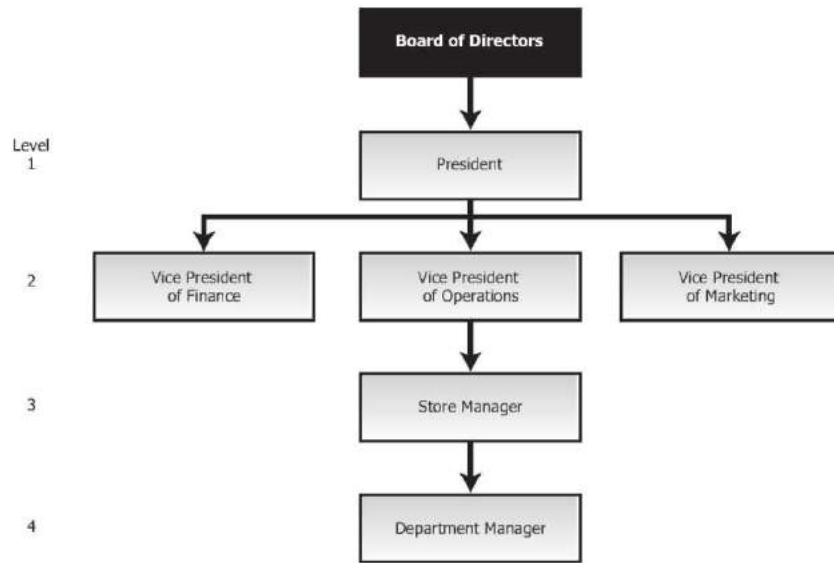


Exhibit 202: A corporate functional organization chart including four levels of management

To identify the items over which each manager has control, the lines of authority should follow a specified path. For example, in Exhibit 202 we show that a department supervisor may report to a store manager, who reports to the vice president of operations, who reports to the president. The president is ultimately responsible to stockholders or their elected representatives, the board of directors. In a sense, the president is responsible for all revenue and expense items of the company, since at the presidential level all items are controllable over some period. The president often carries the title, Chief Executive Officer (CEO) and usually delegates authority to lower level managers since one person cannot keep fully informed of the day-to-day operating details of all areas of the business.

The manager's level in the organization also affects those items over which that manager has control. The president is usually considered a first-level manager. Managers (usually vice presidents) who report directly to the president are second-level managers. Notice on the organization chart in Exhibit 202 that individuals at a specific management level are on a horizontal line across the chart. Not all managers at that level, however, necessarily have equal authority and responsibility. The degree of a manager's authority varies from company to company.

While the president may delegate much decision-making power, some revenue and expense items remain exclusively under the president's control. For example, in some companies, large capital (plant and equipment) expenditures may be approved only by the president. Therefore, depreciation, property taxes, and other related expenses should not be designated as a store manager's responsibility since these costs are not primarily under that manager's control.

The controllability criterion is crucial to the content of performance reports for each manager. For example, at the department supervisor level, perhaps only direct materials and direct labor cost control are appropriate for measuring performance. A plant manager, however, has the authority to make decisions regarding many other

costs not controllable at the supervisory level, such as the salaries of department supervisors. These other costs would be included in the performance evaluation of the store manager, not the supervisor.

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### A broader perspective: Employee buyouts

Traditional organization lines of responsibility have workers reporting to supervisors or department managers, who in turn report to higher managers, who report to even higher managers, and so forth on up the organization. Top management is accountable to stockholders.

What happens when those stockholders are also employees, as in the case of many employee buyouts (such as The Chilcote Company – <http://www.chilcotecompany.com>)? Now, employees report to managers who are accountable back to the employees in their role as stockholders. Employees wear two hats: They own the company and they work for the company. In some sense, this makes each employee like a proprietor of a business. Presumably, after employees buy their company, they have greater incentives to make the company successful.

Source: Based on the authors' research.

### Responsibility reports

Responsibility accounting provides reports to different levels of management. The amount of detail varies depending on the manager's level in the organization. A performance report to a department manager of a retail store would include actual and budgeted dollar amounts of all revenue and expense items under that supervisor's control. The report issued to the store manager would show only totals from all the department supervisors' performance reports and any additional items under the store manager's control, such as the store's administrative expenses. The report to the company's president includes summary totals of all the stores' performance levels plus any additional items under the president's control. In effect, the president's report should include all revenue and expense items in summary form because the president is responsible for controlling the profitability of the entire company.

**Management by exception** is the principle that upper level management does not need to examine operating details at lower levels unless there appears to be a problem. As businesses become increasingly complex, accountants have found it necessary to filter and condense accounting data so that these data may be analyzed quickly. Most executives do not have time to study detailed accounting reports and search for problem areas. Reporting only summary totals highlights any areas needing attention and makes the most efficient use of the executive's time.

The condensation of data in successive levels of management reports is justified on the basis that the appropriate manager will take the necessary corrective action. Thus, specific performance details need not be reported to superiors.

For example, if sales personnel costs have been excessively high in a particular department, that departmental manager should find and correct the cause of the problem. When the store manager questions the unfavorable budget variance of the department, the departmental supervisor can inform the store manager that corrective action was taken. Hence, it is not necessary to report to any higher authority that a particular department within one of the stores is not operating satisfactorily because the matter has already been resolved. Alternatively, if a

## 25. Responsibility accounting: Segmental analysis

manager's entire store has been performing poorly, summary totals reported to the vice president of operations discloses this situation, and an investigation of the store manager's problems may be indicated.

In preparing responsibility accounting reports, companies use two basic methods to handle revenue or expense items. In the first approach, only those items over which a manager has direct control are included in the responsibility report for that management level. Any revenue and expense items that cannot be directly controlled are not included. The second approach is to include all revenue and expense items that can be traced directly or allocated indirectly to a particular manager, whether or not they are controllable. This second method represents a full-cost approach, which means all costs of a given area are disclosed in a single report. When this approach is used, care must be taken to separate controllable from noncontrollable items to differentiate those items for which a manager can and should be held responsible.

For accounting reports to be of maximum benefit, they must be timely. That is, accountants should prepare reports as soon as possible after the end of the performance measurement period. Timely reporting allows prompt corrective action to be taken. When reports are delayed excessively, they lose their effectiveness as control devices. For example, a report on the previous month's operations that is not received until the end of the current month is virtually useless for analyzing poor performance areas and taking corrective action.

Companies also should issue reports regularly so that managers can spot trends. Then, appropriate management action can be initiated before major problems occur. Regular reporting allows managers to rely on reports and become familiar with their contents.

Firms should make the format of their responsibility reports relatively simple and easy to read. Confusing terminology should be avoided. Where appropriate, expressing results in physical units may be more familiar and understandable to some managers. To assist management in quickly spotting budget variances, companies can report both budgeted (expected) and actual amounts. A **budget variance** is the difference between the budgeted and actual amounts of an item. Because variances highlight problem areas (exceptions), they are helpful in applying the management-by-exception principle. To help management evaluate performance to date, responsibility reports often include both a current period and year-to-date analysis.

### Responsibility reports—An illustration

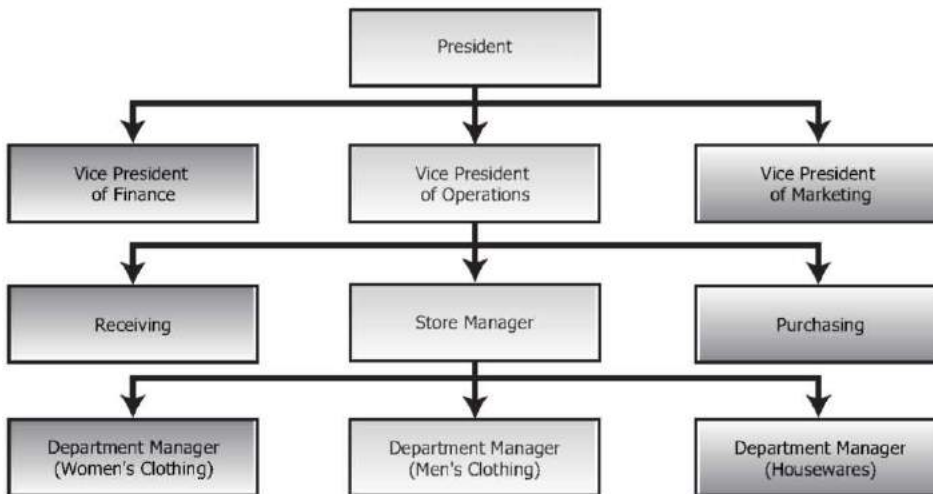
Exhibit 203 on the next page, shows how Macy's Corporation could relate its responsibility accounting reports. Assume Macy's has four management levels—the president, vice president of operations, store manager, and department manager. In Exhibit 203 on the next page, we show that a responsibility report would be prepared for each management level.

Note in Exhibit 204, the detailed information included in the responsibility reports for each manager. Only the individual manager's controllable expenses are contained in these reports. For example, the store manager's report includes only totals from the Men's Clothing Department manager's report. In turn, the report to the vice president includes only totals from the store manager's report, and so on. Detailed data from the lower levels are summarized or condensed and reported at the next higher level.

You can see that at each level, more and more costs become controllable. Also, the company introduces controllable costs not included on lower level reports into the reports for levels 3, 2, and 1. The only store cost not included at the store manager's level is the store manager's salary because it is noncontrollable by that store manager. It is, however, controllable by the store manager's supervisor, the vice president of operations.

Based on an analysis of these reports, the Men's Clothing Department manager probably would take immediate action to see why supplies and overtime were significantly over budget this month. The store manager may ask the department manager what the problems were and whether they are now under control. The vice president may ask the same question of the store manager. The president may ask each vice president why the budget was exceeded this month and what corrective action has been taken.

**Illustration 25.2 Organization Chart—Macy's Corporation**



**Illustration 25.3 Responsibility Reports for Macy's Corporation**

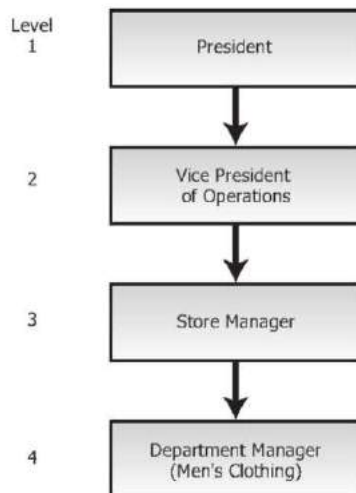


Exhibit 203: Organization chart-Macy's corporation

### Responsibility centers

A **segment** is a fairly autonomous unit or division of a company defined according to function or product line. Traditionally, owners have organized their companies along functional lines. The segments or departments organized along functional lines perform a specified function such as marketing, finance, purchasing, production,

## 25. Responsibility accounting: Segmental analysis

or shipping. Recently, large companies have tended to organize segments according to product lines such as an electrical products division, shoe department, or food division.

A **responsibility center** is a segment of an organization for which a particular executive is responsible. There are three types of responsibility centers—expense (or cost) centers, profit centers, and investment centers. In designing a responsibility accounting system, management must examine the characteristics of each segment and the extent of the responsible manager's authority. Care must be taken to ensure that the basis for evaluating the performance of an expense center, profit center, or investment center matches the characteristics of the segment and the authority of the segment's manager. The following sections of the chapter discuss the characteristics of each of these centers and the appropriate bases for evaluating the performance of each type.

### First Level

<b>Macy's Corporation President</b>				
<b>Controllable Expenses</b>	<b>Amount</b>		<b>Over or (Under) Budget</b>	
	<b>This Month</b>	<b>Year to Date</b>	<b>This Month</b>	<b>Year to Date</b>
President's office expense	\$ 11,000	\$ 55,000	\$ 1,000	\$ 2,000
Vice president of operations	128,720	700,000	6,000	8,000
Vice president of marketing	18,700	119,000	4,000	8,000
Vice president of finance	14,000	115,000	8,000	9,000
Vice presidents' salaries	29,000	145,000	-0-	-0-
Total	\$ 201,420	\$ 1,134,000	\$ 19,000	\$ 27,000

### Second Level

<b>Macy's Corporation Vice President of Operations</b>				
<b>Controllable Expenses</b>	<b>Amount</b>		<b>Over or (Under) Budget</b>	
	<b>This Month</b>	<b>Year to Date</b>	<b>This Month</b>	<b>Year to Date</b>
Vice president's office expense	\$ 2,840	\$ 9,500	\$ (500)	\$ (8,000)
Store manager	88,800	490,000	2,500	5,000
Purchasing	5,300	32,500	1,000	2,000
Receiving	4,700	33,000	3,000	9,000
Salaries of store managers and heads of purchasing and receiving	27,000	135,000	-0-	-0-
Total (include in report for next higher level)	\$ 128,720	\$ 700,000	\$ 6,000	\$ 8,000

### Fourth Level

**Macy's Corporation  
Manger, Men's Clothing Department**

Controllable Expenses	Amount		Over or (Under) Budget	
	This Month	Year to Date	This Month	Year to Date
Inventory losses	\$ 2,000	\$ 10,000	\$ 100	\$ 400
Supplies	1,800	8,500	800	950
Salaries	11,000	53,000	(100)	810
Overtime	2,000	14,500	800	140
Total (include in report for next higher level)	\$ 16,800	\$ 86,000	\$ 1,600	\$ 2,300

Exhibit 204: Responsibility reports for Macy's corporation

An **expense center** is a responsibility center incurring only expense items and producing no direct revenue from the sale of goods or services. Examples of expense centers are service centers (e.g. the maintenance department or accounting department) or intermediate production facilities that produce parts for assembly into a finished product. Managers of expense centers are held responsible only for specified expense items.

The appropriate goal of an expense center is the long-run minimization of expenses. Short-run minimization of expenses may not be appropriate. For example, a production supervisor could eliminate maintenance costs for a short time, but in the long run, total costs might be higher due to more frequent machine breakdowns.

A **profit center** is a responsibility center having both revenues and expenses. Because segmental earnings equal segmental revenues minus related expenses, the manager must be able to control both of these categories. The manager must have the authority to control selling price, sales volume, and all reported expense items. To properly evaluate performance, the manager must have authority over all of these measured items. **Controllable profits of a segment** result from deducting the expenses under a manager's control from revenues under that manager's control.

Closely related to the profit center concept is an investment center. An **investment center** is a responsibility center having revenues, expenses, and an appropriate investment base. When a firm evaluates an investment center, it looks at the rate of return it can earn on its investment base. Accountants compute the **return on investment (ROI)**, also called the rate of return, by dividing segmental income by the appropriate investment base. For example, a segment that earns USD 500,000 on an investment base of USD 5,000,000 has an ROI of 10 per cent.

Determining the investment base to be used in the ROI calculation is a tricky matter. Normally, the assets available for use by the division make up its investment base. But accountants disagree on whether depreciable assets should be included in the ROI calculation at original cost, original cost less accumulated depreciation, or current replacement cost. **Original cost** is the price paid to acquire the assets. **Original cost less accumulated depreciation** is the book value of the assets—the amount paid less total depreciation taken. **Current replacement cost** is the cost of replacing the present assets with similar assets in the same condition as those now in use. A different rate of return results from each of these measures. Therefore, management must select and agree on an appropriate measure of investment base prior to making ROI calculations or interdivision comparisons.

Even after the investment base is defined, problems may still remain because many segment managers have limited control over some of the items included in the investment base of their segment. For instance, top-level management often makes capital expenditure decisions for major store assets rather than allowing the segment managers to do so. Therefore, the segment manager may have little control over the store assets used by the segment. Another problem area may be the company's centralized credit and collection department. The segment

## 25. Responsibility accounting: Segmental analysis

manager may have little or no control over the amount of accounts receivable included as segment assets because the manager cannot change the credit-granting or collection policies of the company.

Usually these problems are overcome when managers realize that if all segments are treated in the same manner, the inclusion of noncontrollable items in the investment base may have negligible effects. Then, comparisons of the ROI for all segments are based on a consistent treatment of items. To avoid adverse reactions or decreased motivation, segment managers must agree to this treatment.

Companies prefer to evaluate segments as investment centers because the ROI criterion facilitates performance comparisons between segments. Segments with more resources should produce more profits than segments with fewer resources, so it is difficult to compare the performance of segments of different sizes on the basis of profits alone. However, when ROI is a performance measure, performance comparisons take into account the differences in the sizes of the segments. The segment with the highest percentage ROI is presumably the most effective in using whatever resources it has.

Typical investment centers are large, autonomous segments of large companies. The centers are often separated from one another by location, types of products, functions, and/or necessary management skills. Segments such as these often seem to be separate companies to an outside observer. But the investment center concept can be applied even in relatively small companies in which the segment managers have control over the revenues, expenses, and assets of their segments.

### Transfer prices

Profit centers and investment centers inside companies often exchange products with each other. The Pontiac, Buick, and other divisions of General Motors buy and sell automobile parts from each other, for example. No market exchange takes place, so the company sets transfer prices that represent revenue to the selling division and costs to the buying division.

A **transfer price** is an artificial price used when goods or services are transferred from one segment to another segment within the same company. Accountants record the transfer price as a revenue of the producing segment and as a cost, or expense, of the receiving segment. Usually no cash actually changes hands between the segments. Instead, the transfer price is an internal accounting transaction.

Segments are generally evaluated based on some measure of profitability. The transfer price is important because it affects the profitability of the buying and selling segments. The higher the transfer price, the better for the seller. The lower the transfer price, the better for the buyer.

Ideally, a transfer price provides incentives for segment managers to make decisions not only in their best interests but also in the interests of the entire company. For example, if the selling segment can sell everything it produces for USD 100 per unit, the buying segment should pay the market price of USD 100 per unit. A seller with excess capacity, however, should be willing to transfer a product to the buying segment for any price at or above the differential cost of producing and transferring the product to the buying segment (typically all variable costs).

In practice, companies mostly base transfer prices on (1) the market price of the product, (2) the cost of the product, or (3) some amount negotiated by the buying and selling segment managers.

### Use of segmental analysis

So far we have described only the fundamentals of responsibility accounting. In this section we focus specifically on segmental analysis.

**Decentralization** is the dispersion of decision-making authority among individuals at lower levels of the organization. In other words, the extent of decentralization refers to the degree of control that segment managers have over the revenues, expenses, and assets of their segments. When a segment manager has control over these elements, the investment center concept can be applied to the segment. Thus, the more decentralized the decision making is in an organization, the more applicable is the investment center concept to the segments of the company. The more centralized the decision making is, the more likely responsibility centers are to be established as expense centers.

Some advantages of decentralized decision making are:

- Managing segments trains managers for high-level positions in the company. The added authority and responsibility also represent job enlargement and often increase job satisfaction and motivation.
- Top management can be more removed from day-to-day decision making at lower levels of the company and can manage by exception. When top management is not involved with routine problem solving, it can devote more time to long-range planning and to the company's most significant problem areas.
- Decisions can be made at the point where problems arise. It is often difficult for top managers to make appropriate decisions on a timely basis when they are not intimately involved with the problem they are trying to solve.
- Since decentralization permits the use of the investment center concept, performance evaluation criteria such as ROI and residual income (to be explained later) can be used.

### Concepts used in segmental analysis

To understand segmental analysis, you need to know about the concepts of variable cost, fixed cost, direct cost, indirect cost, net income of a segment, and contribution to indirect expenses. Next, we describe each concept.

Costs may be either directly or indirectly related to a particular cost object. A **cost object** is a segment, product, or other item for which costs may be accumulated. In other words, a cost is not direct or indirect in and of itself. It is only direct or indirect in relation to a given cost object.

A **direct cost (expense)** is specifically traceable to a given cost object. An **indirect cost (expense)** is not traceable to a given cost object but has been allocated to it. Accountants can designate a particular cost (expense) as direct or indirect by reference to a given cost object. Thus, a cost that is direct to one cost object may be indirect to another. For instance, the salary of a segment manager may be a direct cost of a given manufacturing segment but an indirect cost of one of the products manufactured by that segment. In this example, the segment and the product are two distinct cost objects.

Because a direct cost is traceable to a cost object, the cost is likely to be eliminated if the cost object is eliminated. For instance, if the plastics segment of a business closes down, the salary of the manager of that segment probably is eliminated. Sometimes a direct cost would remain even if the cost object were eliminated, but this is the exception rather than the rule.

An indirect cost is not traceable to a particular cost object; therefore, it only becomes an expense of the cost object through an allocation process. For example, consider the depreciation expense on the company headquarters building that is allocated to each segment of the company. The depreciation expense is a direct cost for the company headquarters, but it is an indirect cost to each segment. If a segment of the company is eliminated, the indirect cost for depreciation assigned to that segment does not disappear; the cost is simply allocated among the remaining



## 25. Responsibility accounting: Segmental analysis

segments. In a given situation, it may be possible to identify an indirect cost that would be eliminated if the cost object were eliminated, but this would be the exception to the general rule.

Because the direct costs of a segment are clearly identified with that segment, these costs are often controllable by the segment manager. In contrast, indirect costs become segment costs only through allocation; therefore, most indirect costs are noncontrollable by the segment manager. Be careful, however, not to equate direct costs with controllable costs. For example, the salary of a segment manager may be direct to that segment and yet is noncontrollable by that manager because managers cannot specify their own salaries.

When preparing internal reports on the performance of segments of a company, management often finds it is important to classify expenses as fixed or variable and as direct or indirect to the segment. These classifications may be more useful to management than the traditional classifications of cost of goods sold, operating expenses, and nonoperating expenses that are used for external reporting in the company's financial statements. As a result, many companies prepare an income statement for internal use with the format shown in Exhibit 205(A).

### A. All Expenses Allocated to Segments

	Segment A	Segment B	Total
Sales	\$ 2,500,000	\$ 1,500,000	\$ 4,000,000
Less: Variable expenses (all of which are direct expenses)	<u>700,000</u>	<u>650,000</u>	<u>1,350,000</u>
<b>Contribution margin</b>	<b>\$ 1,800,000</b>	<b>\$ 850,000</b>	<b>\$ 2,650,000</b>
Less: Direct fixed expenses	<u>450,000</u>	<u>550,000</u>	<u>1,000,000</u>
<b>Contribution to indirect expenses</b>	<b>\$ 1,350,000</b>	<b>\$ 300,000</b>	<b>\$ 1,650,000</b>
Less: Indirect fixed expenses	<u>270,000</u>	<u>330,000</u>	<u>600,000</u>
<b>Net Income</b>	<b>\$ 1,080,000</b>	<b>\$ (30,000)</b>	<b>\$ 1,050,000</b>

### B. Indirect Expenses not allocated to Segments

	Segment A	Segment B	Total
Sales	\$ 2,500,000	\$ 1,500,000	\$ 4,000,000
Less: Variable expenses	<u>700,000</u>	<u>650,000</u>	<u>1,350,000</u>
<b>Contribution margin</b>	<b>\$ 1,800,000</b>	<b>\$ 850,000</b>	<b>\$ 2,650,000</b>
Less: Direct fixed expenses	<u>450,000</u>	<u>550,000</u>	<u>1,000,000</u>
<b>Contribution to indirect expenses</b>	<b>\$ 1,350,000</b>	<b>\$ 300,000</b>	<b>\$ 1,650,000</b>
Less: Indirect fixed expenses			<u>600,000</u>
<b>Net income</b>			<b>\$ 1,050,000</b>

Exhibit 205: Contribution margin format income Statement

This format is called the **contribution margin format** for an income statement (first introduced in Chapter 22) because it shows the contribution margin. **Contribution margin** is defined as sales revenue less variable expenses. Notice in Exhibit 205(A) that all variable expenses are direct expenses of the segment. The second subtotal in the contribution margin format income statement is the segment's contribution to indirect expenses. **Contribution to indirect expenses** is defined as sales revenue less all direct expenses of the segment (both variable direct expenses and fixed direct expenses). The final total in the income statement is **segmental net income**, defined as segmental revenues less all expenses (direct expenses and allocated indirect expenses).

Earlier we stated that the performance of a profit center is evaluated on the basis of the segment's profits. It is tempting to use segmental net income to make this evaluation since total net income is used to evaluate the performance of the entire company. The problem with using segmental net income to evaluate performance is that

segmental net income includes certain indirect expenses that have been allocated to the segment but are not directly related to it or its operations. Because segmental contribution to indirect expenses includes only revenues and expenses directly related to the segment, this amount is often more appropriate for evaluation purposes.

Given the facts in Exhibit 205(A), if management relied on segmental net income to judge segmental performance, management might conclude that Segment B should be eliminated because it shows a loss of USD 30,000. But this action would reduce overall company income by USD 300,000, as shown here:

Reduction in corporate revenues		\$ 1,500,000
<u>Reduction in corporate expenses:</u>		
Variable expenses	\$ 650,000	
Direct fixed expenses	<u>550,000</u>	<u>1,200,000</u>
Reduction in corporate income		<u>\$ 300,000</u>

Notice that the elimination of Segment B would not eliminate the USD 330,000 of allocated fixed costs. These costs would need to be allocated to Segment A if Segment B no longer existed.

To stress the importance of a segment's contribution to indirect expenses, many companies prefer the contribution margin income statement format in Exhibit 205(B), over that in Exhibit 205(A). The difference is that indirect fixed costs are not allocated to individual segments in Exhibit 205(B). Indirect fixed expenses appear only in the total column for the computation of net income for the entire company. The computation for each segment stops with the segment's contribution to indirect expenses; this is the appropriate figure to use for evaluating the earnings performance of a segment. Only for the company as a whole is net income (revenues minus all expenses) computed; this is, of course, the appropriate figure to use for evaluating the company as a whole.

**Arbitrary allocations of indirect fixed expenses** As stated earlier, indirect fixed expenses, such as depreciation on the corporate administration building or on the computer facility maintained at company headquarters, can only be allocated to segments on some arbitrary basis. The two basic guidelines for allocating indirect fixed expenses are by the benefit received and by the responsibility for the incurrence of the expense.

Accountants can make an allocation on the basis of benefit received for certain indirect expenses. For instance, assume the entire company used a corporate computer for a total of 10,000 hours. If it used 4,000 hours, Segment K could be charged (allocated) with 40 per cent of the computer's depreciation for the period because it received 40 per cent of the total benefits for the period.

For certain other indirect expenses, accountants base allocation on responsibility for incurrence. For instance, assume that Segment M contracts with a magazine to run an advertisement benefiting Segment M and various other segments of the company. Some companies would allocate the entire cost of the advertisement to Segment M because it was responsible for incurring the advertising expense.

To further illustrate the allocation of indirect expenses based on a measure of benefit or responsibility for incurrence, assume that Daily Company operates two segments, X and Y. It allocates the following indirect expenses to its two segments using the designated allocation bases:

<b>Expense</b>	<b>Allocation Base</b>
Administrative office building occupancy expense, \$ 50,000	Net sales
Insurance expense, \$ 35,000	Cost of segmental plant assets
General administrative expenses, \$ 40,000	Number of employees

The following additional data are provided:

	<b>Segment X</b>	<b>Segment Y</b>	<b>Total</b>
Net sales	\$ 400,000	\$ 500,000	\$ 900,000
Segmental plant assets	\$ 250,000	\$ 400,000	\$ 650,000

## 25. Responsibility accounting: Segmental analysis

Number of employees 50                      80                      130

The following expense allocation schedule shows the allocation of indirect expenses:

	<b>Segment X</b>	<b>Segment Y</b>	<b>Total</b>
Administrative office building occupancy expense	\$ 22,222 <sup>a</sup>	\$ 27,778 <sup>b</sup>	\$ 50,000
Insurance expense	13,462 <sup>c</sup>	21,538 <sup>d</sup>	35,000
General administrative expenses	15,385 <sup>e</sup>	24,615 <sup>f</sup>	40,000

<sup>a</sup> \$ 400,000/\$ 900,000 x \$ 50,000 = \$ 22,222

<sup>d</sup> \$400,000/\$650,000 x \$35,000 = \$ 21,538

<sup>b</sup> \$500,000/\$900,000 x \$50,000 = \$27,778

<sup>e</sup> 50/130 x \$40,000 = \$ 15,385

<sup>c</sup> \$250,000/\$650,000 x \$35,000 = \$13,462

<sup>f</sup> 80/130 x \$40,000 = \$24,615

When it uses neither benefit nor responsibility to allocate indirect fixed expenses, a company must find some other reasonable, but arbitrary, basis. Often, for lack of a better approach, a firm may allocate indirect expenses based on net sales. For instance, if Segment X's net sales were 60 per cent of total company sales, then 60 per cent of the indirect expenses would be allocated to Segment X. Allocating expenses based on sales is not recommended because it reduces the incentive of a segment manager to increase sales because this would result in more indirect expenses being allocated to that segment.

Having covered some basic concepts essential to segmental analysis, we next present some specific procedures for performance evaluation.

### Investment center analysis

To this point, the segmental analysis discussion has concentrated on the contribution to indirect expenses and segmental net income approaches. Now we introduce the investment base concept into the analysis. Two evaluation bases that include the concept of investment base in the analysis are ROI (return on investment) and RI (residual income).

A segment that has a large amount of assets usually earns more in an absolute sense than a segment that has a small amount of assets. Therefore, a firm cannot use absolute amounts of segmental income to compare the performance of different segments. To measure the relative effectiveness of segments, a company might use **return on investment (ROI)**, which calculates the return (income) as a percentage of the assets employed (investment). The formula for ROI is:

$$\text{ROI} = \frac{\text{Income}}{\text{Investment}}$$

To illustrate the difference between using absolute amounts and using percentages in evaluating a segment's performance, consider the data in Exhibit 206, for a company with three segments.

	<b>Segment A</b>	<b>Segment B</b>	<b>Segment C</b>	<b>Total</b>
(a) Income	\$ 250,000	\$1,000,000	\$ 500,000	\$1,750,000
(b) Investment	2,500,000	5,000,000	2,000,000	9,500,000
Return on investment (a) ÷ (b)	10 per cent	20 per cent	25 per cent	18.42 per cent

Exhibit 206: Computation of return on investment (ROI)

When using absolute dollars of income to evaluate performance, Segment B appears to be doing twice as well as Segment C. However, using ROI to evaluate the segments indicates that Segment C is really performing the best (25 per cent), Segment B is next (20 per cent), and Segment A is performing the worst (10 per cent). Therefore, ROI is a more useful indicator of the relative performance of segments than absolute income.

Although ROI appears to be a quite simple and straightforward computation, there are several alternative methods for making the calculation. These alternatives focus on what is meant by income and investment. Exhibit 207, shows various definitions and applicable situations for each type of computation.

Situation	Definition of Income	Definition of Investment
1. Evaluation of the earning power of the company. Do not use for segments or segment managers due to inclusion of non controllable expenses.	Net income of the company.*	Total assets of the company.†
2. Evaluation of rate of income contribution of segment. Do not use for segment managers due to inclusion of non controllable expenses.	Contribution to indirect expenses.	Assets directly used by and identified with the segment.
3. Evaluation of income performance of segment manager.	<i>Controllable</i> income. Begin with contribution to indirect expenses and eliminate any revenues and direct expenses not under the control of the segment manager.	Assets under the control of the segment manager.

\* Often *net operating income* is used; this term is defined as income before interest and taxes.

† *Operating assets* are often used in the calculation. This definition excludes assets not used in normal operations.

#### Exhibit 207: Possible definitions of income and investment

As discussed earlier in the chapter, alternative valuation bases include cost less accumulated depreciation, original cost, and current replacement cost. Each of the valuation bases has merits and drawbacks, as we discuss next. First, cost less accumulated depreciation is probably the most widely used valuation base and is easily determined. Because of the many types of depreciation methods, comparisons between segments or companies may be difficult. Also, as book value decreases, a constant income results in a steadily increasing ROI even though the segment's performance is unchanged. Second, the use of original cost eliminates the problem of decreasing book value but has its own drawback. The cost of old assets is much less than an investment in new assets, so a segment with old assets can earn less than a segment with new assets and realize a higher ROI. Third, current replacement cost is difficult to use because replacement cost figures often are not available, but this base does eliminate some of the problems caused by the other two methods. Whichever valuation basis is adopted, all ROI calculations that are to be used for comparative purposes should be made consistently.

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### An accounting perspective:

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#### Business insight

Although financial performance measures such as ROI are important for providing incentives to perform well, so is the company's culture. For example, Johnson & Johnson has a culture emphasizing high ethical standards. The Johnson & Johnson Credo, published in its annual report and displayed throughout the company, is a famous example of this culture. HP is known as a people-oriented company that emphasizes personal development and long-term employment.

To encourage long-term growth, 3M requires that at least 25 per cent of each division's sales come from new products. This encourages constant innovation and new product development. In addition, the company allows employees to spend 15 per cent of their time on innovative projects, encourages sharing of technology across divisions, and provides "seed" grants for employees to develop new products. With this corporate culture, 3M has a worldwide reputation for innovation.

## 25. Responsibility accounting: Segmental analysis

**Expanded form of ROI computation** The ROI formula breaks into two component parts:

$$\text{ROI} = \frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Investment}}$$

The first part of the formula, Income/Sales, is called margin or return on sales. The **margin** refers to the percentage relationship of income or profits to sales. This percentage shows the number of cents of profit generated by each dollar of sales. The second part of the formula, Sales/Investment, is called turnover. **Turnover** shows the number of dollars of sales generated by each dollar of investment. Turnover measures how effectively each dollar of assets was used.

A manager can increase ROI in the following three ways. In Exhibit 208, note the possible outcomes of some of these strategies to increase ROI.

- By concentrating on increasing the profit margin while holding turnover constant: Pursuing this strategy means keeping selling prices constant and making every effort to increase efficiency and thereby reduce expenses.
- By concentrating on increasing turnover by reducing the investment in assets while holding income and sales constant: For example, working capital could be decreased, thereby reducing the investment in assets.

Past year's return on investment:

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

$$\text{ROI} = \frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Investment}}$$

$$\text{ROI} = \frac{\text{USD } 100,000}{\text{USD } 2,000,000} \times \frac{\text{USD } 2,000,000}{\text{USD } 1,000,000}$$

$$\text{ROI} = 5 \text{ per cent} \times 2 \text{ time}$$

ROI = 10 per cent

- Increase margin through reducing expenses by USD 40,000; no effect on sales or investment.

$$\text{ROI} = \frac{\text{USD } 140,000}{\text{USD } 2,000,000} \times \frac{\text{USD } 2,000,000}{\text{USD } 1,000,000}$$

$$\text{ROI} = 7 \text{ per cent} \times 2 \text{ time}$$

ROI = 14 per cent

- Increase turnover through reducing investment in assets by USD 200,000; no effect on sales or investment.

$$\text{ROI} = \frac{\text{USD } 100,000}{\text{USD } 2,000,000} \times \frac{\text{USD } 2,000,000}{\text{USD } 800,000}$$

$$\text{ROI} = 5 \text{ per cent} \times 2.5 \text{ time}$$

ROI = 12.5 per cent

- (a) Increase margin and turnover by disposing of nonproductive depreciable assets; income increased by USD 10,000; investment decreased by USD 200,000; no effect on sales.

$$\text{ROI} = \frac{\text{USD } 110,000}{\text{USD } 2,000,000} \times \frac{\text{USD } 2,000,000}{\text{USD } 800,000}$$

$$\text{ROI} = 5.5 \text{ per cent} \times 2.5 \text{ time}$$

ROI = 13.75 per cent

- (b) Increase margin and turnover through increased advertising; sales increased by USD 500,000 and income by USD 50,000; no effect on investment.

$$\text{ROI} = \frac{\text{USD } 150,000}{\text{USD } 2,500,000} \times \frac{\text{USD } 2,500,000}{\text{USD } 1,000,000}$$

$$\text{ROI} = 6 \text{ per cent} \times 2.5 \text{ time}$$

ROI = 15 per cent

- (c) Increase turnover through increased advertising; sales increased by USD 500,000 and income by USD 12,500; no effect on investment.

$$\text{ROI} = \frac{\text{USD } 112,500}{\text{USD } 2,500,000} \times \frac{\text{USD } 2,500,000}{\text{USD } 1,000,000}$$

$$\text{ROI} = 4.5 \% \times 2.5 \text{ times}$$

$$\text{ROI} = 11.25\%$$

Exhibit 208: Strategies for increasing return on investment (ROI)

- By taking actions that affect both margin and turnover: For example, disposing of nonproductive depreciable assets would decrease investment while also increasing income (through the reduction of depreciation expense). Thus, both margin and turnover would increase. An advertising campaign would probably increase sales and income. Turnover would increase, and margin might increase or decrease depending on the relative amounts of the increases in income and sales.

## 25. Responsibility accounting: Segmental analysis

### Economic value added and residual income

When a company uses ROI to evaluate performance, managers have incentives to focus on the average returns from their segments' assets. However, the company's best interest is served if managers also focus on the marginal returns.

To illustrate, assume the manager of Segment 3 in Exhibit 209, has an opportunity to take on a project involving an investment of USD 100,000 that is estimated to return USD 22,000, or 22 per cent, on the investment. Since the segment's ROI is currently 25 per cent, or USD 250,000/USD 1,000,000, the manager may decide to reject the project because accepting the project will cause the segment's ROI to decline. Suppose however, from the company's point of view, all projects earning greater than a 10 per cent return should be accepted, even if they are lower than a particular segment's ROI.

Before acceptance of the project by Segment 3, the amounts are as follows:

	Segment 1	Segment 2	Segment 3
a. Income	\$ 100,000	\$ 500,000	\$ 250,000
b. Investment	1,000,000	2,500,000	1,000,000
c. Cost of capital	10%	10%	10%
d. Desired minimum income	\$ 100,000	\$ 250,000	\$ 100,000
e. Residual Income (RI)	-0-	250,000	150,000

With acceptance of the project by Segment 3, the amounts would be as follows:

	Segment 1	Segment 2	Segment 3
a. Income	\$ 100,000	\$ 500,000	\$ 272,000 <sup>†</sup>
b. Investment	1,000,000	2,500,000	1,100,000 <sup>‡</sup>
c. Cost of capital	10%	10%	10%
d. Desired minimum income	\$ 100,000	\$ 250,000	\$ 110,000
e. Residual Income (RI)	-0-	250,000	162,000

<sup>†</sup> \$250,000 + (22% of \$100,000).

<sup>‡</sup> \$1,000,000 original investment + \$100,000 new investment.

#### Exhibit 209: Computation of Residual Income (RI)

The rejection by a segment manager of a project that exceeds the 10 per cent desired minimum return is an example of suboptimization. **Suboptimization** occurs when a segment manager takes an action that is in the segment's best interest but is not in the best interest of the company as a whole.

To deal with this type of suboptimization, many companies use the concept of economic value added which computes the residual income of a business segment. **Residual income (RI)** is defined as the amount of income a segment has in excess of the segment's investment base times its cost of capital percentage. Each company based on debt costs establishes its cost of capital coverage and desired returns to stockholders. The formula for residual income (RI) is:

$$RI = \text{Income} - (\text{Investment} \times \text{Cost of capital percentage})$$

When a company uses RI to evaluate performance, the segment rated as the best is the segment with the greatest amount of RI rather than the one with the highest ROI.

Returning to our example, the project opportunity for Segment 3 could earn in excess of the desired minimum ROI of 10 per cent. In fact, the project generates RI of USD 12,000, calculated as (USD 22,000 - [10 per cent X USD 100,000]). If RI were applied as the basis for evaluating segmental performance, the manager of Segment 3 would accept the project because doing so would improve the segment's performance. That choice would also be beneficial to the entire company.

Critics of the RI method complain that larger segments are likely to have the highest RI. In a given situation, it may be advisable to look at both ROI and RI in assessing performance or to scale RI for size.

A manager tends to make choices that improve the segment's performance. The challenge is to select evaluation bases for segments that result in managers making choices that benefit the entire company. When performance is evaluated using RI, choices that improve a segment's performance are more likely also to improve the entire company's performance.

When calculating RI for a segment, the income and investment definitions are contribution to indirect expenses and assets directly used by and identified with the segment. When calculating RI for a manager of a segment, the income and investment definitions should be income controllable by the manager and assets under the control of the segment manager.

In evaluating the performance of a segment or a segment manager, comparisons should be made with (1) the current budget, (2) other segments or managers within the company, (3) past performance of that segment or manager, and (4) similar segments or managers in other companies. Consideration must be given to factors such as general economic conditions and market conditions for the product being produced. A superior segment in Company A may be considered superior because it is earning a return of 12 per cent, which is above similar segments in other companies but below other segments in Company A. However, segments in Company A may be more profitable because of market conditions and the nature of the company's products rather than because of the performance of the segment managers. Top management must use careful judgment whenever performance is evaluated.

### **Segmental reporting in external financial statements**

In June 1997, the Financial Accounting Standards Board issued *Statement of Financial Accounting Standards No. 131*, "Disclosures about Segments of an Enterprise and Related Information". This statement requires publicly held companies to publish certain segmental information in their annual and interim financial statements. It also requires that these companies report certain information about their products and services, the geographic areas in which they operate, and their major customers. Thus, external users of financial statements of a company can (1) better understand the company's performance, (2) better assess the prospects for future net cash flows, and (3) make more informed judgments about the company.

In this chapter you learned about responsibility accounting and segmental analysis. Chapter 26 discusses capital budgeting and long-term planning.

#### **Understanding the learning objectives**

- Responsibility accounting refers to an accounting system that collects, summarizes, and reports accounting data relating to the responsibilities of individual managers.
- Although the amount of detail varies, reports issued under a responsibility accounting system are interrelated. Totals from the report on one level of management are carried forward in the report to the management level immediately above.
- The contribution margin format for the income statement shows the contribution margin for the company.
- Contribution to indirect expenses is defined as sales revenue less all direct expenses of the segment.
- The final total in the income statement is segmental net income, defined as segmental revenues less all expenses (direct expenses and allocated indirect expenses).



## 25. Responsibility accounting: Segmental analysis

- Return on investment measures the relative effectiveness of segments. The formula for return on investment is:

$$\text{Return on investment} = \frac{\text{Income}}{\text{Investment}}$$

- Alternatively, the formula for return on investment can be broken into two components:

$$\text{Return on investment} = \frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Investment}}$$

- Margin refers to the percentage relationship of income or profits to sales. This percentage shows the number of cents of profit generated by each dollar of sales. The formula for margin can be expressed as:

$$\text{Margin} = \frac{\text{Income}}{\text{Sales}}$$

- Turnover shows the number of dollars of sales generated by each dollar of investment. Turnover measures how effectively each dollar of assets was used. The formula for turnover can be expressed as:

$$\text{Turnover} = \frac{\text{Sales}}{\text{Investment}}$$

- Residual income is defined as the amount of income a segment has in excess of its investment base times its cost of capital percentage.

- Each company sets its cost of capital based on debt costs and desired returns to stockholders.

- The formula for residual income is:

$$\text{RI} = \text{Income} - (\text{Investment} \times \text{Cost of capital percentage})$$

- Two basic methods exist for allocating service department costs: (1) the direct method and (2) the step method.

### Appendix: Allocation of service department costs

Throughout this text, we have emphasized cost allocations only in the operating departments of a company. These operating departments perform the primary purpose of the company—to produce goods and services for consumers. Examples of operating departments are the assembly departments of manufacturing firms and the departments in hotels that take and confirm reservations.

The costs of service departments are allocated to the operating departments because they exist to support the operating departments. Examples of service departments are maintenance, administration, cafeterias, laundries, and receiving. Service departments aid multiple production departments at the same time, and accountants must allocate and account for all of these costs. It is crucial that these service department costs be allocated to the operating departments so that the costs of conducting business in the operating departments are clearly and accurately reflected.

Accountants allocate service department costs using some type of base. When the companies' managers choose bases to use, they consider such criteria as the types of services provided, the benefits received, and the fairness of the allocation method. Examples of bases used to allocate service department costs are number of employees, machine-hours, direct labor-hours, square footage, and electricity usage.

Two basic methods exist for allocating service department costs. The first method, the direct method, is the simplest of the two. The direct method allocates costs of each of the service departments to each operating department based on each department's share of the allocation base. Services used by other service departments are ignored. For example, if Service Department A uses some of Service Department B's services, these services would

be ignored in the cost allocation process. Because these services are not allocated to other service departments, some accountants believe the direct method is not accurate.

The second method of allocating service department costs is the step method. This method allocates service costs to the operating departments and other service departments in a sequential process. The sequence of allocation generally starts with the service department that has incurred the greatest costs. After this department's costs have been allocated, the service department with the next highest costs has its costs allocated, and so forth until the service department with the lowest costs has had its costs allocated. Costs are not allocated back to a department that has already had all of its costs allocated.

To illustrate the direct method and the step method, we use the following data:

	<b>Service Maintenance</b>	<b>Department Administration</b>	<b>Operating Departments 1                      2</b>	
Costs	\$ 8,000	\$ 4,000	\$ 32,000	\$ 36,000
Machine-hours used	1,000	2,000	1,500	2,500
Number of employees	100	200	250	150

The costs of the maintenance department are allocated based on the machine-hours used. For the administration department, the cost allocation is based on the number of employees.

Using the preceding data, an example of the direct method follows:

	<b>Service Maintenance</b>	<b>Departments Administration</b>	<b>Operating 1</b>	<b>Departments 2</b>
Costs	\$ 8,000	\$ 4,000	\$ 32,000	\$ 36,000
Allocation of maintenance department's costs*	(8,000)		3,000	5,000
	\$ -0-			
Allocation of administration department's costs†		(4,000)	2,500	1,500
		\$ -0-	\$ 37,500	\$ 42,500
* Department 1's fraction is 2,500/4,000.	fraction is	1,500/4,000;	Department	2's fraction is
† Department 1's fraction is 150/400.	fraction is	250/400;	Department	2's fraction is

Using the same data, an example of the step method follows:

	<b>Service Maintenance</b>	<b>Departments Administration</b>	<b>Operating 1</b>	<b>Departments 2</b>
Costs	\$ 8,000	\$ 4,000	\$ 32,000	\$ 36,000
Allocation of maintenance department's costs*	(8,000)	2,667	2,000	3,333
	\$ -0-			
Allocation of administration department's costs†		(6,667)	4,167	2,500
		\$ -0-	\$ 38,167	\$ 41,833
* Administration 1's fraction is 1,500/6,000; Department 2's fraction:	fraction is	2,000/6,000;	Department	1's fraction:
† Department 1's fraction is 150/400.	fraction:	250/400;	Department	2's fraction is

## 25. Responsibility accounting: Segmental analysis

Note in the preceding examples that the maintenance department costs were not allocated to the administration department under the direct method but were allocated under the step method. Also, to eliminate the administration department's costs, under the step method those costs allocated to the administration department from the maintenance department must be allocated to the operating departments as part of the total administration department's cost.

### Demonstration problem

The results of operations for Alan Company's two segments in 2009 follow:

	Segment 1	Segment 2	Total
Sales	\$ 90,000	\$ 135,000	\$ 225,000
Variable expenses	63,000	81,000	144,000
Fixed expenses:			
Direct	9,000	25,200	34,200
Indirect			12,600

The company has total operating assets of USD 315,000; USD 288,000 of these assets are identified with particular segments as follows:

	Segment 1	Segment 2
Assets directly used by and identified with the segment	\$ 108,000	\$ 180,000

- Prepare a statement showing the contribution margin, contribution to indirect expenses for each segment, and the total income for Alan Company.
- Determine the return on investment for each segment and then for the entire company.
- Comment on the results of (a) and (b).

### Solution to demonstration problem

a. **Alan Company**

**Income statement showing segmental contribution to indirect expenses**  
**For the year ended 2009 December 31**

	Segment 1	Segment 2	Total
Sales	\$ 90,000	\$ 135,000	\$ 225,000
Less: Variable expenses	63,000	81,000	144,000
Contribution margin	\$ 27,000	\$ 54,000	\$ 81,000
Less: Direct fixed expenses	9,000	25,200	34,200
Contribution to indirect expenses	\$ 18,000	\$ 28,800	\$ 46,800
Less: Indirect fixed expenses			12,600
Net income			\$ 34,200

b. 1. 
$$\text{ROI} = \frac{\text{Contribution for indirect expenses}}{\text{Assets directly used by also identified with the segment}}$$

ROI =  $\frac{\text{Segment 1}}{\text{USD } 18,000} = 16.67\%$       ROI =  $\frac{\text{Segment 2}}{\text{USD } 28,800} = 16\%$   
 ROI =  $\frac{\text{USD } 108,000}$       ROI =  $\frac{\text{USD } 180,000}$

2. 
$$\text{ROI} = \frac{\text{Net operating income}}{\text{Operating assets}} = \frac{\text{USD } 34,200}{\text{USD } 315,000} = 10.9 \text{ per cent}$$

c. In part (a), Segment 2 showed a higher contribution to indirect expenses. But in (b), Segment 1 showed a higher return on investment. The difference between these calculations shows that when a segment is evaluated as a profit center, the center with the highest investment base usually shows the best results. But when the segment is evaluated as an investment center, the segment with the highest investment base does not necessarily show the highest return. The computations in (b) also demonstrate that the return on investment for the company as a whole will be lower than that of each segment because of the increased investment base.

### Key terms\*

**Budget variance** The difference between the budgeted and actual amounts of an item.

**Contribution margin** Sales revenues less variable expenses.

**Contribution margin format** An income statement format that shows the contribution margin (Sales - Variable expenses) for a segment.

**Contribution to indirect expenses** Sales revenue less all direct expenses of the segment.

**Controllable profits of a segment** Profit of a segment when expenses under a manager's control are deducted from revenues under that manager's control.

**Cost object** A segment, product, or other item for which costs may be accumulated.

**Current replacement cost** The cost of replacing the present assets with similar assets in the same condition as those now in use.

**Decentralization** The dispersion of decision-making authority among individuals at lower levels of the organization.

**Direct cost (expense)** A cost that is specifically traceable to a given cost object.

**Expense center** A responsibility center incurring only expense items and producing no direct revenue from the sale of goods or services. Examples include the accounting department and the maintenance department.

**Indirect cost (expense)** A cost that is not traceable to a given cost object but has been allocated to it.

**Investment center** A responsibility center having revenues, expenses, and an appropriate investment base.

**Management by exception** The principle that upper level management does not need to examine operating details at lower levels unless there appears to be a problem (an exception).

**Margin (as used in ROI)** The percentage relationship of income (or profits) to sales.

$$\text{Margin} = \frac{\text{Income}}{\text{Sales}}$$

**Original cost** The price paid to acquire an asset.

**Original cost less accumulated depreciation** The book value of an asset—the amount paid less total depreciation taken.

**Profit center** A responsibility center having both revenues and expenses.

**Residual income (RI), Economic Value Added** The amount of income a segment has in excess of the investment base times the cost of capital percentage. Residual income is equal to Income - (Investment X Cost of capital percentage).

**Responsibility accounting** Refers to an accounting system that collects, summarizes, and reports accounting data relating to the responsibility of the individual managers. A responsibility accounting system provides information to evaluate each manager on revenue and expense items over which that manager has primary control.

**Responsibility center** A segment of an organization for which a particular executive is responsible.

**Return on investment (ROI)** Calculates the return (income) as a percentage of the assets employed (investment).

$$\text{Return on investment} = \frac{\text{Income}}{\text{Investment}} \quad \text{Or} \quad \frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Investment}}$$

**Segment** A fairly autonomous unit or division of a company defined according to function or product line.

**Segmental net income** The final total in the income statement; segmental revenues less all expenses (direct expenses and allocated indirect expenses).

**Suboptimization** A situation when a segment manager takes an action in the segment's best interest but not in the best interest of the company as a whole.

**Transfer price** An artificial price used when goods or services are transferred from one segment to another segment within the same company.

**Turnover (as used in ROI)** The number of dollars of sales generated by each dollar of investment.

$$\text{Turnover} = \frac{\text{Sales}}{\text{Investment}}$$

\*Some terms listed in earlier chapters are repeated here for your convenience.

### Self-test

#### True-false

Indicate whether each of the following statements is true or false.

## 25. Responsibility accounting: Segmental analysis

Items that a manager has direct control over are included in responsibility accounting reports for that management level.

An appropriate goal of an expense center is the long-run minimization of expenses.

The salary of a segment manager would be considered a direct cost as well as an uncontrollable cost to that segment.

Segmental net income is the most appropriate figure to use when evaluating the performance of a segment.

When calculating RI for a segment, the income and investment definitions are income controlled by a manager, and assets directly used by and identified with the segment.

### Multiple-choice

Select the best answer for each of the following questions.

The investment base used when determining the ROI calculation could be which of the following?

- Current replacement cost.
- Original cost.
- Original cost less accumulated depreciation.
- Any of the above.

Which of the following actions would increase ROI?

- Reduce operating expenses with no effect on sales or assets.
- Increase investment in assets, with no change in income.
- Increase sales with no change in income or assets.
- None of the above.

Calculate ROI using the expanded form (margin times turnover) from the following data:

Sales	\$1,000,000
Investment	500,000
Income	50,000

- 20 per cent.
- 10 per cent.
- 15 per cent.
- None of the above.

In evaluating the performance of a segment or manager, comparisons should be made with:

- Other segments and managers within the company and in other companies.
- Past performance of the segment manager.
- The current budget.
- All of the above.

Calculate the ROI and RI for each of the following segments and determine if a segment should be dropped based on RI.

	Segment 1	Segment 2	Segment 3
Income	\$ 180,000	\$ 1,000,000	\$ 500,000
Investment	2,000,000	5,000,000	2,000,000
ROI	?	?	?
Desired minimum ROI (10%)	<u>200,000</u>	<u>500,000</u>	<u>200,000</u>
RI	?	?	?

- 9 per cent, 20 per cent, 20 per cent

USD 0, USD 500,000, USD 200,000

Consider dropping Segment 1.

b. 20 per cent, 20 per cent, 20 per cent

USD 200,000, USD 500,000, USD 200,000

Do not drop any segment.

c. 9 per cent, 20 per cent, 25 per cent

USD (20,000), USD 500,000, USD 300,000

Consider dropping Segment 1.

d. 20 per cent, 20 per cent, 25 per cent

USD 200,000, USD 500,000, USD 300,000

Do not drop any segment.

Now turn to “Answers to self-test” at the back of the chapter to check your answers.

## Questions

- What is the fundamental principle of responsibility accounting?
- List five important factors that should be considered in designing reports for a responsibility accounting system.
- How soon should accounting reports be prepared after the end of the performance measurement period? Explain.
- Name and describe three types of responsibility centers.
- Describe a segment of a business enterprise that is best treated as an expense center. List four indirect expenses that may be allocated to such an expense center.
- Compare and contrast an expense center and an investment center.
- What purpose is served by setting transfer prices?
- What is the advantage of using investment centers as a basis for performance evaluation?
- Which categories of items must a segment manager have control over for the investment center concept to be applicable?
- What is the connection between the extent of decentralization and the investment center concept?
- Give some of the advantages of decentralization.
- Differentiate between a direct cost and an indirect cost of a segment. What happens to these categories if the segment to which they are related is eliminated?
- Is it possible for a cost to be direct to one cost object and indirect to another cost object? Explain.
- Describe some of the methods by which indirect expenses are allocated to a segment.
- Give the general formula for return on investment (ROI). What are its two components?
- Give the three sets of definitions for income and investment that can be used in ROI calculations, and explain when each set is applicable.
- Give the various valuation bases that can be used for plant assets in investment center calculations. Discuss some of the advantages and disadvantages of these methods.
- In what way is the use of the residual income (RI) concept superior to the use of ROI?
- How is residual income (RI) determined?

## 25. Responsibility accounting: Segmental analysis

- If the RI for segment manager A is USD 50,000 while the RI for segment manager B is USD 100,000, does this necessarily mean that B is a better manager than A? Explain.
- **Real world question** Refer to the annual report of a publicly traded company. Which of the company's geographic regions performed better? Explain.
- (Based on Appendix) Briefly discuss the two methods of allocating service department costs.

### Exercises

**Exercise A** The following information refers to the inspection department of a chemical packaging plant for September:

	<b>Amount</b>	<b>Over or (Under) Budget</b>
Supplies	\$ 54,000	\$ (10,800)
Repairs and maintenance	270,000	21,600
Overtime paid to inspectors	108,000	10,800
Salary of inspection department manager	32,400	(5,400)
Salary of plant manager	43,200	-0-
Allocation of company accounting costs	32,400	10,800
Allocation of building depreciation to the inspection department	21,600	(5,400)

Using this information, prepare a responsibility report for the manager of the inspection department for September. Include those items for which you think the inspection department manager would be held responsible.

**Exercise B** Present the following information for the Hardware Division of ABC Computer Company,

Sales	\$ 1,400,000
Variable selling and administrative expenses	100,000
Fixed direct manufacturing expenses	35,000
Fixed indirect manufacturing expenses	56,000
Variable manufacturing expenses	400,000
Fixed direct selling and administrative expenses	175,000
Fixed indirect selling and administrative expenses	28,000

**Exercise C** Given the following data, prepare a schedule that shows contribution margin, contribution to indirect expenses, and net income of the Sharks Division of Hockey, Inc.:

Direct fixed expenses	\$ 324,000
Indirect fixed expenses	259,200
Sales	2,100,000
Variable expenses	1,500,000

What would be the effect on the company income if the segment were eliminated?

**Exercise D** Three segments (A, B, and C) of Trump Enterprises have net sales of USD 300,000, USD 150,000, and USD 50,000, respectively. A decision is made to allocate the pool of USD 25,000 of administrative overhead expenses of the home office to the segments, using net sales as the basis for allocation.

- a. How much of the USD 25,000 should be allocated to each segment?
- b. If Segment C is eliminated, how much of the USD 25,000 will be allocated to A and B?

**Exercise E** Two segments (Mountain Bike and Road Bike) showed the following data for the most recent year:

	<b>Mountain bike</b>	<b>Road bike</b>
Contribution to indirect expenses	\$ 840,000	\$ 504,000
Assets directly used by and identified	2,520,000	2,184,000

with the segment  
Sales 3,360,000 6,720,000

- Calculate return on investment for each segment in the most direct manner.
- Calculate return on investment using the margin and turnover components.

**Exercise F** Calculate the new margin, turnover, and return on investment of the Mountain Bike segment for each of the following changes. Consider each change independently of the others.

- Direct variable expenses were reduced by USD 33,600. Sales and assets were unaffected.
- Assets used by the segment were reduced by USD 540,000, while income and sales were unaffected.
- An advertising campaign increased sales by USD 336,000 and income by USD 50,000. Assets directly used by the segment were unaffected.

**Exercise G** The following data are available for Segment A of ABC Company:

Net income of the segment	\$ 50,000
Contribution to indirect expenses	40,000
Controllable income by manager	48,000
Assets directly used by the manager	360,000
Assets under the control of the segment manager	240,000

Determine the return on investment for evaluating (a) the income performance of the manager of Segment A and (b) the rate of income contribution of the segment.

**Exercise H** Travel Company has three segments: Air, Land, and Sea. Data concerning income and investment follow:

	Air	Land	Sea
Contribution to indirect expenses	\$ 43,200	\$ 86,400	\$ 115,200
Assets directly used by and identified with the segment	288,000	576,000	1,296,000

Assuming that the cost of capital on investment is 12 per cent, calculate the residual income of each of the segments. Do the results indicate that any of the segments should be eliminated?

### Problems

**Problem A** You are given the following information for Farflung Company for the year ended 2009 December 31. The company is organized according to functions:

Controllable expenses	Plant Manager		Vice Of Manufacturing		President	
	Budget	Actual	Budget	Actual	Budget	Actual
Office expense	\$ 7,200	\$ 9,600	\$ 12,000	\$ 16,800	\$ 24,000	\$ 16,800
Printing	19,200	16,800				
Paging	2,400	2,160				
Binding	4,800	4,800				
Purchasing			24,000	26,400		
Receiving			12,000	14,400		
Inspection			19,200	16,800		
Vice president of marketing					192,000	168,000
Controller					144,000	120,000
Treasurer					96,000	72,000
Vice president of personnel					48,000	72,000

Prepare the responsibility accounting reports for the three levels of management—plant manager, vice president of manufacturing, and president.



## 25. Responsibility accounting: Segmental analysis

**Problem B** Joey Bauer Corporation has production plants in Sacramento, Dallas, and Seattle. Following is a summary of the results for 2009:

Plant	Revenues	Expenses	Investment base (gross assets)
Sacramento	\$ 450,000	\$ 225,000	\$ 4,500,000
Dallas	450,000	180,000	3,375,000
Seattle	675,000	247,500	7,200,000

- If the plants are treated as profit centers, which plant manager appears to have done the best job?
- If the plants are treated as investment centers, which plant manager appears to have done the best job? (Assume the plant managers are evaluated by return on investment on gross assets.)
- Do the results of profit center analysis and investment center analysis give different findings? If so, why?

**Problem C** Quinn Company allocates all of its home office expenses to its two segments, A and B. Allocations are based on the following selected expense account balances and additional data:

Expenses (allocation bases)			
Home office building expense (net sales)			\$ 76,800
Buying expense (net purchases)			67,200
Uncollectible accounts (net sales)			8,000
Depreciation of home office equipment (net sales)			21,120
Advertising expense (indirect, allocated on basis of relative amounts of direct advertising)			86,400
Insurance expense (relative amounts of equipment plus average inventory in department)			23,040
	Segment A	Segment B	Total
Purchases (net)	\$ 243,200	\$ 76,800	\$ 320,000
Sales (net)	512,000	128,000	640,000
Equipment (cost)	96,000	64,000	160,000
Advertising (cost)	25,600	12,800	38,400
Average inventory	160,000	64,000	224,000

- Prepare a schedule showing the amounts of each type of expense allocable to Segments X and Y using these data and bases of allocation.
- Evaluate and criticize these allocation bases.

**Problem D** Allentown, Inc., is a company with two segments, X and Y. Its revenues and expenses for 2009 follow:

	Segment X	Segment Y	Total
Net sales	\$ 96,000	\$ 144,000	\$ 240,000
<u>Direct expenses:</u> *			
Cost of goods sold	45,000	99,000	144,000
Selling	13,680	7,200	20,880
Administrative:			
Uncollectible accounts	3,000	1,800	4,800
Insurance	2,400	1,200	3,600
Interest	480	240	720
<u>Indirect expenses (all fixed):</u>			
Selling			18,000
Administrative			25,200

\* All the direct expenses are variable except insurance and interest, which are fixed.

- Prepare a schedule showing the contribution margin, the contribution to indirect expenses of each segment, and net income for the company as a whole. Do not allocate indirect expenses to the segments.

b. Assume that indirect selling expenses are to be allocated on the basis of net sales and that indirect administrative expenses are to be allocated on the basis of direct administrative expenses. Prepare a statement (starting with the contribution to indirect expenses) that shows the net income of each segment.

c. Comment on the appropriateness of the income amounts shown in parts (a) and (b) for determining the income contribution of the segments.

**Problem E** The following data pertain to the operating revenues and expenses for Golden State Company for 2009:

	<b>Los Angeles (LA) Segment</b>	<b>San Francisco (SF) Segment</b>	<b>Total</b>
Sales	\$ 180,000	\$ 360,000	\$ 540,000
Variable expenses	96,000	240,000	336,000
Direct fixed expenses	24,000	30,000	54,000
Indirect fixed expenses			72,000

Regarding the company's total operating assets of USD 900,000, the following facts exist:

	<b>Los Angeles Segment</b>	<b>San Francisco Segment</b>
Assets directly used by and identified with the segment	\$ 180,000	\$ 360,000

a. Prepare a statement showing the contribution margin of each segment, the contribution to indirect expenses of each segment, and the total income of Golden State Company.

b. Determine the return on investment for evaluating (1) the earning power of the entire company and (2) the performance of each segment.

c. Comment on the results of part (b).

**Problem F** Shaq Company operates with three segments, Louisiana, Orlando, and LA. Data regarding these segments follow:

	<b>Louisiana segment</b>	<b>Orlando segment</b>	<b>LA segment</b>
Contribution to indirect expenses	\$ 324,000	\$ 180,000	\$ 144,000
Assets directly used and identified with the segment	1,800,000	1,440,000	720,000

a. Calculate the return on investment for each segment. Rank them from highest to lowest.

b. Assume the cost of capital is 12 per cent for a segment. Calculate residual income for each segment. Rank them from highest to lowest.

c. Repeat (b), but assume the cost of capital is 17 per cent for a segment. Rank them from highest to lowest.

d. Comment on the rankings achieved.

**Problem G** The manager of the Winston Company faced the following data for the year 2009:

Contribution to indirect expenses	\$ 1,800,000
Assets directly used by and identified with the segment	22,500,000
Sales	36,000,000

a. Determine the margin, turnover, and return on investment for the segment in 2009.

b. Determine the effect on margin, turnover, and return on investment of the segment in 2010 if each of the following changes were to occur. Consider each change separately and assume that any items not specifically mentioned remain the same as in 2009:

A campaign to control costs resulted in USD 180,000 of reduced expenses.

## 25. Responsibility accounting: Segmental analysis

Certain nonproductive assets were eliminated. As a result, investment decreased by USD 900,000, and expenses decreased by USD 72,000.

An advertising campaign resulted in increasing sales by USD 3,600,000, cost of goods sold by USD 2,700,000, and advertising expense by USD 540,000.

An investment was made in productive assets costing USD 900,000. As a result, sales increased by USD 360,000, and expenses increased by USD 54,000.

**Problem H** For the year ended 2009 December 31, Fore Company reported the following information for the company as a whole and for the sports segment of Fore Corporation:

	<b>Fore company</b>	<b>Sports Woods Project</b>	<b>Segment Irons Project</b>	<b>Total</b>
Sales	\$ 12,000,000	\$ 1,350,000	\$ 600,000	\$ 1,950,000
Income	1,125,000	300,000	37,500	337,500
Investment	4,500,000	900,000	105,000	1,005,000

Fore Company anticipates that these relationships (return on investment, margin, and turnover) will hold true for the upcoming year. The sports segment is faced with the possibility of adding a new project in 2010, with the following projected data:

	<b>Putters Project</b>
Sales	\$ 450,000
Income	52,500
Investment	187,500

a. Determine the return on investment for Fore Company, for the sports segment, and for the Woods and Irons projects separately for the year ended 2009 December 31.

b. Using this information, determine the effect of adding the Putters project on the sports segment's return on investment. What problem may be encountered?

Using the data provided in the previous problem, determine the residual income (1) for all three projects and (2) for the sports segment with and without the Putters project, if the cost of capital is 25 per cent. What is the effect on the sport segment's residual income if the Putter project is added? How does this result compare with your answer to the previous problem?

### Alternate problems

**Alternate problem A** Swiss Corporation has three production plants (X, Y, and Z). Following is a summary of the results for January 2009:

<b>Plant</b>	<b>Revenues</b>	<b>Expenses</b>	<b>Investment Base (gross assets)</b>
X	\$ 720,000	\$ 300,000	\$ 1,440,000
Y	960,000	180,000	1,920,000
Z	5,040,000	1,920,000	13,200,000

a. If the plants are treated as profit centers, which plant manager appears to have done the best job?

b. If the plants are treated as investment centers, which plant manager appears to have done the best job? (Assume the plant managers are evaluated by return on investment.)

c. Do the results of profit center analysis and investment center analysis give different findings? If so, why?

**Alternate problem B** Easy Loans, Inc., allocates expenses and revenues to the two segments that it operates. Easy Loans extends credit to customers under a revolving charge plan whereby all account balances not paid within 30 days are charged interest at the rate of 11/2 per cent per month.

Following are selected revenue and expense accounts and some additional data needed to complete the allocation of the one revenue amount and the expenses.

**Revenue and Expenses (allocation bases)**

Revolving charge service revenue (net sales)	\$ 600,000
Home office building occupancy expense (net sales)	45,000
Buying expenses (net purchases)	150,000
General administrative expenses (number of employees in department)	75,000
Insurance expense (relative average inventory plus cost of equipment and fixtures in each department)	18,000
Depreciation expense on home office equipment (net 30,000 sales)	

	High Risk Segment	Low Risk Segment	Total
Number of employees	3	7	10
Net sales	\$ 300,000	\$ 600,000	\$ 900,000
Net purchases	240,000	360,000	600,000
Averaging inventory	60,000	120,000	180,000
Cost of equipment fixtures	90,000	180,000	270,000

- Prepare a schedule showing allocation of these items to the High and Low Risk segments.
- Do you think these are good allocation bases? Why or why not?

**Alternate problem C** Student Painters, Inc., operates two segments, interior and exterior. The revenue and expense data for 2009 follow:

	Interior	Exterior	Total
Net sales	\$ 335,700	553,800	\$ 889,500
<u>Direct expenses:</u> *			
Cost of goods sold	186,000	282,000	468,000
Selling	31,800	27,000	58,800
Administrative	9,000	6,000	15,000
Uncollectible accounts	2,400	6,600	9,000
<u>Indirect expenses (all fixed):</u>			
Selling			126,000
Administrative			156,000

\*All the direct expenses are variable except administrative expense, which is fixed.

- Prepare a schedule showing the contribution margin, the contribution to indirect expenses of each segment, and net income for the company as a whole. Do not allocate indirect expenses to the segments.
- Assume that indirect selling expenses are to be allocated to segments on the basis of net sales (round to the nearest per cent) and that indirect administrative expenses are to be allocated on the basis of direct administrative expenses. Prepare a statement (starting with the contribution to indirect expenses) which shows the net income of each segment.
- Comment on the appropriateness of the income amounts shown in parts (a) and (b) for determining the income contribution of the segments.

**Alternate problem D** Elliott Corporation has three segments. Following are the results of operations for 2009:

	Segment A	Segment B	Segment C	Total
Sales	\$36,000,000	\$ 21,600,000	\$ 14,400,000	\$ 72,000,000
Variable expenses	25,920,000	12,240,000	9,720,000	47,880,000
<u>Fixed expenses:</u>				
Direct	5,040,000	1,800,000	720,000	7,560,000
Indirect				3,600,000

For the company's total operating assets of USD 100,800,000, the following facts exist:

## 25. Responsibility accounting: Segmental analysis

	Segment A	Segment B	Segment C
Assets directly used by and identified with the segment	\$ 50,400,000	\$ 28,800,000	\$ 14,400,000

- Prepare a statement (in thousands of dollars) showing the contribution margin, the contribution to indirect expenses for each segment, and the total income of the Elliott Corporation.
- Determine the return on investment for evaluating (1) the performance of the entire company and (2) performance of each segment.
- Comment on the results of part (a).

**Alternative problem E** Goodwin Company has three segments, 1,2, and 3. Data regarding these segments follow:

	Segment 1	Segment 2	Segment 3
Contribution to indirect expenses	\$ 432,000	\$ 208,800	\$ 72,000
Assets directly used by and identified with the segment	3,600,000	1,440,000	360,000

- Calculate the return on investment for each segment. Rank them from highest to lowest.
- Assume the cost of capital is 10 per cent for a segment. Calculate the residual income for each segment. Rank them from highest to lowest.
- Repeat (b), but assume the desired cost of capital is 14 per cent. Rank the segments from highest to lowest.
- Comment on the rankings achieved.

### Beyond the numbers—Critical thinking

**Business decision case A** Texas Company manufactures skateboards. Because the company's business is seasonal, between August and December skilled manufacturing employees are laid off. To improve morale, the financial vice president suggested that 10 employees not be laid off in the future. Instead, she suggested that they work in general labor from August to December but still be paid their manufacturing wages of USD 10 per hour. General labor personnel earn USD 6.60 per hour. What are the implications of this plan for the assignment of costs to the various segments of the business?

**Business decision case B** Piero Company builds new homes. Sarah Richards is in charge of the construction department. Among other responsibilities, Sarah hires and supervises the carpenters and other workers who build the homes. Piero Company does not do its own foundation work. The construction of foundations is done by subcontractors hired by Leslie Larue of the procurement department.

To start the development of a 500-home community, Larue hired Dire Company to build the foundations for the homes. On the day construction was to begin, Dire Company went out of business. Consequently, construction was delayed six weeks while Larue hired a new subcontractor. Which department should be charged with the cost of the delay in construction? Why?

**Business decision case C** Ken Silva is the supervisor of Department 103 of Laguna Company. The annual budget for Silva's department is as follows:

Annual budget for Department 103	
Small tools	\$ 6,750
Set up	7,500
Direct labor	8,250
Direct materials	15,000
Supplies	3,750
Supervision	22,500
Property taxes	3,750

Property insurance	750
Depreciation, machinery	1,500
Depreciation, building	1,500
Total	<u>\$ 71,250</u>

Silva's salary of USD 15,000 is included in supervision. The remaining USD 7,500 in supervision is the salary of the assistant supervisor directly responsible to Silva. Identify the budget items that Silva controls.

**Broader perspective – Writing experience D** Refer to "A broader perspective: Employee buyouts". Write a brief report explaining the effects of employee buyouts on employee motivation.

**Group project E** Macrofast Software, Inc., faces stiff competition in selling its products. Macrofast's top management feels considerable pressure from the company's stockholders to increase earnings.

Mac Washington, the vice president of marketing at the company's Production Software Division, received a memorandum from top management that said, in effect, "Increase your division's earnings or look for a new job".

Washington could think of only one way to increase earnings by the end of the year. The Production Software Division had several installations that should be completed early the following year, probably in February or March. For each of those jobs, he asked the customers to sign a Completed Installation document stating the job was completed to the customer's satisfaction. He did this because Macrofast's accounting department would record the revenue from the job when it received the Completed Installation document.

Several customers signed Completed Installation documents even though the jobs were not complete because Washington gave them a personally signed letter stating the Completion Installation document was not legally binding.

The scheme initially worked. Revenues were prematurely recorded for these jobs, sales and earnings for the year were up, Macrofast's top management was delighted with the results, and Washington was rewarded with a large bonus and a promotion to a vice presidency at corporate headquarters.

The following June, a staff accountant discovered the scheme when a customer called to complain that he was being billed for a job that was not yet completed. When the accountant produced the customer's Completed Installation document, the customer produced Washington's letter saying the document was not binding. The accountant did some detective work and unearthed the scheme. When she presented the results to her supervisor, the supervisor said, "This practice is unfortunate and is against company policy. But what is done is done. Do not worry about last year's financial statements. Just be sure it does not happen again."

- In teams of four, discuss what the staff accountant should do.
- Then, decide how your solution would change if all jobs had been completed to the customers' satisfaction.
- As a team, write a memorandum to your instructor describing your solutions. The heading of the memo should contain the date, to whom it is written, from whom, and the subject matter.

**Group project F** Bleak Prospects, Inc., found that its market share was slipping. Division managers were encouraged to maximize ROI and made decisions consistent with that goal. Nonetheless, there were frequent customer complaints, with resulting loss of business. Moreover, Bleak depended on an established product line and was unable to find new products for expansion while its competitors seemed to be able to generate new products almost yearly. What would you suggest Bleak Prospects' management do to improve the situation? In groups of two or three students, write a memorandum to your instructor addressing this question. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

## 25. Responsibility accounting: Segmental analysis

**Group project G** Management of Division A is evaluated based on residual income measures. The division can either rent or buy a certain asset. Will the performance evaluation technique have an impact on the rent-or-buy decision? Why or why not? In groups or three students, write a memorandum to your instructor addressing this question. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

### Using the Internet—A view of the real world

Visit the website for PepsiCo, Incorporated.

<http://www.pepsico.com>

Go to the company's most recent annual report. Compare the performance of PepsiCo's three business segments: (1) beverages, (2) snack foods, and (3) restaurants. (You will find business segment information in the notes to the financial statements.) Which business segment had the most operating profits? Which business performed better using ROI, profit margin, and asset turnover as the performance measures? Use end-of-year "identifiable assets" to measure investment, "operating profits" to measure income, and "net sales" to measure sales. Be sure to submit a copy of PepsiCo's business segment information from the annual report.

Visit the website for PepsiCo, Incorporated.

<http://www.pepsico.com>

Go to the company's most recent annual report. Using financial information for the most recent year, which of the company's geographic areas had the highest ROI? (You will find business segment information in the notes to the financial statements, including geographic segments.) Use end-of-year "identifiable assets" to measure investment, "operating profits" to measure income, and "net sales" to measure sales. Be sure to submit a copy of PepsiCo's business segment information from the annual report.

### Answers to self-test

#### True-false

**True.** Those items that a manager has direct control over are included in responsibility reports for that management level.

**True.** An appropriate goal of an expense center is the long-run minimization of expenses.

**True.** The manager's salary would be a direct cost of the segment but not controllable at that level. (The salary would be controllable by someone higher in the organization.)

**False.** Segments should be evaluated using their revenues and direct expenses.

**False.** The income and investment definitions when calculating RI for a segment are contribution to indirect expenses and assets directly used by and identified with the segment.

#### Multiple-choice

**d.** Any of these bases—current replacement cost, original cost, or original cost less accumulated depreciation—could be used.

**a.** ROI would increase if operating expenses were reduced, all other things remaining constant.

**b.**

$$\text{ROI} = \frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Investment}}$$

$$\text{ROI} = \frac{50,000}{1,000,000} \times \frac{1,000,000}{500,000}$$

$$\text{ROI} = .05 \times 2$$

ROI = 10 per cent

**d.** All of these should be used to evaluate managerial performance.

**c.**

	<b>Segment 1</b>	<b>Segment 2</b>	<b>Segment 3</b>
Income	\$ 180,000	\$ 1,000,000	\$ 500,000
Investment	2,000,000	5,000,000	2,000,000
ROI	9%	20%	25%
Desired minimum			
ROI (10%)	200,000	500,000	200,000
RI	\$ (20,000)	\$ 500,000	\$ 300,000

Consider dropping Segment 1.



# 26. Capital budgeting: Long-range planning

## Learning objectives

After studying this chapter, you should be able to:

- Define capital budgeting, explain budgeting and explain the effects of making poor capital-budgeting decisions.
- Determine the net cash inflows, after taxes, for both an asset addition and an asset replacement.
- Evaluate projects using the payback period.
- Evaluate projects using the unadjusted rate of return.
- Evaluate projects using the net present value.
- Evaluate projects using the profitability index.
- Evaluate projects using the time-adjusting rate of return.
- Determine for project evaluation, the effect of an investment in working capital.

In your personal life, you make many short-run decisions, such as where to go on vacation this year, and many long-run decisions, such as whether to buy a home. The quality of these decisions determines, to a large extent, the success of your life. Businesses also face short-run and long-run decisions.

In previous chapters, you studied how accountants help management make short-run decisions, such as what prices to charge for their products this year. Accountants also play an important role in advising management on long-range decisions that will benefit the company for many years, such as investing in new buildings and equipment. Long-run decisions have a great impact on the long-run success of a company. Incorrect long-run decisions can threaten the survival of a company.

Whereas short-run decisions involve items such as selling prices, costs, volume, and profits in the current year, long-run decisions involve investments in capital assets, such as buildings and equipment, affecting the current year and many future years. Planning for these investments is referred to as capital budgeting.

This chapter introduces the general concepts behind capital budgeting. Then, it discusses and illustrates four methods for selecting the best alternatives among capital projects. Two of these methods involve the use of present value concepts. Finally, the chapter stresses the importance of the postaudit review of capital project decisions.

## Capital budgeting defined

**Capital budgeting** is the process of considering alternative capital projects and selecting those alternatives that provide the most profitable return on available funds, within the framework of company goals and objectives. A **capital project** is any available alternative to purchase, build, lease, or renovate buildings, equipment, or other long-range major items of property. The alternative selected usually involves large sums of money and brings about a large increase in fixed costs for a number of years in the future. Once a company builds a plant or undertakes some other capital expenditure, its future plans are less flexible.

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Poor capital-budgeting decisions can be costly because of the large sums of money and relatively long periods involved. If a poor capital budgeting decision is implemented, the company can lose all or part of the funds originally invested in the project and not realize the expected benefits. In addition, other actions taken within the company regarding the project, such as finding suppliers of raw materials, are wasted if the capital-budgeting decision must be revoked. Poor capital-budgeting decisions may also harm the company's competitive position because the company does not have the most efficient productive assets needed to compete in world markets.

Investment of funds in a poor alternative can create other problems as well. Workers hired for the project might be laid off if the project fails, creating morale and unemployment problems. Many of the fixed costs still remain even if a plant is closed or not producing. For instance, advertising efforts would be wasted, and stock prices could be affected by the decline in income.

On the other hand, failure to invest enough funds in a good project also can be costly. Ford's Mustang is an excellent example of this problem. At the time of the original capital-budgeting decision, if Ford had correctly estimated the Mustang's popularity, the company would have expended more funds on the project. Because of an undercommitment of funds, Ford found itself short on production capacity, which caused lost and postponed sales of the automobile.

Finally, the amount of funds available for investment is limited. Thus, once a company makes a capital investment decision, alternative investment opportunities are normally lost. The benefits or returns lost by rejecting the best alternative investment are the **opportunity cost** of a given project.

For all these reasons, companies must be very careful in their analysis of capital projects. Capital expenditures do not occur as often as ordinary expenditures such as payroll or inventory purchases but involve substantial sums of money that are then committed for a long period. Therefore, the means by which companies evaluate capital expenditure decisions should be much more formal and detailed than would be necessary for ordinary purchase decisions.

### Project selection: A general view

Making capital-budgeting decisions involves analyzing cash inflows and outflows. This section shows you how to calculate the benefits and costs used in capital-budgeting decisions. Because money has a time value, these benefits and costs are adjusted for time under the last two methods covered in the chapter.

Money received today is worth more than the same amount of money received at a future date, such as a year from now. This principle is known as the time value of money. Money has time value because of investment opportunities, not because of inflation. For example, USD 100 today is worth more than USD 100 to be received one year from today because the USD 100 received today, once invested, grows to some amount greater than USD 100 in one year. Future value and present value concepts are extremely important in assessing the desirability of long-term investments (capital budgeting). If you need to review these concepts, refer back to the appendix to Chapter 15, which covers these concepts.

The **net cash inflow** (as used in capital budgeting) is the net cash benefit expected from a project in a period. The net cash inflow is the difference between the periodic cash inflows and the periodic cash outflows for a proposed project.

**Asset acquisition** Assume, for example, that a company is considering the purchase of new equipment for USD 120,000. The equipment is expected (1) to have a useful life of 15 years and no salvage value, and (2) to

produce cash inflows (revenue) of USD 75,000 per year and cash outflows (costs) of USD 50,000 per year. Ignoring depreciation and taxes, the annual net cash inflow is computed as follows:

Cash inflows	\$75,000.00
Cash outflows	50,000
Net cash inflow	\$ 25,000

**Depreciation and taxes** The computation of the net cash inflow usually includes the effects of depreciation and taxes. Although depreciation does not involve a cash outflow, it is deductible in arriving at federal taxable income. Thus, depreciation reduces the amount of cash outflow for federal income taxes. This reduction is a tax savings made possible by a depreciation tax shield. A **tax shield** is the total amount by which taxable income is reduced due to the deductibility of an item. For example, if depreciation is USD 8,000, the tax shield is USD 8,000. To simplify the illustration, we assume the use of the straight-line depreciation for tax purposes throughout the chapter. Straight-line depreciation can be elected for tax purposes, even under the new tax law.

The tax shield results in a tax savings. The amount of the tax savings can be found by multiplying the tax rate by the amount of the depreciation tax shield. The formula is:

$$\text{Tax rate} \times \text{Depreciation tax shield} = \text{Tax savings}$$

Using the data in the previous example and assuming straight-line depreciation of USD 8,000 per year and a 40 per cent tax rate, the amount of the tax savings is USD 3,200 (40 per cent x USD 8,000 depreciation tax shield). Now, considering taxes and depreciation, we compute the annual net cash inflow from the USD 120,000 of equipment as follows:

	<b>Change in net income</b>	<b>Change in cash flow</b>
Cash inflows	\$ 75,000	\$75,000
Cash outflows	50,000	50,000
Net cash inflow before taxes	\$25,000	\$25,000
Depreciation	8,000	
Income before income taxes	\$17,000	
Deduct: Income at 40%	6,800	6,800
Net income after taxes	\$10,200	
Net cash inflow (after taxes)		\$18,200

If there were no depreciation tax shield, federal income tax expense would have been USD 10,000, or (USD 25,000 x 40 per cent), and the net after-tax cash inflow from the investment would have been USD 15,000, found by (USD 25,000 - USD 10,000), or [USD 25,000 x (1 - 40 per cent)].

The depreciation tax shield, however, reduces federal income tax expense by USD 3,200, or (USD 8,000 x 40 per cent), and increases the investment's after-tax net cash inflow by the same amount. Therefore, the following formula also can be used to determine the after-tax net cash inflow from an investment:

$$\begin{aligned} \text{Net cash inflow after taxes} &= \underbrace{[\text{Net cash inflow before taxes} \times (1 - \text{Tax rate})]}_{\text{Net cash inflow after taxes (ignoring depreciation)}} + \underbrace{[\text{Depreciation expense} \times \text{Tax rate}]}_{\text{Tax savings attributable to depreciation tax shield}} \\ &= (\text{USD } 25,000 \times (1 - .4)) + (\text{USD } 8,000 \times .4) = \text{USD } 18,200 \end{aligned}$$

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**Asset replacement** Sometimes a company must decide whether or not it should replace existing plant assets. Such replacement decisions often occur when faster and more efficient machinery and equipment appear on the market.

The computation of the net cash inflow is more complex for a replacement decision than for an acquisition decision because cash inflows and outflows for two items (the asset being replaced and the new asset) must be considered. To illustrate, assume that a company operates two machines purchased four years ago at a cost of USD 18,000 each. The estimated useful life of each machine is 12 years (with no salvage value). Each machine will produce 40,000 units of product per year. The annual cash operating expenses (labor, repairs, etc.) for the two machines together total USD 14,000. After the old machines have been used for four years, a new machine becomes available. The new machine can be acquired for USD 28,000 and has an estimated useful life of eight years (with no salvage value). The new machine produces 60,000 units annually and entails annual cash operating expenses of USD 10,000. The USD 4,000 reduction in operating expenses (USD 14,000 - USD 10,000) is a USD 4,000 increase in net cash inflow (savings) before taxes.

The firm pays USD 28,000 in the first year to acquire the new machine. In addition to this initial outlay, the annual net cash inflow from replacement is computed as follows:

$$\text{Net cash inflow after taxes} = (\text{Annual net cash inflows (savings) before taxes} \times (1 - \text{tax rate})) + \text{Additional annual depreciation expense} \times \text{Tax rate}$$

Using these data, the following display shows how you can use this formula to find the net cash flow after taxes:

Annual cash operating expenses:

Old machines	\$ 14,000
New machines	10,000
Annual net cash inflow (savings) before taxes	\$ 4,000
1 - Tax rate	X 60%
Annual net cash inflow (savings)* after taxes ignoring depreciation (1)	\$ 2,400

Annual depreciation expense:

Old machines	\$ 3,000
New machine	3,500
Additional annual depreciation expense	\$ 500
Tax rate	X 40%
Tax savings from additional depreciation (2)	200
Net cash inflow after taxes (1) + (2)	\$ 2,600

\*Cash savings are considered to be cash inflows.

In formula format, the calculation is:

$$\text{Net cash inflow after taxes} = (\text{USD } 4,000 \times (1 - .4)) + (\text{USD } 500 \times .4) = \text{USD } 2,600$$

Notice that these figures concentrated only on the differences in costs for each of the two alternatives. Two other items also are relevant to the decision. First, the purchase of the new machine creates a USD 28,000 cash outflow immediately after acquisition. Second, the two old machines can probably be sold, and the selling price or salvage value of the old machines creates a cash inflow in the period of disposal. Also, the previous example used straight-line depreciation. If the modified Accelerated Cost Recovery System (modified ACRS) had been used, the tax shield would have been larger in the early years and smaller in the later years of the asset's life.

**Out-of-pocket and sunk costs** A distinction between out-of-pocket costs and sunk costs needs to be made for capital budgeting decisions. An **out-of-pocket cost** is a cost requiring a future outlay of resources, usually cash. Out-of-pocket costs can be avoided or changed in amount. Future labor and repair costs are examples of out-of-pocket costs.

**Sunk costs** are costs already incurred. Nothing can be done about sunk costs at the present time; they cannot be avoided or changed in amount. The price paid for a machine becomes a sunk cost the minute the purchase has been made (before that moment it was an out-of-pocket cost). The amount of that past outlay cannot be changed, regardless of whether the machine is scrapped or used. Thus, depreciation is a sunk cost because it represents a past cash outlay. Depletion and amortization of assets, such as ore deposits and patents, are also sunk costs.

A sunk cost is a past cost, while an out-of-pocket cost is a future cost. Only the out-of-pocket costs (the future cash outlays) are relevant to capital budgeting decisions. Sunk costs are not relevant, except for any effect they have on the cash outflow for taxes.

**Initial cost and salvage value** Any cash outflows necessary to acquire an asset and place it in a position and condition for its intended use are part of the **initial cost of the asset**. If an investment has a salvage value, that value is a cash inflow in the year of the asset's disposal.

**The cost of capital** The cost of capital is important in project selection. Certainly, any acceptable proposal should offer a return that exceeds the cost of the funds used to finance it. **Cost of capital**, usually expressed as a rate, is the cost of all sources of capital (debt and equity) employed by a company. For convenience, most current liabilities, such as accounts payable and federal income taxes payable, are treated as being without cost. Every other item on the right (equity) side of the balance sheet has a cost. The subject of determining the cost of capital is a controversial topic in the literature of accounting and finance and is not discussed here. We give the assumed rates for the cost of capital in this book. Next, we describe several techniques for deciding whether to invest in capital projects.

### Project selection: Payback period

The **payback period** is the time it takes for the cumulative sum of the annual net cash inflows from a project to equal the initial net cash outlay. In effect, the payback period answers the question: How long will it take the capital project to recover, or pay back, the initial investment? If the net cash inflows each year are a constant amount, the formula for the payback period is:

$$\text{Payback period} = \frac{\text{Initial cash outlay}}{\text{Annual net cash inflow (benefit)}}$$

For the two assets discussed in the previous section, you can compute the payback period as follows. The purchase of the USD 120,000 equipment creates an annual net cash inflow after taxes of USD 18,200, so the payback period is 6.6 years, computed as follows:

$$\text{Payback period} = \frac{\text{USD } 120,000}{\text{USD } 18,200} = 6.6 \text{ years}$$

The payback period for the replacement machine with a USD 28,000 cash outflow in the first year and an annual net cash inflow of USD 2,600, is 10.8 years, computed as follows:

$$\text{Payback period} = \text{USD } 28,000 / \text{USD } 2,600 = 10.8 \text{ years}$$

Remember that the payback period indicates how long it will take the machine to pay for itself. The replacement machine being considered has a payback period of 10.8 years but a useful life of only 8 years. Therefore, because the

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investment cannot pay for itself within its useful life, the company should not purchase a new machine to replace the two old machines.

In each of the previous examples, the projected net cash inflow per year was uniform. When the annual returns are uneven, companies use a cumulative calculation to determine the payback period, as shown in the following situation.

Neil Company is considering a capital investment project that costs USD 40,000 and is expected to last 10 years. The projected annual net cash inflows are:

Year	Investment	Annual net cash inflow	Cumulative net cash inflows
0	\$ 40,000	-----	---
1	---	\$ 8,00	\$ 8,000
2	---	6,000	14,000
3	---	7,000	21,000
4	---	5,000	26,000
5	---	8,000	34,000
6	---	6,000	40,000
7	---	3,000	43,000
8	---	2,000	45,000
10	---	1,000	49,000

The payback period in this example is six years—the time it takes to recover the USD 40,000 original investment.

When using payback period analysis to evaluate investment proposals, management may choose one of these rules to decide on project selection:

- Select the investments with the shortest payback periods.
- Select only those investments that have a payback period of less than a specified number of years.

Both decision rules focus on the rapid return of invested capital. If capital can be recovered rapidly, a firm can invest it in other projects, thereby generating more cash inflows or profits.

Some managers use payback period analysis in capital budgeting decisions due to its simplicity. However, this type of analysis has two important limitations:

- Payback period analysis ignores the time period beyond the payback period. For example, assume Allen Company is considering two alternative investments; each requires an initial outlay of USD 30,000. Proposal Y returns USD 6,000 per year for five years, while proposal Z returns USD 5,000 per year for eight years. The payback period for Y is five years (USD 30,000/USD 6,000) and for Z is six years (USD 30,000/USD 5,000). But, if the goal is to maximize income, proposal Z should be selected rather than proposal Y, even though Z has a longer payback period. This is because Z returns a total of USD 40,000, while Y simply recovers the initial USD 30,000 outlay.

- Payback analysis also ignores the time value of money. For example, assume the following net cash inflows are expected in the first three years from two capital projects:

	Net Cash Inflows	
	Project A	Project B
First year	\$ 15,000	\$ 9,000

Second year	12,000	12,000
Third year	9,000	15,000
Total	\$ 36,000	\$ 36,000

Assume that both projects have the same net cash inflow each year beyond the third year. If the cost of each project is USD 36,000, each has a payback period of three years. But common sense indicates that the projects are not equal because money has time value and can be reinvested to increase income. Because larger amounts of cash are received earlier under Project A, it is the preferable project.

### Project selection: Unadjusted rate of return

Another method of evaluating investment projects that you are likely to encounter in practice is the **unadjusted rate of return** method. To compute the unadjusted rate of return, divide the average annual income after taxes by the average amount of investment in the project. The average investment is the (Beginning balance + Ending balance)/2. If the ending balance is zero (as we assume), the average investment equals the original cash investment divided by 2. The formula for the unadjusted rate of return is:

$$\text{Unadjusted rate of return} = \frac{\text{Average annual income after taxes}}{\text{Average amount of investment}}$$

Notice that this calculation uses annual income rather than net cash inflow.<sup>54</sup>

To illustrate the use of the unadjusted rate of return, assume Thomas Company is considering two capital project proposals, each having a useful life of three years. The company does not have enough funds to undertake both projects. Information relating to the projects follows:

Proposal	Initial cost	Salvage Value	Average annual Before-tax Net cash inflow	Average Annual depreciation
1	\$ 76,000	\$ 4,000	\$ 45,000	\$ 24,000
2	95,000	5,000	55,000	30,000

Assuming a 40 per cent tax rate, Thomas Company can determine the unadjusted rate of return for each project as follows:

		Proposal 1	Proposal 2
Average investment: (original outlay + Salvage value)/2	(1)	\$ 40,000	\$ 50,000
Annual net cash inflow (before income taxes)		\$ 45,000	\$ 55,000
Annual depreciation		24,000	30,000
Annual income (before income taxes)		\$ 21,000	\$ 25,000

<sup>54</sup> Some formulas use the initial investment in the denominator instead of the average investment. We prefer the average investment because it approximates the use of assets throughout the year not just at the beginning of the year.

<sup>51</sup> These general comments about the use of averages in a ratio apply to the other ratios involving averages discussed in this chapter.

<sup>52</sup> Accounting Principles Board, *Opinion No. 15*, "Reporting Earnings per Share" (New York: AICPA, 1969), par. 12. *FASB Statement No. 128*, "Earnings per Share" (Norwalk, Connecticut: FASB, 1997), simplified the standards for computing earnings per share and made them comparable to international EPS standards.

<sup>55</sup> "Texas Instruments: Cost of Quality (A)" (Boston: Harvard Business School, Case 9-189-029).

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Deduct: Income taxes at 40%		8,400	10,000
Average annual net income from investment	(2)	\$ 12,600	\$ 15,000
Rate of return (2)/(1)		31.5%	30%

From these calculations, if Thomas Company makes an investment decision solely on the basis of the unadjusted rate of return, it would select Proposal 1 since it has a higher rate.

Also, the company could compute the unadjusted rate of return with the following formula:

$$\text{Rate of return} = \frac{(\text{Average annual before-tax net cash inflow} - \text{Average annual depreciation}) \times (1 - \text{Tax rate})}{\text{Average investment}}$$

For Proposal 1, the computation is as follows:

$$\begin{aligned} \text{Rate of return} &= \frac{(\text{USD } 45,000 - \text{USD } 24,000) \times (1 - 0.4)}{(\text{USD } 76,000 + \text{USD } 4,000) / 2} \\ &= \frac{\text{USD } 21,000 \times 0.6}{\text{USD } 40,000} = \frac{\text{USD } 12,600}{\text{USD } 50,000} = 30 \text{ per cent} \end{aligned}$$

For Proposal 2, the computation is as follows:

$$\begin{aligned} \text{Rate of return} &= \frac{(\text{USD } 55,000 - \text{USD } 30,000) \times (1 - 0.4)}{(\text{USD } 95,000 + \text{USD } 5,000) / 2} \\ &= \frac{\text{USD } 25,000 \times 0.6}{\text{USD } 50,000} = \frac{\text{USD } 15,000}{\text{USD } 50,000} = 30 \text{ per cent} \end{aligned}$$

Sometimes companies receive information on the average annual after-tax net cash inflow. Average annual after-tax net cash inflow is equal to annual before-tax cash inflow minus taxes. Given this information, the firms could deduct the depreciation to arrive at average net income. For instance, for Proposal 2, Thomas Company would compute average net income as follows:

After-tax net cash inflow (\$55,000 - \$10,000)	\$ 45,000
Less: Depreciation	30,000
Average net income	\$ 15,000

The unadjusted rate of return, like payback period analysis, has several limitations:

- The length of time over which the return is earned is not considered.
- The rate allows a sunk cost, depreciation, to enter into the calculation. Since depreciation can be calculated in so many different ways, the rate of return can be manipulated by simply changing the method of depreciation used for the project.
- The timing of cash flows is not considered. Thus, the time value of money is ignored.

Unlike the two project selection methods just illustrated, the remaining two methods—net present value and time-adjusted rate of return—take into account the time value of money in the analysis. In both of these methods, we assume that all net cash inflows occur at the end of the year. Often used in capital budgeting analysis, this assumption makes the calculation of present values less complicated than if we assume the cash flows occurred at some other time.

### Project selection: Net present value method

In this section, you learn to calculate the net present value of capital projects. Then you learn how to use the profitability index to evaluate projects costing different amounts. The profitability index is a refinement of the net present value method.



The **net present value** method uses the company's required minimum rate of return as a discount rate and discounts all expected after-tax cash inflows and outflows from the proposed investment back to their present values. The net present value of the proposed investment is the difference between the present value of the annual net cash inflows and the present value of the required cash outflows.

In many projects, the only cash outflow is the initial investment, and since it occurs immediately, the initial investment does not need to be discounted. Therefore, in such projects, a company may compute the net present value of the proposed project as the present value of the annual net cash inflows minus the initial investment. Other types of projects require that additional investments, such as a major repair, be made at later dates in the life of the project. In those cases, the company must discount the cash outflows to their present value before comparing them to the present value of the net cash inflows.

A major issue in acknowledging the time value of money in the net present value method is determining an appropriate discount rate to use in computing the present value of cash flows. Management requires some minimum rate of return on its investments. This rate should be the company's cost of capital, but that rate is difficult to determine. Therefore, under the net present value method, management often selects a target rate that it believes to be at or above the company's cost of capital, and then uses that rate as a basis for present value calculations.

To illustrate the net present value method, assume Morris Company is considering a capital investment project that will cost USD 25,000. Morris expects net cash inflows after taxes for the next four years to be USD 8,000, USD 7,500, USD 8,000, and USD 7,500, respectively. Management requires a minimum rate of return of 14 per cent and wants to know if the project is acceptable. The following analysis uses the tables in the Appendix at the end of this text:

	<b>Annual net Cash inflow (after taxes)</b>	<b>Present value of \$ 1 at 14% (from table A.3)</b>	<b>Total Present value</b>
First year	\$ 8,000	.87719	\$ 7,018
Second year	7,500	.76947	5,771
Third year	8,000	.67497	5,400
Fourth year	7,500	.59208	4,441
Present value of net cash inflows			\$22,630
Cost of investment			25,000
Net present value			\$ (2,370)

Because the present value of the net cash inflows, USD 22,630, is less than the initial outlay of USD 25,000, the project is not acceptable. The net present value for the project is equal to the present value of its net cash inflows less the present value of its cost (the investment amount), which in this instance is -USD 2,370, calculated as (USD 22,630 - USD 25,000).

When a company uses the net present value method to screen alternative projects, it considers the project with the higher net present value to be more desirable. In general, a proposed capital investment is acceptable if it has a positive net present value. In the previous example, if the expected net cash inflows from the investment had been USD 10,000 per year for four years, the present value of the benefits would have been (from Table A.4 in the Appendix):

$$\text{USD } 10,000 \times 2.9137 = \text{USD } 29,137$$

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This calculation yields a net present value of USD 4,137, or USD 29,137 - USD 25,000. Since the net present value is positive, the investment proposal is acceptable. However, a competing project may have an even higher net present value.

When comparing investment projects costing different amounts, the net present value method does not provide a valid means by which to rank the projects in order of desirability assuming limited financial resources. A profitability index provides this additional information to management.

### Profitability index

A **profitability index** is the ratio of the present value of the expected net cash inflows (after taxes) divided by the initial cash outlay (or present value of cash outlays if future outlays are required). The profitability index formula is:

$$\text{Profitability index} = \frac{\text{Present value of net cash inflows}}{\text{Initial cash outlay (present value of cash outlays if future outlays are required)}}$$

Management should consider only those proposals having a profitability index greater than or equal to 1.00. Proposals with a profitability index of less than 1.00 cannot yield the minimum rate of return because the present value of the projected cash inflows is less than the initial cost.

To illustrate use of the profitability index, assume that a company is considering two alternative capital outlay proposals that have the following initial costs and expected net cash inflows after taxes:

	<b>Proposal X</b>	<b>Proposal Y</b>
Initial outlay	\$ 7,000	\$ 9,500
Expected net cash inflow (after taxes):		
Year 1	\$ 5,000	\$ 9,000
Year 2	4,000	6,000
Year 3	6,000	3,000

Management's minimum desired rate of return is 20 per cent.

The net present values and profitability indexes can be computed as follows, using Table A.3 in the Appendix at the end of this book:

	<b>Present value</b>	
	<b>Proposal X</b>	<b>Proposal Y</b>
Year 1 (net cash inflow in year 1 x 0.83333)	\$ 4,167	\$ 7,500
Year 2 (net cash inflow in year 2 x 0.69444)	2,778	4,167
Year 3 (net cash inflow in year 3 x 0.57870)	3,472	1,736
Present value of net cash inflows	\$ 10,417	\$ 13,403
Initial outlay	7,000	9,500
Net present value	\$ 3,417	\$ 3,903
	<b>Proposal X</b>	<b>Proposal Y</b>
Profitability index	\$ 10,417 = 1.49	\$ 13,403 = 1.41
	\$ 7,000	\$ 9,500

When the net present values are compared, Proposal Y appears to be more favorable than Proposal X because its net present value is higher. However, the profitability indexes indicate Proposal X is the more desirable investment because it has the higher profitability index. The higher the profitability index, the more profitable the project per dollar of investment. Proposal X earns a higher rate of return on a smaller investment than Proposal Y.

Another technique for evaluating capital projects that accounts for the time value of money is the time-adjusted rate of return method. The next section discusses this method.

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### An accounting perspective:

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#### Business insight

Like US managers, Japanese managers incorporate the cost of capital into their capital investment decisions. However, Japanese managers tend to rely more on consensus decision making, less on the numbers. Discount rates in Japan are generally lower than in the United States.

#### Project selection: The time-adjusted rate of return (or internal rate of return)

The **time-adjusted rate of return**, also called the internal rate of return, equates the present value of expected after-tax net cash inflows from an investment with the cost of the investment. It does this by finding the rate at which the net present value of the project is zero. If the time-adjusted rate of return equals or exceeds the cost of capital or target rate of return, a firm should consider the investment further. If the proposal's time-adjusted rate of return is less than the minimum rate, the firm should reject the proposal. Ignoring other considerations, the higher the time-adjusted rate of return, the more desirable the project.

Calculators and computer software with time-adjusted rate of return functions are readily available. Present value tables also can approximate the time-adjusted rate of return. To illustrate, assume Young Company is considering a USD 90,000 investment expected to last 25 years with no salvage value. The investment yields a USD 15,000 annual after-tax net cash inflow. This USD 15,000 is referred to as an **annuity**, which is a series of equal cash inflows.

The first step in computing the rate of return is to determine the payback period. In this case, the payback period is six years (USD 90,000/USD 15,000). The second step is to examine Table A.4 in the Appendix (present value of an annuity) to find the present value factor that is nearest in amount to the payback period of 6. Since the investment is expected to yield returns for 25 years, look at that row in the table. In that row, the factor nearest to 6 is 5.92745, which appears under the 16.5 per cent interest column. The third step is to multiply the annual return of USD 15,000 by the 5.92745 factor; the result is USD 88,912, which is just below the USD 90,000 cost of the project. Thus, the actual rate of return is slightly less than 16.5 per cent. The rate of return is less than 16.5 per cent but more than 16 per cent because as interest rates increase, present values decrease because less investment is needed to generate the same income.

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### A broader perspective: Caterpillar, Inc.

Caterpillar, Inc., invested USD 1.5 billion in a worldwide factory modernization program. Caterpillar's management realized it must continually monitor the performance of this modernization if the project was to realize its potential.

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At Caterpillar, the projects are grouped into "bundles" of related projects. For example, all of the new assets used for a new product would be bundled together. "Each bundle is monitored every six months at Caterpillar, although a few key characteristics of some bundles are monitored monthly" [p. 32]. Characteristics used in monitoring performance include the amount of money projected versus the amount actually spent on the projects, the number of people expected to be used on the projects versus the number actually used, and the estimated reduction in product cost versus the reduction in product cost actually achieved.

Many firms believe their evaluation of project performance leaves much to be desired. Caterpillar's idea of "bundling" similar projects should be helpful to other firms making significant changes in their production processes and product lines.

Source: Based on the article by James A. Hendricks, Robert C. Bastian, and Thomas L. Sexton, "Bundle Monitoring of Strategic Projects," *Management Accounting*, February 1992, pp. 31-35.

The preceding example involves uniform net cash inflows from year to year. But what happens when net cash inflows are not uniform? In such instances, a trial and error procedure is necessary if present value tables are used. For example, assume that Young Company is considering a USD 200,000 project that will last four years and yield the following returns:

<b>Year</b>	<b>Net cash inflow (after taxes)</b>
1	\$ 20,000
2	40,000
3	80,000
4	150,000
Total	\$ 290,000

The average annual cash inflow is  $\text{USD } 290,000 / 4 = \text{USD } 72,500$ . Based on this average net cash inflow, the payback period is  $\text{USD } 200,000 / \text{USD } 72,500 = 2.76$  years. Looking in the four-year row of Table A.4 in the Appendix, we find that the factor 2.77048 is nearest to the payback period of 2.76. In this case, however, cash flows are not uniform. The largest returns occur in the later years of the asset's life. Since the early returns have the largest present value, the rate of return is likely to be less than the 16.5 per cent rate that corresponds to the present value factor 2.77048. If the returns had been greater during the earlier years of the asset's life, the correct rate of return would have been higher than 16.5 per cent. To find the specific discount rate that yields a present value closest to the initial outlay of USD 200,000, we try out several interest rates less than 16 per cent. The rate of return is found by trial and error. The following computation reveals the rate to be slightly higher than 12 per cent:

<b>Year</b>	<b>Return</b>	<b>Present value Factor at 12%</b>	<b>Present value of net Cash inflows</b>
1	\$ 20,000	0.89286	\$ 17,857
2	40,000	0.79719	31,888
3	80,000	0.71178	56,942
4	150,000	0.63553	95,330
			\$ 202,017

Since the cost of capital is not a precise percentage, some financial theorists argue that the time-adjusted rate of return method is preferable to the net present value method. Under the time-adjusted rate of return method, the cost of capital is used only as a cutoff point in deciding which projects are acceptable and should be given more consideration.

No matter which time value of money concept is considered better, these methods are both theoretically superior to the payback period and the unadjusted rate of return methods. However, the time value of money methods are more difficult to compute unless you use a business calculator or a microcomputer spreadsheet program. In reality, no single method should be used by itself to make capital-budgeting decisions. Managers should consider all aspects of the investment, including such nonquantitative factors as employee morale (layoff of workers due to higher efficiency of a new machine) and company flexibility (versatility of production of one machine over another). The company commits itself to its investment in a capital project for a long time and should use the best selection techniques and judgment available.

Too often, in capital project selection decisions, investments in working capital are ignored. The next section shows how to incorporate this factor into the analysis.

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### An accounting perspective:

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#### Use of technology

People use PC spreadsheets extensively in evaluating capital projects. Decisions about investing in capital projects require a lot of thinking about the future. Because no one can predict the future with certainty, people often make numerous estimates of future cash flows—some optimistic, some pessimistic, and some simply best guesses. PC spreadsheets make the preparation of numerous forecasts (scenarios) feasible, and even fun.

#### Investments in working capital

An investment in a capital asset usually must be supported by an investment in working capital, such as accounts receivable and inventory. For example, companies often invest in a capital project expecting to increase sales. Increased sales usually bring about an increase in accounts receivable from customers and an increase in inventory to support the higher sales level. The increases in current assets—accounts receivable and inventory—are investments in working capital that usually are recovered in full at the end of a capital project's life. Such working capital investments should be considered in capital-budgeting decisions.

To illustrate, assume that a company is considering a capital project involving a USD 50,000 investment in machinery and a USD 40,000 investment in working capital. The machine, which will produce a new product, has an estimated useful life of eight years and no salvage value. The annual cash inflows (before taxes) are estimated at USD 25,000, with annual cash outflows (before taxes) of USD 5,000. The annual net cash inflow from the project is computed as follows (assuming straight-line depreciation and a 40 per cent tax rate):

Cash inflows	\$ 25,000
Cash outflows	5,000
Net cash inflow before taxes	\$ 20,000

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1 – Tax rate	X 60%
Net cash inflow after taxes (ignoring depreciation) (1)	\$ 12,000
Depreciation tax shield (\$ 50,000/8 years)	\$ 6,250
Income tax rate	X 40%
Depreciation tax savings (2)	\$ 2,500
Annual net cash inflow, years 1-8 (1) + (2)	\$ 14,500

The annual net cash inflow from the machine is USD 14,500 each year for eight years. However, the working capital investment must be considered. The investment of USD 40,000 in working capital at the start of the project is an additional outlay that must be made when the project is started. The USD 40,000 would be tied up every year until the project is finished, or in this case, until the end of the life of the machine. At that point, the working capital would be released, and the USD 40,000 could be used for other investments. Therefore, the USD 40,000 is a cash outlay at the start of the project and a cash inflow at the end of the project.

The net present value of the project is computed as follows (assuming a 14 per cent minimum desired rate of return):

Net cash inflow, years 1-8 (\$ 14,500 x 4.63886)	\$ 67,263
Recovery of investment in working capital (\$ 40,000 x 0.35056)	14,022
Present value of net cash inflows	\$ 81,285
Initial cash outlay (\$ 50,000 + \$ 40,000)	90,000
Net present value	\$ (8,715)

The discount factor for the cash inflows, 4.63886, comes from Table A.4 in the Appendix at the end of the book, because the cash inflows in this example are a series of equal payments—an annuity. The recovery of the investment in working capital is assumed to represent a single lump sum received at the end of the project's life. As such, it is discounted using a factor (0.35056) that comes from Table A.3 in the Appendix.

The investment is not acceptable because it has a negative net present value. If the working capital investment had been ignored, the proposal would have had a rather large positive net present value of USD 17,263 (USD 67,263 - USD 50,000). Thus, it should be obvious that investments in working capital must be considered if correct capital-budgeting decisions are to be made.

The next topic discussed in the chapter is the postaudit. This important step improves the chances that future capital project selection decisions are based on realistic projections of benefits and costs.

### The postaudit

The last step in the capital-budgeting process is a postaudit review that should be performed by a person not involved in the capital-budgeting decision-making process. Such a person can provide an impartial judgment on the project's worthiness. This step should be performed early in the project's life, but enough time should have passed for any operational bugs to have been worked out. Actual operating costs and revenues should be determined and compared with those estimated when the project was originally reviewed and accepted. The postaudit review performs these functions:

- Let management know if the projections were accurate and if the particular project is performing as expected regarding cash inflows and outflows.

- May identify additional factors for management to consider in upcoming capital-budgeting decisions, such as cash outflows that were forgotten in a particular project.
- Provides a review of the capital-budgeting process to determine how effectively and efficiently it is working. The postaudit provides information that allows management to compare the actual results of decisions with the expectations it had during the planning and selection phases of the capital-budgeting process.

### Investing in high technology projects

Many companies have found it hard to justify high technology investments. A US auto manufacturer, for example, found it difficult to justify investing in a new computer-based flexible manufacturing system because its cost savings occurred so far in the future. When discounted, the present value of these savings did not justify the initial outlay. The president of the company was convinced, however, that the new system had benefits not quantified in the cash flow estimates, so he approved the investment even though it had a negative net present value.

Companies have difficulty in justifying an investment in high technology projects for several reasons. First, often several years pass before companies see the cash inflows from the investment. Even if the cash inflows are high, their net present value is low if they come several years in the future.

Second, management has difficulty identifying and measuring all of the benefits of new technology. When personal computers replaced typewriters, for example, people learned many new ways of creating and storing documents by using the computer. These benefits occurred because people used computers and experimented with them. These benefits would have been difficult to predict, much less measure, back when companies were trying to justify investment in personal computers. Managers believe that sometimes they just have to have faith that the investment is a good one, even though they cannot justify it on quantifiable economic grounds.

### Capital budgeting in not-for-profit organizations

The concepts discussed in this chapter also apply to not-for-profit organizations, such as universities, school districts, cities, and not-for-profit hospitals. Since these organizations are not subject to as many taxes as profit-making organizations, the cash flows related to taxes are usually zero or near zero.

### Epilogue

You have now completed the last chapter in this text. Thank you for using our textbook. The knowledge you have gained will serve you well in any career you choose. Good luck!

### Understanding the learning objectives

- Capital budgeting is the process of considering alternative capital projects and selecting those alternatives that provide the most profitable return on available funds, within the framework of company goals and objectives.
- Poor capital budgeting decisions can cause a company to lose all or part of the funds originally invested in a project and can harm the company's competitive position in world markets.

- Asset addition:

$$\text{Net cash inflow after taxes} = (\text{Net cash inflow before taxes} \times (1 - \text{Tax rate})) + (\text{Depreciation expense} \times \text{Tax rate})$$

- Asset replacement:

$$\text{Net cash inflow after taxes} = (\text{Annual net cash inflows (savings) before taxes} \times (1 - \text{Tax rate})) + (\text{Additional annual depreciation expense} \times \text{Tax rate})$$

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- Payback period =  $\frac{\text{Initial cash outlay}}{\text{Annual net cash inflows (benefits)}}$
- Unadjusted rate of return =  $\frac{\text{Average annual income after taxes}}{\text{Average amount of investment}}$
- All expected after-tax cash inflows and outflows from the proposed investment are discounted to their present values using the company's required minimum rate of return as a discount rate. The net present value of the proposed investment is the difference between the present value of the annual net cash in flows and the present value of the required cash outflows
- Profitability index =  $\frac{\text{Present value of net cash inflows}}{\text{Initial cash outlay (present value of cash outlays if future outlays are required)}}$
- The time-adjusted rate of return equates the present value of expected after-tax net cash inflows from an investment with the cost of the investment by finding the rate at which the net present value of the project is zero. If the time-adjusted rate of return equals or exceeds the cost of capital or the target rate of return, the project should be considered. If the rate is less than the minimum rate, the project should be rejected.
- The investment in working capital causes the net present value to be lower than it would be if the working capital investment is ignored. Therefore, the required return of a project must be higher to account for the investment in working capital.

### Demonstration problem

Barkley Company is considering three different investments; the following data relate to these investments:

Investment	Initial cash outlay	Expected Before-Tax Net	Expected after-tax net	Expected life
		Cash inflow per year	Cash inflow per year	Of proposals* (years)
A	\$ 50,000	\$ 13,333	\$ 10,000	10
B	60,000	12,000	8,800	15
C	75,000	15,000	10,500	20

\*No estimated salvage value. Use straight-line depreciation.

The income tax rate is 40 per cent. The salvage value of each investment is zero. Management requires a minimum return on investments of 14 per cent.

Rank these proposals using the following selection techniques:

- Payback period.
- Unadjusted rate of return.
- Profitability index.
- Time-adjusted rate of return.

### Solution to demonstration problem

a. Payback period:

Proposal	(a)	(b)	(a)/(b)
	Investment	Annual after-tax Cash inflow	Payback period (years)
A	\$ 50,000	\$ 10,000	5.00
B	60,000	8,800	6.82
C	75,000	10,500	7.14



b. Unadjusted rate of return:

	(a)	(b)	(c)	(d)=[(b - c) x (1 - .4)]	(d)/(a)
		Average annual before -tax net	Average	Average	Rate
Proposal	Average investment	Cash inflow	Depreciation	Annual income	Of Return
A	\$ 25,000	\$ 13,333	\$ 5,000	\$ 5,000	20%
B	30,000	12,000	4,000	4,800	16%
C	37,500	15,000	3,750	6,750	18%

The proposals in order of desirability are A, C, and B.

c. Profitability index:

	(a)	(b)	(c) = (a) x (b)	(d)	(c) x (d)
	Annual after-tax net	Present	Present value of Annual	Initial cash	Profitability
Proposal	Cash inflow	Value factor at 14%	Net cash inflow	Outlay	Index
A	\$ 10,000*	5.21612	\$ 52,161	\$ 50,000	1.04
B	8,800	6.14217	54,051	60,000	0.90
C	10,500	6.62313	69,543	75,000	0.93

\*This amount was given. However, the amount can also be calculated as follows:

Expected before-tax net cash inflow	\$ 13,333
Less depreciation	5,000
Taxable income	\$ 8,333
1 - Tax rate	X 60%
After-tax annual income	\$ 5,000
Add back depreciation	5,000
Annual after-tax net cash inflow	\$ 10,000

The proposals in order of desirability are A, C, and B. (But neither B nor C should be considered acceptable since each has a profitability index of less than one.)

d. Time-adjusted rate of return:

Proposal	Rate	How found
A	15% (slightly above)	(\$ 50,000/\$ 10,000) = Factor of 5 in 10 period row
B	12% (slightly below)	(\$ 60,000/\$ 8,800) = Factor of 6.82 in 15 period row
C	13% (slightly below)	(\$ 75,000/\$ 10,500) = Factor of 7.14 in 20 period row

The proposals in order of desirability are A, C, and B. (But neither B nor C earns the minimum rate of return.)

### Key terms\*

**Annuity** A series of equal cash inflows.

**Capital budgeting** The process of considering alternative capital projects and selecting those alternatives that provide the most profitable return on available funds, within the framework of company goals and objectives.

**Capital project** Any available alternative to purchase, build, lease, or renovate equipment, buildings, property, or other long-term assets.

**Cost of capital** The cost of all sources of capital (debt and equity) employed by a company.

**Initial cost of an asset** Any cash outflows necessary to acquire an asset and place it in a position and condition for its intended use.

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**Net cash inflow** The periodic cash inflows from a project less the periodic cash outflows related to the project.

**Net present value** A project selection technique that discounts all expected after-tax cash inflows and outflows from the proposed investment to their present values using the company's minimum rate of return as a discount rate. If the amount obtained by this process exceeds or equals the investment amount, the proposal is considered acceptable for further consideration.

**Opportunity cost** The benefits or returns lost by rejecting the best alternative investment.

**Out-of-pocket cost** A cost requiring a future outlay of resources, usually cash.

**Payback period** The period of time it takes for the cumulative sum of the annual net cash inflows from a project to equal the initial net cash outlay.

**Profitability index** The ratio of the present value of the expected net cash inflows (after taxes) divided by the initial cash outlay (or present value of cash outlays if future outlays are required).

**Sunk costs** Costs that have already been incurred. Nothing can be done about sunk costs at the present time; they cannot be avoided or changed in amount.

**Tax shield** The total amount by which taxable income is reduced due to the deductibility of an item.

**Time-adjusted rate of return** A project selection technique that finds a rate of return that will equate the present value of future expected net cash inflows (after taxes) from an investment with the cost of the investment; also called internal rate of return.

**Unadjusted rate of return** The rate of return computed by dividing average annual income after taxes from a project by the average amount of the investment.

\*Some terms listed in earlier chapters are repeated here for your convenience.

### Self-test

#### True-false

Indicate whether each of the following is true or false.

Depreciation does not involve a cash outflow; it is deductible in arriving at federal taxable income.

The price a company is going to pay for a machine is an out-of-pocket cost.

Sunk costs and out-of-pocket costs are relevant to capital-budgeting decisions.

A formula for unadjusted rate of return is as follows:

Unadjusted rate of return = Average annual income after taxes / Average amount of investment

When investment projects cost different amounts are being compared, the net present value does not provide a valid means by which to rank projects in order of contribution to income or desirability assuming limited financial resources.

#### Multiple-choice

Choose the best answer for each of the following questions.

Which of the following is incorrect regarding the payback period method?

- The payback period ignores the time period beyond the payback period.
- When using payback analysis for investment decisions, one rule is to select the shortest payback period investment.
- The formula for the payback period is:  
Payback period = Initial cash outlay / Annual amount of investment
- Payback analysis ignores the time value of money.

When using time value of money concepts, all aspects of the investment should be considered including which of the following?

- Employee morale.
- No single time value of money method should be used by itself to make capital budgeting decisions.

- c. Company flexibility.
- d. All of the above.

Which of the following correctly describe(s) the limitations when using the unadjusted rate of return.

- a. Timing of cash flows is not considered.
- b. It allows a sunk cost, depreciation, to enter into the calculation.
- c. The length of time over which the return will be earned is not considered.
- d. All of the above.

Which of the following statements is (are) true regarding the profitability index?

- a. Only proposals with profitability indexes greater than 1.00 should be considered.
- b. Only proposals with profitability indexes less than 1.00 should be considered.
- c. The profitability index is the ratio of the initial cash outlay divided by the present value of cash benefits (before taxes).
- d. b and c.

Which of the following statements is (are) true regarding net present value?

- a. When determining an appropriate discount rate, management uses net cash outflow.
- b. With projects that require an investment at a later date, management must discount the cash outflow to its present value before it is compared to the present value of cash inflows.
- c. When using the net present value to screen alternative projects, as long as the project's net present value is equal to the investment the project is desirable.
- d. b and c.

Which of the following statements is (are) true regarding the time-adjusted rate of return?

- a. The first step in computing the rate of return is determining the payback period.
- b. The annual after-tax net cash inflow also is called an annuity.
- c. The cost of capital is used only as a cutoff point in deciding which projects should be considered further.
- d. All of the above.

Now turn to “Answers to self-test” at the back of the chapter to check your answers.

## Questions

- How do capital expenditures differ from ordinary expenditures?
- What effects can capital-budgeting decisions have on a company?
- What effect does depreciation have on cash flow?
- Give an example of an out-of-pocket cost and a sunk cost by describing a situation in which both are encountered.
- A machine is being considered for purchase. The salesperson attempting to sell the machine says that it will pay for itself in five years. What is meant by this statement?
- Discuss the limitations of the payback period method.
- What is the profitability index, and of what value is it?
- What is the time-adjusted rate of return on a capital investment?
- What role does the cost of capital play in the time-adjusted rate of return method and in the net present value method?

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- What is the purpose of a postaudit? When should a postaudit be performed?
- A friend who knows nothing about the concepts in this chapter is considering purchasing a house for rental to students. In just a few words, what would you tell your friend to think about in making this decision?

### Exercises

**Exercise A** Diane Manufacturing Company is considering investing USD 600,000 in new equipment with an estimated useful life of 10 years and no salvage value. The equipment is expected to produce USD 240,000 in cash inflows and USD 160,000 in cash outflows annually. The company uses straight-line depreciation, and has a 40 per cent tax rate. Determine the annual estimated net income and net cash inflow.

**Exercise B** Zen Manufacturing Company is considering replacing a four-year-old machine with a new, advanced model. The old machine was purchased for USD 60,000, has an estimated useful life of 10 years with no salvage value, and has annual maintenance costs of USD 15,000. The new machine would cost USD 45,000, but annual maintenance costs would be only USD 6,000. The new machine would have an estimated useful life of 10 years with no salvage value. Using straight-line depreciation and an assumed 40 per cent tax rate, compute the additional annual cash inflow if the old machine is replaced.

**Exercise C** Given the following annual costs, compute the payback period for the new machine if its initial cost is USD 420,000.

	Old machine	New machine
Depreciation	\$ 18,000	\$ 42,000
Labor	72,000	63,000
Repairs	21,000	4,500
Other costs	12,000	3,600
	\$ 123,000	\$ 113,100

**Exercise D** Jefferson Company is considering investing USD 33,000 in a new machine. The machine is expected to last five years and to have a salvage value of USD 8,000. Annual before-tax net cash inflow from the machine is expected to be USD 7,000. Calculate the unadjusted rate of return. The income tax rate is 40 per cent.

**Exercise E** Compute the profitability index for each of the following two proposals assuming the desired minimum rate of return is 20 per cent. Based on the profitability indexes, which proposal is better?

	Proposal 1	Proposal 2
Initial cash outlay	\$ 16,000	\$ 10,300
Net cash inflow (after taxes):		
First year	10,000	6,000
Second year	9,000	6,000
Third year	6,000	4,000
Fourth year	-0-	2,500

**Exercise F** Ross Company is considering three alternative investment proposals. Using the following information, rank the proposals in order of desirability using the payback period method.

	A	Proposal B	C
Initial outlay	\$ 360,000	\$ 360,000	\$ 360,000
Net cash inflow (after taxes):			
First year	\$ -0-	\$ 90,000	\$ 90,000
Second year	180,000	270,000	180,000

Third year	180,000	90,000	270,000
Fourth year	90,000	180,000	450,000
	\$ 450,000	\$ 630,000	\$ 990,000

**Exercise G** Simone Company is considering the purchase of a new machine costing USD 50,000. It is expected to save USD 9,000 cash per year for 10 years, has an estimated useful life of 10 years, and no salvage value. Management will not make any investment unless at least an 18 per cent rate of return can be earned. Using the net present value method, determine if the proposal is acceptable. Assume all tax effects are included in these numbers.

**Exercise H** Refer to the data in previous exercise. Calculate the time-adjusted rate of return.

**Exercise I** Rank the following investments for Renate Company in order of their desirability using the (a) payback period method, (b) net present value method, and (c) time-adjusted rate of return method. Management requires a minimum rate of return of 14 per cent.

Investment	Initial Cash outlay	Expected after-tax net cash Inflow per year	Expected life of proposal (years)
A	\$ 120,000	\$ 15,000	8
B	150,000	26,000	20
C	240,000	48,000	10

### Problems

**Problem A** Hamlet Company is considering the purchase of a new machine that would cost USD 300,000 and would have an estimated useful life of 10 years with no salvage value. The new machine is expected to have annual before-tax cash inflows of USD 100,000 and annual before-tax cash outflows of USD 40,000. The company will depreciate the machine using straight-line depreciation, and the assumed tax rate is 40 per cent.

- Determine the net after-tax cash inflow for the new machine.
- Determine the payback period for the new machine.

**Problem B** Graham Company currently uses four machines to produce 400,000 units annually. The machines were bought three years ago for USD 50,000 each and have an expected useful life of 10 years with no salvage value. These machines cost a total of USD 30,000 per year to repair and maintain.

The company is considering replacing the four machines with one technologically superior machine capable of producing 400,000 units annually by itself. The machine would cost USD 140,000 and have an estimated useful life of seven years with no salvage value. Annual repair and maintenance costs are estimated at USD 14,000.

Assuming straight-line depreciation and a 40 per cent tax rate, determine the annual additional after-tax net cash inflow if the new machine is acquired.

**Problem C** Macro Company owns five machines that it uses in its manufacturing operations. Each of the machines was purchased four years ago at a cost of USD 120,000. Each machine has an estimated life of 10 years with no expected salvage value. A new machine has become available. One new machine has the same productive capacity as the five old machines combined; it can produce 800,000 units each year. The new machine will cost USD 648,000, is estimated to last six years, and will have a salvage value of USD 72,000. A trade-in allowance of USD 24,000 is available for each of the old machines. These are the operating costs per unit:

	Five old Machines	New Machines
Repairs	\$ 0.6796	\$ 0.0856
Depreciation	0.1500	0.2400
Power	0.1890	0.1036

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Other operating costs	0.1620	0.0496
	\$ 1.1806	\$ 0.4788

Ignore federal income taxes. Use the payback period method for (a) and (b).

- Do you recommend replacing the old machines? Support your answer with computations. Disregard all factors except those reflected in the data just given.
- If the old machines were already fully depreciated, would your answer be different? Why?
- Using the net present value method with a discount rate of 20 per cent, present a schedule showing whether or not the new machine should be acquired.

**Problem D** Span Fruit Company has used a particular canning machine for several years. The machine has a zero salvage value. The company is considering buying a technologically improved machine at a cost of USD 232,000. The new machine will save USD 50,000 per year after taxes in cash operating costs. If the company decides not to buy the new machine, it can use the old machine for an indefinite time by incurring heavy repair costs. The new machine would have an estimated useful life of eight years.

- Compute the time-adjusted rate of return for the new machine.
- Management thinks the estimated useful life of the new machine may be more or less than eight years. Compute the time-adjusted rate of return for the new machine if its useful life is (1) 5 years and (2) 12 years, instead of 8 years.
- Suppose the new machine's useful life is eight years, but the annual after-tax cost savings are only USD 45,000. Compute the time-adjusted rate of return.
- Assume the annual after-tax cost savings from the new machine will be USD 35,000 and its useful life will be 10 years. Compute the time-adjusted rate of return.

**Problem E** Merryll, Inc., is considering three different investments involving depreciable assets with no salvage value. The following data relate to these investments:

	Initial cash	Expected before-tax net	Expected after-tax net	Life of proposal
Investment	Outlay	Cash inflow per year	Cash inflow per year	(years)
1	\$ 140,000	\$ 37,333	\$ 28,000	10
2	240,000	72,000	48,000	20
3	360,000	89,333	68,000	10

The income tax rate is 40 per cent. Management requires a minimum return on investment of 12 per cent.

Rank these proposals using the following selection techniques:

- Payback period.
- Unadjusted rate of return.
- Profitability index.
- Time-adjusted rate of return.

**Problem F** Slow to Change Company has decided to computerize its accounting system. The company has two alternatives—it can lease a computer under a three-year contract or purchase a computer outright.

If the computer is leased, the lease payment will be USD 5,000 each year. The first lease payment will be due on the day the lease contract is signed. The other two payments will be due at the end of the first and second years. The lessor will provide all repairs and maintenance.

If the company purchases the computer outright, it will incur the following costs:

Acquisition cost	\$ 10,500
Repairs and maintenance:	
First year	300
Second year	250
Third year	350

The computer is expected to have only a three-year useful life because of obsolescence and technological advancements. The computer will have no salvage value and be depreciated on a double-declining-balance basis. Slow to Change Company's cost of capital is 16 per cent.

- Calculate the net present value of out-of-pocket costs for the lease alternative.
- Calculate the net present value of out-of-pocket costs for the purchase alternative.
- Do you recommend that the company purchase or lease the machine?

**Problem G** Van Gogh Sports Company is trying to decide whether to add tennis equipment to its existing line of football, baseball, and basketball equipment. Market research studies and cost analyses have provided the following information:

Van Gogh will need additional machinery and equipment to manufacture the tennis equipment. The machines and equipment will cost USD 450,000, have an estimated 10-year useful life, and have a USD 10,000 salvage value.

Sales of tennis equipment for the next 10 years have been projected as follows:

Years	Sales in dollars
1	\$ 75,000
2	112,500
3	168,750
4	187,500
5	206,250
6 – 10 (each year)	225,000

Variable costs are 60 per cent of selling price, and fixed costs (including straight-line depreciation) will total USD 88,500 per year.

The company must advertise its new product line to gain rapid entry into the market. Its advertising campaign costs will be:

Years	Annual advertising cost
1 – 3	\$ 75,000
4 – 10	37,500

The company requires a 14 per cent minimum rate of return on investments.

Using the net present value method, decide whether or not Van Gogh Sports Company should add the tennis equipment to its line of products. (Ignore federal income taxes.) Round to the nearest dollar.

**Problem H** Jordan Company is considering purchasing new equipment costing USD 2,400,000. Jordan estimates that the useful life of the equipment will be five years and that it will have a salvage value of USD 600,000. The company uses straight-line depreciation. The new equipment is expected to have a net cash inflow (before taxes) of USD 258,000 annually. Assume that the tax rate is 40 per cent and that management requires a minimum return of 14 per cent.

Using the net present value method, determine whether the equipment is an acceptable investment.

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**Problem I** Penny Company has an opportunity to sell some equipment for USD 40,000. Such a sale will result in a tax-deductible loss of USD 4,000. If the equipment is not sold, it is expected to produce net cash inflows after taxes of USD 8,000 for the next 10 years. After 10 years, the equipment can be sold for its book value of USD 4,000. Assume a 40 per cent federal income tax rate.

Management currently has other opportunities that will yield 18 per cent. Using the net present value method, show whether the company should sell the equipment. Prepare a schedule to support your conclusion.

### Alternate problems

**Alternate problem A** Mark's Manufacturing Company is currently using three machines that it bought seven years ago to manufacture its product. Each machine produces 10,000 units annually. Each machine originally cost USD 25,500 and has an estimated useful life of 17 years with no salvage value.

The new assistant manager of Mark's Manufacturing Company suggests that the company replace the three old machines with two technically superior machines for USD 22,500 each. Each new machine would produce 15,000 units annually and would have an estimated useful life of 10 years with no salvage value.

The new assistant manager points out that the cost of maintaining the new machines would be much lower. Each old machine costs USD 2,500 per year to maintain; each new machine would cost only USD 1,500 a year to maintain.

Compute the increase in after-tax annual net cash inflow that would result from replacing the old machines; use straight-line depreciation and an assumed tax rate of 40 per cent.

**Alternate problem B** Fed Extra Company is considering replacing 10 of its delivery vans that originally cost USD 30,000 each; depreciation of USD 18,750 has already been taken on each van. The vans were originally estimated to have useful lives of eight years and no salvage value. Each van travels an average of 150,000 miles per year. The 10 new vans, if purchased, will cost USD 36,000 each. Each van will be driven 150,000 miles per year and will have no salvage value at the end of its three-year estimated useful life. A trade-in allowance of USD 3,000 is available for each of the old vans. Following is a comparison of costs of operation per mile:

	Old vans	New vans
Fuel, lubricants, etc.	\$ 0.152	\$ 0.119
Tires	0.067	0.067
Repairs	0.110	0.087
Depreciation	0.025	0.080
Other operating costs	0.051	0.043
Operating costs per mile	\$ 0.405	\$ 0.396

Use the payback period method for (a) and (b).

a. Do you recommend replacing the old vans? Support your answer with computations and disregard all factors not related to the preceding data.

b. If the old vans were already fully depreciated, would your answer be different? Why?

c. Assume that all cost flows for operating costs fall at the end of each year and that 18 per cent is an appropriate rate for discounting purposes. Using the net present value method, present a schedule showing whether or not the new vans should be acquired.

**Alternate problem C** Mesa Company has been using an old-fashioned computer for many years. The computer has no salvage value. The company is considering buying a computer system at a cost of USD 35,000. The new computer system will save USD 7,000 per year after taxes in cash (including tax effects of depreciation). If the



company decides not to buy the new computer system, it can use the old one for an indefinite time. The new computer system will have an estimated useful life of 10 years.

- a. Compute the time-adjusted rate of return for the new computer system.
- b. The company is uncertain about the new computer system's 10-year useful life. Compute the time-adjusted rate of return for the new computer system if its useful life is (1) 6 years and (2) 15 years, instead of 10 years.
- c. Suppose the computer system has a useful life of 10 years, but the annual after-tax cost savings are only USD 4,500. Compute the time-adjusted rate of return.
- d. Assume the annual after-tax cost savings will be USD 7,500 and the useful life will be eight years. Compute the time-adjusted rate of return.

**Alternate problem D** Ott's Fresh Produce Company has always purchased its trucks outright and sold them after three years. The company is ready to sell its present fleet of trucks and is trying to decide whether it should continue to purchase trucks or whether it should lease trucks. If the trucks are purchased, the company will incur the following costs:

	<b>Costs per fleet</b>
Acquisition cost	\$ 312,000
Repairs:	
First year	3,600
Second year	6,600
Third year	9,000
Other annual costs	9,600

At the end of three years, the trucks could be sold for a total of USD 96,000. Another fleet of trucks would then be purchased. The costs just listed, including the same acquisition cost, also would be incurred with respect to the second fleet of trucks. The second fleet also could be sold for USD 96,000 at the end of three years.

If the company leases the trucks, the lease contract will run for six years. One fleet of trucks will be provided immediately, and a second fleet of trucks will be provided at the end of three years. The company will pay USD 126,000 per year under the lease contract. The first lease payment will be due on the day the lease contract is signed. The lessor bears the cost of all repairs.

Using the net present value method, determine if the company should buy or lease the trucks. Assume the company's cost of capital is 18 per cent. (Ignore federal income taxes.)

#### Beyond the numbers—Critical thinking

**Business decision case A** Lloyd's Company wishes to invest USD 750,000 in capital projects that have a minimum expected rate of return of 14 per cent. The company is evaluating five proposals. Acceptance of one proposal does not preclude acceptance of any of the other proposals. The company's criterion is to select proposals that meet its 14 per cent minimum required rate of return. The relevant information related to the five proposals is as follows:

<b>Investment</b>	<b>Initial cash Outlay</b>	<b>Expected after-tax net Cash inflow per year</b>	<b>Expected life of Proposal (years)</b>
A	\$ 150,000	\$ 45,000	5
B	300,000	60,000	8
C	375,000	82,500	10

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D	450,000	78,000	12
E	150,000	31,500	10

- Compute the net present value of each of the five proposals.
- Which projects should be undertaken? Why? Rank them in order of desirability.

**Business decision case B** Slick Company is considering a capital project involving a USD 225,000 investment in machinery and a USD 45,000 investment in working capital. The machine has an expected useful life of 10 years and no salvage value. The annual cash inflows (before taxes) are estimated at USD 90,000 with annual cash outflows (before taxes) of USD 30,000. The company uses straight-line depreciation. Assume the federal income tax rate is 40 per cent.

The company's new accountant computed the net present value of the project using a minimum required rate of return of 16 per cent (the company's cost of capital). The accountant's computations follow:

Cash inflows	\$ 90,000
Cash outflows	30,000
Net cash inflow	\$ 60,000
Present value of net cash at 16%	X 4.833
Present value of net cash inflow	\$283,980
Initial cash outlay	225,000
Net present value	\$ 64,980

- Are the accountant's computations correct? If not, compute the correct net present value.
- Is this capital project acceptable to the company? Why or why not?

**An accounting perspective – Writing experience C** Refer to "An accounting perspective: Business insight". Write a brief paper explaining why managers in Japan might use lower measures of the cost of capital than US managers.

**Ethics case – Writing experience D** Rebecca Peters just learned that First Bank's investment review committee rejected her pet project, a new computerized method of storing data that would enable customers to have instant access to their bank records. Peters' software consulting firm specializes in working with financial institutions. This project for First Bank was her first as project manager.

Following up, Peters learned that First Bank's investment review committee liked the idea but were not convinced that the new software's financial benefits would justify the cost of the software. When she told a colleague about the rejection at First Bank, the colleague said, "Why not tell the committee this software will increase the bank's profits? After we installed the software in the bank in Indianapolis, Indiana, USA their profits increased substantially. We even have data from that bank that you could present."

Peters thought about the suggestion. She knew First Bank would be pleased with the software if they installed it, and she wanted to make the sale. She also knew that the situation in Indianapolis, Indiana, USA was different; profits there had increased primarily because of other software that had reduced the bank's operating costs.

What should Rebecca Peters do? Write her a letter telling what you would do.

**Group assignment E** For summer employment, a friend is considering investing in a coffee stand on a busy street near office buildings. Being unfamiliar with the concepts in this chapter, your friend does not know how to make the decision. In teams of four, help your friend get started by providing a framework and questions that your friend should answer. (For example, how much will the investment be? How much are the estimated cash flows from sales?) Prepare a memorandum from the group to your instructor; list your questions and suggestions for your friend. In the heading, include the date, to whom it is written, from whom, and the subject matter.

**Group project F** You have the option of choosing between two projects with equal total cash flows over five years but different annual cash flows. In groups of two or three students, determine which project should be selected for investment. Write a memorandum to your instructor addressing this issue. Be sure to provide examples to reinforce your answer. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

**Group project G** A manager comments to her superior, "There is no need to perform a postaudit. The project was justified based on our initial projections and we were given the green light to proceed. It has been a year since we started the project, a postaudit would be a waste of time." In groups of two or three students, respond to this comment. Do you agree? Do you disagree? If this manager is right, why bother with a postaudit? Write a memorandum to your instructor addressing these questions. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter.

#### Using the Internet—A view of the real world

Using any Internet search engine enter "budgeting" . Select an article that directly discusses budgeting in an organization or industry and print a copy of the article. You are encouraged (but not required) to find an article that answers some of the following questions: What is the purpose of budgeting? How are budgets developed? How is budgeting used to motivate employees? How might budgeting create ethical dilemmas?

Write a memorandum to your instructor summarizing the key points of the article. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter. Be sure to include a copy of the article used for this assignment.

Using any Internet search engine select one of the new terms at the end of the chapter and perform a key word search. Be sure to include quotation marks (for example: "Payback period"). Select an article that directly discusses the new term used, and print a copy of the article. Write a memorandum to your instructor summarizing the key points of the article. The heading of the memorandum should contain the date, to whom it is written, from whom, and the subject matter. Be sure to include a copy of the article used for this assignment.

#### Answers to self-test

##### True-false

**True.** Depreciation does not involve a cash outflow; it is deductible in arriving at federal taxable income.

**True.** The price paid for a machine becomes a sunk cost the minute the purchase has been made.

**False.** Only the out-of-pocket costs (the future cash outlays) are relevant to capital-budgeting decisions.

**True.**  $\text{Unadjusted rate of return} = \frac{\text{Average annual income after taxes}}{\text{Average amount of investment}}$

**True.** The profitability index should be used to rank these projects.

##### Multiple-choice

**c.** The correct formula is:

$$\text{Payback period} = \frac{\text{Initial cash outlay}}{\text{Annual net cash inflow (benefit)}}$$

**d.** All of the above choices are correct answers.

**d.** All of the above choices are correct answers.

**a.** A profitability index is the ratio of the present value of the expected net cash inflows (after taxes) divided by the initial cash outlay (or present value of cash outlays if future outlays are required).

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**b.** With projects that require an investment at a later date, management must discount the cash outflow to its present value before it is compared to the present value of cash inflows.

**d.** All of the choices are correct answers.