

The Quality of Law in Civil Code and Common Law Regimes: Judicial Incentives, Legal Human Capital and the Evolution of Law

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March 2006

1. INTRODUCTION

As developing countries and countries transitioning from planned economies struggle to develop the institutions that support market democracy, there has been increased attention from economists and legal scholars directed to the question of what legal regimes best promote economic growth and political liberalization. A small empirical literature, originally focused on comparative finance regimes, has emerged suggesting that common law regimes outperform civil code regimes. (La Porta et al 1997, Mahoney 2001, Djankov et al 2003). Although there are questions about the reliability of the empirical findings, in light of the difficulty of obtaining adequate measures of legality, (Davis 2004), there is nonetheless a widespread view (at least in scholarly communities in common law countries) that countries with legal regimes rooted in English common law attain better economic and political results than those with regimes rooted in either German, French or Scandinavian civil codes. Missing from this literature, however, is a careful account of the specific institutional differences between these legal families that may account for their differential success at achieving the legality that supports market democracy. By and large the explanation offered by this literature is based on a relatively abstract appeal to the differences between 'judge-made' and 'code' law, with a specific appeal to the benefits of an independent judiciary developing precedent.

This account, however, leaves us with several puzzles. First, it is clear that modern common-law regimes are heavily infused with codes (statutes). Indeed, common law per se—meaning areas of law in which judge-made precedent is the only source of law—governs an increasingly small proportion of litigation in the United States and other "common law" countries. Even in the traditional common law areas—contract, tort, and property—there are numerous general application statutes such as the Uniform Commercial Code and state civil codes, together with regulatory statutes for specific areas such as bankruptcy, corporate governance, securities, insurance, product safety, landlord-tenant relations, and so on. Second, it is also clear that modern civil code regimes can and do generate precedent-based reasoning. In advanced code regimes such as Germany, judicial opinions are increasingly published and cited. (Schneider 2003) In addition, the code provisions that govern some areas of law in civil code regimes are often barely more than a statement of principle akin to what we find in common law principles. The French law of torts,

for example, is based on a handful of brief code provisions.¹ More to the point, publication and citation to the decisions of other courts are largely matters of practice among lawyers and judges; any appeal to the differential reliance on judge-made principles as between common law and civil code regimes must ultimately explain these behavioral differences, not take them as given *a priori*. It is clear that judges and lawyers in common law regimes are routinely in the business of arguing and deciding cases on the basis of statutory language, just as civil code judges and lawyers are. And it is clear that civil code judges and lawyers pay attention to the cases decided by other courts.²

Yet it is also clear that the *practice* of decision and argument differs between common law and civil codes regimes. Indeed, although the common law system is described as one that subscribes to a rule of *stare decisis*, the rule is simply a practice followed by the common law courts. Civil code regimes have an analogous practice, that of *jurisprudence constante*, the tendency of courts, in fact, to treat a settled question as settled. The practice may differ as between these two regimes—common law courts may defer to a single decision in another court, civil code courts may defer only after the accumulation of several decisions—but these are not institutional differences, they are behavioral differences. Other behavioral differences are also evident. A French court decision, for example, is typically short, conclusory and involves little or no discussion of facts.³ German appellate cases are lengthier than the French, and not written in the same conclusory style. They appear more like

¹See Merryman (1985) p. 53. As enacted originally in the Code Napoleon, and unchanged today, the key provisions are:

1382: Every action of man whatsoever which occasions injury to another, binds him through whose fault it happened to reparation thereof.

1383: Every one is responsible for the damage of which he is the cause, not only by his own act, but also by his negligence or by his imprudence.

²As Merryman (1985) has explained: "This is the theory [that courts in civil code regimes are not bound by the decisions of other courts] but the facts are different. Although there is no formal rule of *stare decisis*, the practice is for judges to be influenced by prior decisions. Judicial decisions are regularly published in most civil law jurisdictions. A lawyer preparing a case searches for cases in point and uses them in his argument; and the judge deciding a case often refers to prior cases. Whatever the ideology of the revolution may say about the value of precedent, the fact is that courts do not act very differently toward reported decisions in civil law jurisdictions than do courts in the United States. ...Those who contrast the civil law and the common law traditions by a supposed nonuse of judicial authority in the former and a binding doctrine of precedent in the latter exaggerate on both sides. Everybody knows that civil law courts do use precedents. Everybody knows that common law courts distinguish cases they do not want to follow, and sometimes overrule their own decisions." p. 47

³As an example, the following is the complete text of a case on appeal in the Cour de Cassation, the highest appellate court for private law matters in France:

"The Court:

Given that according to the judgment under attack the engine of Martin's motor cycle caught fire after it collided with Veidt's motor-car, and when its petrol tank exploded Sandrock, who had been on the scene and was attempting to extinguish the flames, was injured;

Given that the Court of Appeal is criticised for holding Martin liable to Sandrock on the ground that a contract of assistance had been formed between them, whereas there cannot be a contract without agreement of the parties and the judgment did not find that Martin had ever agreed;

But given that the Court of Appeal had no need to find that Martin ever expressed his agreement, since an offeree is presumed to have accepted an offer which is exclusively in his own interests, and that having concluded, as it had power to do, that a contract of assistance had been formed between Sandrock and Martin, the judges were quite correct to hold that the party assisted was bound to repair the harm suffered by the person providing gratuitous assistance;

common law decisions but, relative to modern U.S. cases (but perhaps not older U.S. cases and British cases) are less elaborate in their reasoning and appear to use fewer facts in developing their reasons.⁴ Judicial observers can conclude that civil code judges appear more interested in the relationship between textual provisions, coherence and abstract concepts while common law judges are more interested in the reasonableness of principles as applied to facts and in producing outcomes.⁵

For these reasons, DISMISSES the application for review." *Martin v. Sandrock* 1 December 1969, Translated French Cases and Materials under the direction of Professor B. Markesinis and M. le Conseiller Dominique Hascher (available at www.ucl.ac.uk/laws/global_law/french-cases)

⁴As an example, here is the key paragraph from a German decision deciding the liability of an architect for building defects. The facts in the case are recited in two short paragraphs. The entire decision is less than 2000 words. (Note also the appeal to caselaw and scholarly writing.):

"2. It is clear in any case that the plaintiff has a tortious claim. The defendant has breached the duty of care which he owed to F Ltd in that he did not ensure, when performing the role of supervising the building work which was entrusted to him, that the first defendant installed the damp insulation in the basement free from defects.

(a) According to the case law of the BGH [German supreme court], an architect may be liable in tort on the basis of a breach of his supervisory obligation for the loss thereby caused. Thus, for example, the architect responsible for the building work was held liable in tort for the loss caused by the collapse of a roof or ceiling [references omitted]; the same applies to the damage caused to a person using a staircase which proved to be unsafe [references omitted]. The tortious responsibility of the architect was also accepted for loss caused by damp to the property of third parties resulting from inadequate damp-proofing or a defective roof [references omitted]. This tortious responsibility of the architect is derived from the fact that during the construction process he not only owes duties on the basis of the contract with the builder, but he also owes duties of care in tort to third parties who are expected to come into contact with the building. For, in the normal course of events, such persons may rely on the architect carrying out in the proper way those tasks which will secure their protection against loss in the future [reference omitted]. That, also, applies to the tenant of a building. The fact that such a person may be, in certain circumstances, less worthy of protection than other third parties who only occasionally come into contact with the building, is no obstacle to a finding that the architect is liable. Of course, in normal circumstances the tenant will have a claim for compensation against the landlord where loss is inflicted by events such as those at issue. That factor makes no difference, however, to the architect's duty of care. Even for the builder himself, claims in tort are not in principle excluded by the fact that there are parallel claims in contract [references omitted]. Nor, however, is the tenant prevented from pursuing claims in tort against the architect, even though he may have a contractual claim against the landlord. The contractual liability of the landlord is not intended to exclude tortious claims against other persons who inflict loss on the tenant.

The liability of the architect is not excluded by the fact that it is in the first instance the main building contractor who is responsible for the building works. The Division has rejected this argument also to the extent that the architect owes a duty of care to safeguard the building site [references omitted]. Just as the architect may be responsible for the safety of the building site within the framework of the tasks which he has undertaken to perform, so the supervisory obligations which are intended to protect the residents of the building and their property may generate a duty of care.

This line of case law is likewise not challenged in the literature [references to literature omitted]. While it is possible to find in the literature signs of a move towards restricting the duty of care [references to literature omitted], there is no need in this case to take a definitive position on this matter. It may be doubtful in individual cases how far the duty of care of the architect extends. The Sixth Division has already referred to this point [reference omitted]. In any event, there is such a duty where the supervisory obligations in respect of the building work are specifically intended to avoid the occurrence of particularly dangerous types of errors on the part of the building contractor which are likely to arise." BGH NJW 1991 (Translated cases available at www.ucl.ac.uk/laws/global_law/german-cases.)

⁵I have my own anecdote about these differences. I recently attended a conference in Florence at which American, British, German, French and Italian law professors met to discuss the

Civil code lawyers and judges appear to have a much more refined approach to deciding what is legal and what is non-legal—what is relevant to a court decision and what is not—than do common law judges and lawyers. In the case of France, this can be seen in the goal of the Code Napoleon to eliminate the need for lawyers, to make law simple and straightforward, such that any lay person could read its provisions, know what was required: all that is relevant to dispute resolution is contained in the plain language of the code. As Merryman (1985) argues, the Code Napoleon was built on the idea that it was possible for the code to be clear, complete and coherent, and thus for the governance of legal relationships to require nothing beyond attention to the provisions of the code. In the case of Germany, where the belief that written law could ever achieve the ideals of completeness, clarity and coherence did not take hold, the ideal of a legal science emerged, which saw the body of German law in historical context as data from which expert lawyers and legal scholars could extract the principles of law.⁶

In both cases, the style of legal reasoning is heavily focused on abstract concepts and the effort to provide conceptual coherence in order to discover from strictly legal sources—the language of codes but also the extracted principles identified by judges and scholars—the content of law and hence the basis for resolving legal disputes. As Merryman (1985) has observed with respect to German legal science, "This high level of abstraction—this tendency to make the facts recede—is one of the most striking characteristics of legal science to a lawyer from the United States or England...The legal scientist is more interested in developing and elaborating a theoretical scientific structure than he is in solving concrete problems." Common law courts, while clearly interested in reconciling principles and extracting concepts from statutory provisions and caselaw to achieve coherence within legal doctrine, are apparently much more animated by the goals and effects of particular legal decisions. For common law courts, what counts as a relevant legal consideration is apparently much broader, encompassing not only strictly legal concepts and principles, but also facts and theories about the way the world works. Again, as Merryman (1985) puts the point:

The basic difference is epitomized in [a] quotation from the German legal scientist Rudolph Sohm: "A rule of law may be worked out either by developing the consequences that it involves, or by developing the wider principles that it presupposes...The more important of these two methods of procedure is the second, i.e., the method by which, from given rules of law, we ascertain the major

Convention on the International Sale of Goods. Here we were all discussing a code, so there was no question of judge-made versus code-made law. But the discussion revealed that we were approaching the task of interpreting and applying the code in entirely different terms. By and large the European scholars were very adept at citing textual provisions from this and a full range of other statutes, appealing to the conceptual overlaps and tensions in trying to resolve, for example, the proper treatment of what Americans call 'the battle of the forms' under the CISG. And by and large the American scholars were very adept at discussing the details of when and how the battle of the forms arises (appealing to factors such as the organizational structures within firms and agency issues) and the implications for commercial practice and efficiency of different 'tests' that one might concoct. And by and large scholars in each group appeared to think the others were not very good legal scholars, or at least to think that what the others were discussing was off-point and irrelevant. It was the divergence in the framing of what the resolution of a legal dilemma requires that was so striking.

⁶Merryman (1985) p. 31-32, 61-67.

premises they presuppose." . . . An American legal realist would resist the implication that rules of law should be the principal objects of his study or the suggestion that there are only these two ways of studying them. But if pushed to Sohm's choice, most law professors, judges, and lawyers in the United States would easily and quickly choose the first of his two methods. Most civil lawyers would still choose the second." (p. 67)

Elsewhere Merryman (1985) states simply: "The civil law has [] sacrificed flexibility for certainty. In contrast, the common law tends to strike the balance between them more equally." Merryman attributes this difference (at least in part) to the history of equitable courts in the common law system, where judges are specifically empowered to focus on the consequences of their decisions and to "mold the result in the case to the requirements of the facts, bend the rule where necessary to achieve substantial justice, and interpret and reinterpret in order to make the law respond to social change. These powers are not seen as threats to certainty in law; indeed certainty is to be achieved through the doctrine of *stare decisis*, itself a judicial doctrine. The difficulties of rationalizing the demand for certainty and the justice of the individual case thus become problems for solution by the judges themselves." (p. 51)

In this paper, I begin work on the construction of a model of the differences between common law and civil code regimes that seeks to attribute differential outcomes not to inherent differences in practices (sometimes referred to as differences in legal ideology, tradition or culture⁷) but rather to explain those different practices as endogenous and evolving features of the particular institutional attributes that vary as between these regimes. In particular, I emphasize the differential rates at which legal human capital about the consequences of law accumulates in these two types of regimes, as a consequence of differences in the institutional incentives facing judges to adopt innovations in legal rules on the one hand and lawyers (on behalf of clients) to develop innovative legal rules and present the evidence necessary to apply new rules on the other.

Legal human capital is the input that determines the errors made by courts when choosing or interpreting and applying legal rules. The basic insight is three-fold. First, legal human capital accumulates in courts as a result of the investments in evidence and innovative legal argument (proffering innovative interpretations of statutes or precedents) made by or at least suggested by lawyers on behalf of clients. Second, the incentive of lawyers to make such investments is a function of the likelihood that judges will both entertain innovative legal rules and apply them to the benefit of these lawyers' clients. Third, the incentive of judges to entertain innovative legal rules is determined by the institutional environment, specifically

⁷Merryman, for example, after debunking the idea that what distinguishes civil code jurisdictions from common law jurisdictions is the reliance on codes or statutes, offers this: "If, however, one thinks of codification not as a form but as the expression of an ideology, and if one tries to understand that ideology and why it achieves expression in code form, then one can see how it makes sense to talk about codes in comparative law. It is true that California has a number of what are called codes, as do some other states in the United States, and that the Uniform Commercial Code has been adopted in most American jurisdictions. However, although these look like the codes in civil law countries, the underlying ideology—the conception of what a code is and of the functions it should perform in the legal process—is not the same. There is an entirely different ideology of codification at work in the civil law world." (p. 26-27.)

the systems generating private rewards for judges such as prestige and promotion, and judicial beliefs about the likelihood of error in the choice and application of innovative legal rules. Legal error, however, is a function of the accumulated level of legal human capital. I show that in equilibrium, judges may choose not to entertain innovative legal arguments either because of institutional incentives that over-emphasize the importance of judicial rule-following, or because of a low level of legal human capital resulting in a high rate of legal error. I show that it is possible for a regime to be 'stuck' in a low legal human capital state as a result either of weak initial incentives or low legal human capital: in such an environment, lawyers may lack the incentives to invest in innovative legal argument and evidentiary presentations and so legal human capital, which would otherwise reduce the rate of error and make legal innovation optimal, may not accumulate in the regime. From a policy perspective, this directs attention to two features of the legal environment: the institutional structure of the incentives facing judges and the level of legal human capital. The implication of the equilibrium analysis I offer here is that judicial incentives to adapt the law and adequate initial levels of legal human capital are both necessary for the adaptation of legal rules to changing environments.

This work draws an important connection between what Glaeser et al (2004) identify as the two competing accounts of the relationship between institutions, such as a legal regime, and economic growth. Those accounts are first, the view that strong institutions, particularly legal institutions that accord independence to judges and impose legal (constitutional) constraints on the executive, promote economic growth and second, that both economic growth and strong institutions are fueled by human and social capital. Glaeser et al (2004), reviewing the empirical literature, conclude that there is little support for the first view, and that the evidence that is available is suggestive of the more fundamental role of human and social capital. The model in this paper suggests a particular mechanism by which human capital, specifically legal human capital, promotes a more efficient legal regime, specifically one that is better able to respond to local and changing conditions with innovative legal rules that are more accurately implemented.

The paper is organized as follows. Section 2 reviews what we know about the institutional differences between common law and civil code regimes. In Section 3 I discuss legal evolution and adaptation as a key mechanism by which legal regimes influence economic growth, and discusses the impact of legal (judicial) error on the effectiveness of a legal regime. Section 4 then lays out a simple model of legal adaptation, and Section 5 analyzes the role of institutional attributes that determine the equilibrium incentives of judges and litigants and the accumulation of legal human capital in a regime without corruption. Section 6 discusses this analysis and its relationship to the institutional attributes of and the tradeoffs between common law and civil code regimes, noting in particular the shifts in these tradeoffs over time as economic growth is accompanied by increased heterogeneity and increasingly rapid rates of change.

2. INSTITUTIONAL DIFFERENCES BETWEEN COMMON LAW AND CIVIL CODE

REGIMES

As many scholars have now recognized, the differences between common law and civil code regimes are many. It is conventional to summarize these differences as the difference between judge-made law based on precedent on the one hand and legislation on the other. The cross-country comparison of legal regimes, however, brings into play many factors beyond the fairly abstract distinction between judge-made and statutory law. Moreover, as I indicated above, the relative roles of judges and legislators in making law is neither as sharp as is sometimes assumed, nor is it a feature of the institutional environment per se as opposed to the practice of judges and lawyers within an institutional environment.

Common law legal regimes—those rooted in the English legal system—are characterized by a host of institutional characteristics that distinguish them from the institutional constellations associated with "civil code" regimes rooted in the French, German and Scandinavian traditions. Because of the conventional focus on the source of law as the key distinction between these two regimes, the catalogue of institutional differences available to us is slim; one of the purposes of the analysis in this paper is to prompt more careful empirical attention to the details of legal institutions in different regimes. The following summarizes key institutional differences that can be drawn from our existing descriptive sources. I report here generalities which should be understood as stylized facts about the common law and civil code regimes.

2.1. *Jurisdiction: Specialized Courts.* The court system in both civil code and common law regimes allocates jurisdiction over different types of cases to different courts. Common law countries, for example, in addition to general jurisdiction courts may have small claims courts, traffic courts, family courts, juvenile courts, commercial courts, tax courts, bankruptcy courts, patent courts, international trade courts, military courts and so on. In addition, in the U.S., there is a division into state and federal courts. Civil code court systems typically have separate courts for ordinary private law matters (contract, tort), commercial law, employment law, social security matters, administrative law and constitutional law. The key distinction between these systems is the pattern of appeal. In common law countries, specialized courts feed into general jurisdiction courts, with ultimate appeal located in a single supreme court. In the U.S. the only separation is on state and federal lines. In civil code countries, however, the lower specialized courts feed into higher specialized courts, with a separate supreme court for that area. In France, the division at the highest level is between three areas: public law matters (administrative jurisdiction, actions between citizen and the State), private law matters (ordinary jurisdiction, actions between citizens) and constitutional matters. At the highest court for ordinary jurisdiction, the Cour de Cassation, specialization is maintained with separate chambers that hear appeals in different areas. (In some cases, an appeal may be heard by judges drawn from multiple chambers.) In Germany, the divisions are more extensive, with separate supreme courts for constitutional, administrative, tax, labor, social insurance and private matters (including criminal law).

2.2. *Judicial Careers: Training, Experience, Selection and Evaluation.* In civil code regimes judges are typically career civil-servants. Judges typically have little experience outside of the judiciary. They enter the judiciary directly

from law school with a first undergraduate degree in law, undertake specific judicial training offered by the state, and progress through the system from junior positions in low-level courts through to more senior positions. The initial selection of judges is based on performance on judicial exams. Promotion within the system can mean moving to a higher level court within an area or to the head or presidency of a particular court, or being transferred to a more important or desirable location or type of court. Promotion is generally described as being on the basis of performance reviews, in the civil service tradition, and seniority. Performance reviews are conducted in general by senior judges. The panel that reviews performance of sitting judges in the courts of ordinary jurisdiction in France, for example, is composed of (in addition to the President and Justice Minister) five senior judges elected from the private law courts, a public prosecutor, and four members appointed by the President, Senate, National Assembly and State General Assembly who cannot be private law judges but one of whom must be from the *Conseil d'Etat*, the supreme court on the administrative side and the others of whom appear to be largely drawn from other parts of the legal profession. Since 1994, for example, of the three remaining appointments, one was president of the Cour des Comptes, a court which oversees the administration of public funds, and one was a law professor.⁸ The panel recommends to the President appointments to the 350 senior judgeships in the ordinary courts, and has binding authority to determine all other judicial appointments. The panel is also a disciplinary body, taking disciplinary action against judges, including removal from office. Similarly, in Germany promotion of judges at all but the highest levels within the system is on the basis of evaluation and review by senior judges.⁹ In civil code countries, this peer review of judges is understood as a requirement of judicial independence: judges are evaluated by and as judges, and not by and as policymakers or politicians. The understanding of law as legal science (Germany) or the guardianship of a complete, coherent and clear body of code (France) makes sense of the institution: judges can be trained, selected and promoted on the basis of objective criteria evaluated by those who are specialists in law.

The career of a judge in a common law regime is governed by a very different set of institutions. Entry into the judiciary comes after completion of a first undergraduate degree in a subject other than law, a graduate degree in law, admission to the bar and a fairly lengthy period of practice as an attorney (10 years, for example, in New York and Ontario.) Attorney In many common law countries, appointment to the bench is significantly affected by politics. Judges are either appointed by elected officials (the -General in Canada, the President, governors and legislatures

⁸See <http://www.conseil-superieur-magistrature.fr/presentation/english/members.htm>

⁹See Langbein (1985): "The work of a German judge is overseen and evaluated by his peers throughout his career, initially in connection with his tenure review, and thereafter for promotion through the several levels of judicial office and salary grades. A judge knows that his every step will be grist for the regular periodic reviews that will fill his life-long personnel file. His "efficiency rating" is based in part upon objective factors, such as caseload discharge rates and reversal rates, and in part on subjective peer evaluation. The presiding judge of a chamber has special responsibility for evaluating the work of the younger judges who serve with him, but the young judges are rotated through various chambers in the course of their careers, and this reduces the influence of an aberrant rating from any one presiding judge. These evaluations by senior judges pay particular regard to (1) a judge's effectiveness in conducting legal proceedings, including fact-gathering, and his treatment of witnesses and litigants; and (2) the quality of his opinions—his success in mastering and applying the law to his cases." Langbein at 850.

in the U.S.) or elected by popular vote based on political party nomination; in some U.S. states, judges who are appointed initially by governors or legislators are subject to retention elections by popular vote. (In the U.K. recent reforms have led to the creation of an independent Judicial Commission that selects candidates from applicants; selection among candidates is made by the Lord Chancellor—now also Secretary of State for Constitutional Affairs—who holds elected office.) Whereas senior judges appear to play the primary role in evaluating the merit of judges in civil code regimes, evaluation of potential candidate for judicial office in common law countries is substantially affected by the judgments made by practicing lawyers and members of the public.¹⁰ Unlike in the civil code regimes, promotion is far less routine within the common law systems; many judges will remain at the court and in the position they were appointed to for the duration of their judicial careers. Promotion when it does happen proceeds through the same process as initial selection. There is no formal role for peer review by senior judges within a particular court system.

2.3. *Availability of Information about Cases and Judges.* One of the critical attributes of the institutional setting for a legal regime, I will argue, is the nature and extent of information sharing. I will focus on two particular types of information: information about cases and decisions, available to others in the legal profession; and information about the performance of individual judges. Civil and common law regimes differ substantially with respect to the sharing of information of both types.

As a starting point, it is important to remember that most courts prepare written statements of their decisions, which are held in the case file. The question concerns when, how and to whom the contents of those decisions are distributed beyond the parties (or their lawyer) and at what cost. As a generalization, the written accounts of case decisions are more widely, probably much more widely, available and at lower cost in common law countries than in civil code countries. In common law countries such as the U.S. and Canada, electronic access to the decisions of both trial and appellate courts in the state and federal systems is available both to the legal profession and to the public at large. Even decisions that are not “published” in the U.S. in the sense of being citable as precedent are generally available in electronic databases. In civil law countries, on the other hand, there is much more restricted publication, with an emphasis on important cases from higher courts. Electronic access is much more limited, making court decisions less available to the legal profession and the public at large.

Even if court decisions are published, however, the amount and type of information conveyed by the published decision varies as between common law and civil code regimes. As a generalization it appears to be the case that common law case decisions are substantially more detailed in their narration of the facts and substantially more expansive about the reasons for a decision than civil code decisions. This is particularly striking when one compares, for example, French and American court decisions. French decisions are very brief, written in the style of an extended multi-clause sentence, and conclusory in the sense that they state simply that a

¹⁰Utah state judges, for example, are periodically evaluated by the judicial council based on surveys of lawyers and jurors. In Ontario, the judicial nominating committee that determines the list from which judges are selected by the Attorney General consists of 7 lay members and 6 members of the legal profession, including lawyers and judges.

particular legal conclusion is or is not reached. As some scholars have observed, "French decisions are not considered to be very enlightening as to the true bases of a court's decision or of the difficulties encountered in arriving at it."¹¹ German court decisions are lengthier, provide greater factual detail and more discussion of reasons but still appear to be systematically shorter and less detailed than American cases. As I will discuss further below, systematic empirical study of variations among countries would give us a much better sense of how this important attribute varies between "common law" and "civil code" regimes. Those in the common law world, for example, are well aware that modern American cases are generally far more dense in facts and reasoning than modern Canadian and British cases or older American cases. Similar variation is evident, if not documented, among civil code regimes.

The publication of cases in different regimes also reveals different degrees of information about particular judges. In the common law world, the identity of the judge or judges who decide a case is uniformly included in the decision of the court. American court opinions are almost always signed by an authoring judge. At the trial level, the fact that there is a single trial judge who is identified means, of course, that all decisions are signed. At the appellate level with multi-judge panels, identification of the authoring judge is the rule, with an indication of which judges joined in the opinion; concurring or dissenting opinions are not uncommon and indeed routine at the Supreme Court level. An opinion from a British or Canadian court also identifies the author at the trial level by virtue of the fact that there is a single trial judge; cases at the appellate level increasingly identify the author of a particular opinion and carry concurring or dissenting opinions. Even where an appellate decision is unanimous (as is the older tradition in British and Canadian courts), however, the identity of the judges on the panel is known. In contrast, civil code decisions in France and Germany do not identify the author of a decision. Dissenting or concurring opinions are rare if not unheard of. There is therefore much less visibility for individual judges in civil code regimes compared to common law regimes.

2.4. *Judicial Fact-Finding and Evidentiary Rules.* It is conventional to identify common law courts as following an adversarial process, in which lawyers are active and judges are passive in shaping issues and collecting evidence, and civil code courts as following an inquisitorial process, in which judges are responsible for shaping issues and collecting evidence. The distinction is generally overdrawn: judges in common law jurisdictions are increasingly active in pre-trial stages in managing the identification of issues and the collection of evidence through discovery; lawyers in civil code jurisdictions are able to propose issues and sources of evidence. But even accounting for the overstatement of the differences, it is true that lawyers play a much greater role in shaping issues and collecting evidence in common law courts than in civil code courts and that the differences are to some extent located in institutional differences. Judges in civil code regimes are authorized to seek out evidence on their own account, contacting authorities for copies of documents, for example, or appointing experts; common law judges must look only to evidence

¹¹Mary Ann Glendon, Michael Wallace Gordon, Paolo G. Carozza *Comparative Legal Traditions in a Nutshell* (1999) at 2.

that is presented by the parties.¹² Moreover, there is no general practice of discovery in civil code regimes, in the sense of the document and deposition demands made and carried out by the parties themselves, subject only to supervision by the court for abuse when parties resist such demands and seek judicial protection. In civil code regimes, by way of contrast, evidence is sought by an individual party by making a request that the court obtain particular documents or testimony.

The collection of evidence in civil code courts is also affected by the use in many cases of a different judge, the examining judge, for purposes of collecting evidence. This judge then prepares a summary of the evidence (which is generally not otherwise recorded), which is forwarded to the judges (ordinarily more than one) who will decide the case. In common law trial courts, in contrast, evidence is heard in the first instance by the same judge (usually one) who will decide the case. The evidence is not reduced to a judicially-determined record but rather is retained in its original received form through transcripts, exhibits, etc.

Although the governing principle in all legal regimes is relevance, civil code regimes are governed by a set of evidentiary standards that differ from those in common law regimes. Civil code courts, for example, allow evidence that in common law courts would be excluded on the grounds of hearsay or privilege. On the other hand, civil code courts generally will not hear testimony from the parties themselves or others interested in the outcome, whereas common law courts routinely hear such testimony.

The collection of evidence in civil code regimes is also significantly affected by the sequenced nature in which a case is heard and resolved. In common law regimes, although there are pre-trial motions governing the collection of evidence or the resolution of questions of law, evidence itself is heard during a single event—the trial—at the conclusion of which a final decision is rendered by judge or jury. In civil code regimes, by way of contrast, evidence is heard and decisions made in a series of short hearings, in piecemeal fashion, and often on the basis of documents alone; there is no ultimate ‘trial’ at which evidence is presented orally by the parties and a final decision rendered. Judicial control over fact-finding in the civil code regime is thus importantly exercised through judicial identification of disputed issues of fact and judicial determination of how and when disputed facts will be resolved.¹³

2.5. *Shaping Issues.* Although it is a generalization, American practitioners of transnational law have observed that judges in civil-law regimes also play a lead role in the articulation of legal concepts and the shaping of issues than is the case in the common law.¹⁴ The sequenced nature of the proceedings, which is under judicial control, suggests a mechanisms by which this can occur. Given a complaint that identifies a relevant set of facts and sets out a legal theory under which the plaintiff is entitled to a remedy, the civil code judge must determine the order in which legal and factual issues raised by the complaint will be resolved. As most litigators are aware, and the generous approach to the amendment of complaints

¹²Common law courts also have the capacity to appoint experts—a procedure that is frequently used, for example, in family law cases—but the parties are able to call their own experts as well. Moreover, the evidence from a court-appointed expert is subject to cross-examination by the parties. See, for example, California Evidence Code 730, 721.

¹³For a vigorous defense of the advantages of the German judge’s control over the development of evidence, see Langbein (1985).

¹⁴ALI Principles of Transnational Litigation.

in modern common law systems recognizes, facts and legal issues often only make their relevance plain as investigation and engagement with the arguments of the opposing side progress. Moreover, some facts and legal issues will only become relevant if other factual and legal issues are resolved one way rather than another: the existence of a contractual term affecting liability, for example, will alter the nature of a tort claim, for example. If the term is found to be unenforceable or interpreted not to apply to a particular case, the tort claim will be analyzed in one way; if the contract term is found to be enforceable and applicable in some way, the tort claim will be analyzed in another way. The judge's control over the sequencing of issues—deciding whether a contract defense will be resolved early or late in the process, for example—will shape the substantive issues to be addressed in the case. By way of contrast, the parties' control over the presentation of evidence and argument in a common-law trial, addressing all theories that have survived pre-trial motions of law (not addressing, for example, a factual dispute about the interpretation of a contract provision purportedly affecting tort liability), implies that all issues will remain before the judge, together with all the evidence relevant to each one, up until the final decision in the case. Common-law evidence collection will generally therefore cover all issues the parties determine to be relevant, whereas in the civil code system evidence for some issues will never be collected because of an earlier factual determination that renders these later issues moot.

Legal issues, and hence evidentiary investigations, are also shaped differently in civil code as opposed to common law regimes because of the different rules governing appeal. In common law regimes, the trial court has primary control over the determination of evidentiary issues; appeals are largely limited to legal questions with only narrow review of factual determinations to identify gross errors; review of jury factual determinations is highly limited, allowing a reversal or remand on appeal only in the event there exists no evidence to support a jury's (often implicit) factual findings. If the higher court determines that the correct legal rules require additional fact-finding the case is sent back to the trial court to conduct further evidentiary proceedings. In civil codes systems, on the other hand, appellate courts are free to reexamine facts as well as legal issues. Moreover, if a case is remanded by the appellate court (as it must be, for example, in France if the highest court, the Cour de Cassation, finds legal error, as that court generally cannot enter a decision, it can only annul the first decision) it is sent to a different (set of) judge(s) than the one that entered the initial decision. The new trial court is not bound by the higher court's interpretation of the law (although this is clearly persuasive) and new factual investigations may continue.

2.6. *Judicial Independence.* Missing from this list of institutional differences is the idea of judicial independence, which has figured prominently in the literature comparing common law and civil code regimes. (Mahoney 2001, Klerman and Mahoney 2005) It is sometimes claimed that common law judges enjoy greater judicial independence, but this is far from clear as an empirical matter. Judges in both common law and civil code regimes are often protected against removal from office for purely political reasons through life or term tenure. Judges in both regimes are exposed to political consequences. Common law judges in many US states, for example, are elected or subject to recall, and in the federal system are beholden to politicians for appointment to higher office; civil code judges are subject (in some but not all cases) to promotion and transfer by the government, if not removal.

Those in common law regimes look at the civil service nature of judicial careers in civil code regimes and see in that the makings for a judiciary that is controlled by the executive, but the actual mechanisms for the selection, evaluation and promotion of judges, as discussed above, appear to be heavily influenced, particularly at the lower trial and appellate levels, not by political or administrative actors but rather by senior judges. Those in civil code regimes, on the other hand, look at the political appointment and even election of judges at all levels in common law systems and the absence of systematic peer review by members of the judiciary itself and see in that the makings for a judiciary that is beholden to politicians and the electorate rather than the law.

The concept of judicial independence in the comparative literature is also unclear. Independence from whom? In most writing, the concern is about the independence of the judiciary from the government. But it is unclear how relevant this type of independence is for ordinary litigation. Judges who are not beholden to the government will presumably be more effective at countering unauthorized expropriation by government (as Mahoney 2001 argues), but this is surely a small determinant of the risk of expropriation, in light of the capacity of government to authorize expropriation through legislation. Constitutional protections against such legislation are characteristic not of common law regimes in general, but rather of specific constitutional regimes; even in the United States, with a strong constitutional provision, the protection is limited to outright takings and very limited in protecting property against diminution of value through regulation or legislative modification of remedies for breach of government contracts. Most importantly, the vibrancy of a market economy is far more dependent on the reliability of the enforcement of contract and property rights as between citizens than it is on the enforcement of contracts as between citizens and the state. For those cases, judicial independence from corrupting private influences would seem to be far more important. Indeed, the greater risk of government control over judges would seem to be from the expansion of the routes by which corruption from private sources can make its way into the system, rather than the overt distortion of decisions in favor of strictly government interests.

In the analysis that follows, instead of using the concept of judicial independence, I focus instead on developing an explicit model of judicial incentives: what influences a judge's decision about how to decide a case. In this model, as I will explain, it becomes clear that the institutional attributes I discuss above—the nature of judicial selection and evaluation, the availability of information about particular judges, the judicial role in shaping evidence and issues—structure judicial incentives and, in turn, the equilibrium behavior of both judges and the parties appearing before them and thus the development of the law. Before I turn to that model, however, it is necessary to place this analysis in the context of the process by which legal rules are developed and adapted over time to local and changing conditions.

3. THE EVOLUTION OF LAW

Economic analysis of the common law has, since Posner (1973), attempted to locate the value of the common law in its ability to work out, over time, efficient legal rules. Often this literature has framed the analysis as an investigation of the different incentives influencing parties interacting with courts and legislatures and as a debate about whether judges or legislators are more susceptible to rent-seeking

(Posner 1977, Rubin 1982, Tullock 1997) or have adequate access to information on which to base legal development (Hadfield 1992). Framed in this way, the literature appears to address the comparative economic efficiency of common law and civil code regimes. But this extension of the results from the "courts versus legislatures" setting to the "common law versus civil code" setting relies on an overly simplistic view of the differences between common law and code regimes. As I have emphasized, common law and civil code regimes do not differ substantially in the sources of law in practice. But they do differ substantially in the institutional context in which judges and lawyers operate and the way in which judges and lawyers behave in practice. And, I will argue, it is the different institutional environments in which civil code and common law judges and lawyers operate that may explain differences in the economic value of legal rules in these regimes.

The more important contribution of the literature on the evolution of the common law for the comparative project, in my view, is its emphasis on the dynamic nature of law and the process by which a legal regime discovers and adopts rules that promote economic welfare. Models of the evolution of the common law, whether they are based on litigant incentives to challenge inefficient rules (Rubin 1977, Priest 1977, Goodman 1978, Cooter, Kornhauser and Lane 1979) or the explicit process of judicial optimization of rules (Hadfield 1992), recognize that courts do not start out with the right rules; they move towards them based on the information learned directly or indirectly from litigants who bring cases to them. This essential dynamic quality to law is especially important for the comparison of the capacity for common law and civil code regimes to generate economic growth. As Pistor, Berkowitz and Richard (2003) and Botero et al (2003) have emphasized in the context of evaluating the empirical evidence of the growth generated by transplanted legal regimes, the value of a legal regime depends on its ability to adapt to local conditions. Intuitively also, in a changing environment, law must adapt to changing conditions in order to continue to promote economic value in the organization of activities and trade. Both considerations are of special importance in the comparative analysis of civil and common law regimes today, given that the policy motivation of much of this analysis is to recommend legal systems to countries that are transitioning to market democracy. It is essential, therefore, to understand the capacity of different institutional environments to support the dynamic evolution of a legal regime, and to direct its development to optimal adaptation to local and changing circumstances.

An issue that receives little attention in the evolution of the common law literature, however, has a significant impact on the capacity of law to adapt optimally to local and changing circumstances. That is the risk of legal error. Legal rules are not necessarily applied accurately or modified appropriately. Courts can make errors for many reasons. Judges may misunderstand the facts, as a result of cognitive shortcomings or ideological bias or deliberate efforts by litigants to mislead them. The appropriate facts may be not made available to them. They may make mistakes in understanding the relationships between facts, rules and outcomes. And they may be corrupted: by offers of bribes or by professional ambition or by desires to promote personal policy goals. The cost of errors, moreover, is not merely the failure to achieve a given result in a given case; errors can also make law more unpredictable and hence more costly and less effective. Rule adaptation thus will not necessarily be optimal in a regime in which judges make errors; that will

depend on the nature and likelihood of errors and the relative value of an existing rule and a modified rule.

In the section that follows, I construct a model that allows us to examine some of the tradeoffs between the adaptation of law and the following of rules, in light of the risk of judicial errors, and then assess how judges and lawyers, and as a result the law itself, will respond to those tradeoffs over time in the different institutional environments that, I argue, characterize civil code and common law legal regimes. As I will show, the essential attribute of these different environments is the different equilibrium incentives they generate for investments in legal argument and evidence and the resulting accumulation of legal human capital. Legal human capital, I argue, is critical to the determination of legal error and thus the tradeoff between rule-following and rule-adaptation. In order to focus on the role of legal human capital, an unexplored factor in the comparative evolution of law under common law and civil code regimes, I assume that all errors are due to legal human capital and not to deliberately corrupt decisionmaking. I discuss corruption further after I have developed the results in the basic model.

4. MODEL

Consider a multi-period world in which there is a population of judges, plaintiffs and defendants. A defendant's type is described by the pair (x, y) . x is observable to plaintiffs, defendants and judges at zero cost; y is observable only to defendants. Defendants with a value of $x \geq x^*$ are distributed on $[0, \bar{y}]$ according to the cumulative distribution function $F(y)$ with associated density function $f(y)$.¹⁵ Defendants¹⁶ can present evidence of, and legal argument about the relevance of, their type y to the court at a cost $k > 0$; on the basis of this evidence, a court reaches a determination of what it believes to be the value of y . Let this judicially observed value of y be \hat{y} . \hat{y} is related to y as follows:

$$\hat{y} = y + \theta$$

where θ is a random variable independently and uniformly distributed in each period on $[-\bar{\theta}_t, \bar{\theta}_t]$, $\bar{\theta}_t > 0$. Note that under this specification the observed value \hat{y} may be higher or lower than the true value of y and that the errors made by courts are unbiased.

I assume that past investments by defendants in the production of evidence and legal argument, represented by the per defendant expenditure k , accumulate as legal human capital, K , available to all judges for the purposes of their interpretation of evidence and the application of legal rules. Note that this is an assumption about

¹⁵The assumption that y is a random variable, and not a choice variable, may be an important restriction. We are interested in how law evolves over time and as discussed in Hadfield (1992), the long-run impact of legal rules on activity levels will generally be to bias the production of information necessary to the evolution of efficient legal rules. In the interests of simplicity and to focus on the comparative generation of legal human capital in code and common law systems, I abstract from this effect here. As a matter of interpretation, we can think of x as the defendants' choice variable and y as an immutable characteristic or exogenous parameter, such as the cost of technology or consumer preferences.

¹⁶The assumption here is that even in civil code regimes, defendants can present evidence and argument to the court. The effectiveness and cost of this presentation may, however, differ as between the two regimes. I will discuss these differences in Section V.

shared or social human capital. Let D_t be the set of defendants who invested in presenting evidence and argument to a court at cost k in period t . Then

$$K_t = K_{t-1} + \int_{D_{t-1}} kf(y)dy$$

The distribution of the error θ is influenced by the shared legal human capital, K_t , accumulated by the judiciary and legal profession as of a given period t . In particular I assume that

$$\bar{\theta}_t = \bar{\theta}(K_t)$$

Note that this specification assumes that the distribution of error is not affected by the investments in evidence and argument, k , in a given case. This should not be interpreted to mean that current investments by a particular defendant have no impact; rather, it should be interpreted to mean that in order to achieve the distribution determined by the legal human capital accumulated by the judge, a defendant has to invest the amount k .

Let R_t be the rule used by the court in period t to decide cases. Assume there is an existing legal rule, $R^x : x \rightarrow M$, where $M > 0$ represents an amount of damages paid by a defendant found liable under the rule. In particular,

$$R^x(x) = \begin{cases} M & \text{if } x \geq x^* \\ 0 & \text{otherwise} \end{cases}$$

The existing rule, therefore, does not take into account the value of y in determining liability for damages. y is nonetheless a factor in determining the social welfare achieved by a legal decision. In particular, I assume that social welfare, net of the cost of presenting evidence k , is maximized in a given period when only a subset of those defendants held liable under R^x are held liable, specifically, those for whom $y \geq y^*$. Let $R^y : (x, \hat{y}) \rightarrow M$ where

$$R^y(x, \hat{y}) = \begin{cases} M & \text{if } x \geq x^* \text{ and either } \hat{y} \geq y^* \text{ or no evidence of } y \text{ presented} \\ 0 & \text{otherwise} \end{cases}$$

By definition, if $\hat{y} = y$ and $k = 0$, social welfare is higher in a given period under R^y than under R^x . Note that the model collapses all judicial error into observational error: courts are assumed to know the optimal value of $y^* \in [0, \bar{y}]$ to maximize social welfare but to face uncertainty in applying the rule accurately. This is without loss of generality; the model can be rewritten to represent error in the determination of the optimal value y^* without changing the results. Finally, note that I assume that all judges are the same in their propensity for error in a given case.

For simplicity, I assume that plaintiffs sue all defendants, under either rule, for whom $x \geq x^*$ and that all cases proceed to trial and decision by a judge.¹⁷ The focus of the analysis is then on what happens during litigation. The sequence of

¹⁷Note that it will be important in future work to relax this assumption and determine the impact of settlement on the body of information reaching the court. Cf. Hylton (2005) which argues that settlement implies that defendants proceeding to court will be good types who, if observed accurately, would not be held liable. The issues to explore include a) whether litigant investments in human capital become judicial human capital even without litigation and b) how bias in the information set due to settlement affects the accumulation of legal human capital. It may also be important to examine the effect of sub-optimal rules along the evolutionary path on activity levels for defendants (y), which I assume here are immutable. Hadfield (1992) explores the bias that arises in evolution as a result of this effect.

the decisions is as follows. In stage 1, the court decides and announces whether it will follow R^x or R^y . I assume that in announcing R^y the court indicates that it is willing to hear evidence and argument about the relevance of y and to take y into account in its decision if evidence and legal argument about y are presented; otherwise it will apply R^x . In stage 2, defendants decide whether to invest k or not in producing evidence and legal argument about y . In stage 3, the court hears the evidence, observing x with accuracy in all cases and \hat{y} (y with error) in those cases in which defendants choose to present evidence of y , and the court reaches a decision under its previously announced rule.

Working backwards, we begin with stage 3. Here, a court's decisionmaking is deterministic, based on the previously announced rule and the evidence and legal argument present. The court therefore holds all defendants liable for damages M if R^x was announced. If R^y was announced, the court holds those defendants liable for damages M for whom evidence about y was presented and for whom $\hat{y} \geq y^*$. Under an announced R^y regime, the court also holds liable those defendants liable who do not present evidence of y . That is, the court applies R^x , judging liability solely on the basis of evidence about x in the absence of evidence about y .

Note that the court's decisionmaking in stage 3 is deliberately modeled as rule-based decisionmaking: R^y is applied to the court's observed value of y even though the court may be aware of the error in its observation of y . This is, I believe, descriptive of what it means to decide on the basis of a rule, in light of the facts as found, in legal settings. Courts make determinations that facts are or are not established, often overtly with a recognition of error: courts make factual findings in Anglo-American civil litigation, for example, on the basis of a preponderance of the evidence. They do not adjust the application of the rule for the degree of uncertainty in those factual findings. As an example, suppose a legal rule dictates that a company should be held liable for fraud in the making of a contract only if management was aware that its representations during contract negotiations were false. Suppose that there is testimony from two officers of the company, the first of whom testifies that management was aware the representations were false and the second of whom testifies that management believed the representations were true. In deciding such a case, the court must make a factual determination that management either did or did not know that the representations were false. If the court determines that it is more likely than not that the first officer is telling the truth—recognizing that there is some possibility that he or she is lying—then it will apply the rule to the information it "observes," namely that the first officer is telling the truth, and hold the company liable for fraud, paying the damages then proved by the plaintiff. The rule-bound (some would say principled) court cannot, as an unconstrained decisionmaker can and generally optimally will, adjust its decision on liability and/or damages to take into account uncertainty about the factual state of the world.

Defendants' decisions about investing k to produce evidence and legal argument about y are made in stage 2. Trivially—but ultimately with great significance—if the court has announced R^x in stage 1, no defendants invest k . Now consider defendants' decisionmaking when the court has announced that it will apply R^y . Defendants facing R^y will want to invest k if doing so creates a sufficient likelihood that this induces an observed level of y that shifts the court's decision from one of liability to no liability, that is, if it induces $\hat{y} < y^*$. "Good" defendants thus are

those who prefer for courts to have accurate observations about the true value of y . "Bad" defendants are those who prefer for courts to make observational errors and for whom the benefit of presenting evidence of y is the possibility the court will be induced to make a type 2 error. I assume that there are some defendants that can be identified without doubt as bad defendants by courts at the initial level of judicial uncertainty: $y^* + \bar{\theta}_1 < \bar{y}$.

Let L_t be the loss incurred by the defendant as a result of litigation. For both types of defendants the problem is:

$$(4.1) \quad \underset{k}{\text{Min}} EL_t = \begin{cases} \Pr(\hat{y} \geq y^* | y, K_t)M + k & \text{if } k \text{ invested} \\ M & \text{if } k \text{ not invested} \end{cases}$$

Solving this problem, we can derive the following lemma:

Lemma 4.1. *If a court has announced R^y , a defendant of type y will choose to invest k and present evidence and argument about its type if $k \leq M$ and the following condition is met:*

$$y \leq y^* + \bar{\theta} \left(1 - \frac{2k}{M}\right)$$

Proof. Rearranging the defendant's investment problem, the defendant will invest if $\frac{k}{M} \leq (1 - \Pr(\hat{y} \geq y^* | y, K_t))$. $\Pr(\hat{y} \geq y^* | y, K_t) = \Pr(\theta \geq y^* - y | y, K_t) \geq 0$, yielding the limit that for any investment to occur it must be that $k \leq M$. $\Pr(\theta \geq y^* - y | y, K_t) = 0$ if $(y^* - y) > \bar{\theta}$. $\Pr(\theta \geq y^* - y | y, K_t) = 1$ if $(y^* - y) < -\bar{\theta}$. For $-\bar{\theta} \leq (y^* - y) \leq \bar{\theta}$, $\Pr(\theta \geq y^* - y | y, K_t) = \frac{y^* - y}{2\bar{\theta}} + \frac{1}{2}$. Combining these cases yields the condition shown. \square

Lemma 4.1 gives us the following propositions:

Proposition 1. *If bad defendants invest in presenting evidence about y , then all good defendants must also invest. If $k > \frac{M}{2}$ only good defendants invest in presenting evidence about y . If $k < \frac{M}{2}$ all good and some bad defendants invest. Total investment in evidence production is higher for lower costs of producing evidence relative to damages.*

Proposition 2. *Total investment in evidence production decreases with the degree of uncertainty ($\bar{\theta}$) when the costs of producing evidence are relatively high ($k > \frac{M}{2}$) and only good defendants invest. Total investment in evidence production increases with the degree of uncertainty ($\bar{\theta}$) when the costs of producing evidence are relatively low ($k < \frac{M}{2}$) and all good and some bad defendants invest; increases in total investment come exclusively from additional investment by bad defendants.*

Proposition 1 tells us about the determinants of the rate at which legal human capital K will accumulate in different environments, assuming judges are receptive to receiving evidence and argument about y . As we would expect, lower costs of producing evidence and argument about y encourage investment. Proposition 1 also tells us, however, about the composition of the accumulated legal human capital: if the costs of producing evidence are sufficiently low, legal human capital comes from both good and bad defendants. This will have implications for our analysis of whether increased legal human capital increases or decreases the incidence of judicial errors, which I discuss below. Proposition 2 further tells us

that increased uncertainty in low cost environments encourages increased investment by bad defendants because bad defendants exploit the potential for type 2 errors, whereas increased uncertainty in high cost environments shrinks total investments as good defendants are discouraged by the risk of type 1 errors. This will have implications for the dynamics of a legal system and its potential to adopt and implement value-creating rule adaptations over time.

We can now turn to stage 1 and judges' incentives with respect to the adoption of rules. Note that the choice between R^x and R^y models the evolution of law in terms of the elaboration of the complexity of legal rules, and their optimal adaptation to what we could think of as new or changing information. Our model of judges needs to capture the incentives for judges to make such changes. We have few satisfactory economic models of what motivates judges.¹⁸ Models that look exclusively to the effort costs of judging are at odds with the occupation of judging: judges are expected to expend effort to decide cases and to do so with care. Models that specify financial incentives run into difficulty because of the difficulty of describing the relationship between particular decisions and income, particularly for judges with life-tenure or other protections to achieve independence. Models that assume judges act exclusively to satisfy their preferences over policy seem not to capture the basic norms of judging—which are norms because they are widely shared and implemented—which require judges not to pursue a private policy agenda and to follow rules instead. I avoid these specific problems by focusing on the particular aspect of judging in which I am interested—the decision whether to follow an existing rule or to adopt an elaborated rule that will increase social welfare—and by constructing a model of judicial incentives that is sufficiently broad to allow for a wide mixture of incentives and motivations. Indeed, part of my goal in constructing this model is to explore how judicial "incentives" with respect to rule-following are a function of a number of parameters, and importantly related to the risk of judicial error.

Assume there is a continuum of judges indexed by j . In order to develop intuition, I first present a fairly elaborate description of judges. I assume judges enjoy private benefits—be they promotion, prestige, income, personal satisfaction, bribes—that are a combination of the extent to which judges adhere to existing rules and the extent to which judges depart from rules to create social benefits (which may also impose social costs, possibly in excess of the benefits). Suppose in particular that a judge of type j is described by a parameter set $\{\gamma_j, \alpha_j, \delta_{1j}, \delta_{2j}\}$. γ_j is the private return to following the existing R^x . α_j is the private return to adopting the new rule R^y and producing a result that avoids type 1 and type 2 errors. δ_{1j} (δ_{2j}) is the private return to adopting R^y and producing type 1 (2) errors, imposing per-period social losses of ω_1 (ω_2). This implies the following utility function for judges, based on the rule ultimately applied (that is, if the judge announces R^y but no evidence of y is presented, R^x is applied and determines judicial utility):

$$(4.2) \quad \begin{aligned} U_{tj}(R^x) &= \gamma_{tj} \\ U_{tj}(R^y) &= \begin{cases} \alpha_j & \text{if no type 1 or type 2 error in period } t \\ \delta_1 & \text{if type 1 error in period } t \\ \delta_2 & \text{if type 2 error in period } t \end{cases} \end{aligned}$$

¹⁸For a discussion and citations to other sources, see Posner (1994).

I assume all parameters are non-negative (possibly zero) for all types. A value for δ_{1j} (δ_{2j}) less than α_j implies that a judge bears a cost when he or she adopts a rule imposing type 1 (type 2) losses on society; conversely, δ_{1j} (δ_{2j}) greater than α_j captures the idea that a judge benefits from a type 1 (type 2) loss. The latter could arise if, for example, a judge receives a private benefit (such as a bribe, a future business opportunity, prestige with a particular special interest, personal value or policy satisfaction) when adopting rule changes that promote the interests of some in society at the (greater) expense of others. I will develop the principal results of the paper under the more restrictive assumption that all judges have socially-aligned incentives with δ_{1j} and δ_{2j} less than α_j and return to the possibility of corrupt judges in section 5.1, below. Finally, in order to make the exposition simpler, I set $\delta_{1j} = \delta_{2j} = 0$ and normalize $\gamma_j = 1$. In this streamlined version, α_j can be interpreted as the judicial return to rule adaptation relative to rule-following and net of any penalties (or bonuses) assessed for type 1 or type 2 errors. I assume that α is a continuous variable distributed on $[0, \bar{\alpha}]$ according to cumulative distribution function $G(\alpha)$.

The realization of a judge's utility depends on the rule adopted by the judge and the accuracy with which the rule is applied, determined by the observational error. I assume judges do not know the type of defendant before them; if they allow the introduction of evidence and argument about y they observe \hat{y} and then apply R^y to that observed value. (I thus assume that judges cannot use the fact of the presentation of evidence as a signal of type.¹⁹) Let σ_{1t} be the judge's *ex ante* assessment of the probability that if he or she allows the presentation of evidence about y a good defendant will present such evidence (see Lemma 4.1) and the observed value \hat{y} will exceed y^* :

$$(4.3) \quad \begin{aligned} \sigma_{1t} &= \int_0^{\min(y^*, y^* + \bar{\theta}(1 - \frac{2k}{M}))} \Pr(\theta \geq *y^* - y) f(y) dy \\ &= \int_0^{\min(y^*, y^* + \bar{\theta}(1 - \frac{2k}{M}))} (\frac{1}{2} - \frac{y^* - y}{2\bar{\theta}}) f(y) dy \end{aligned}$$

Similarly, let σ_{2t} be the judge's *ex ante* assessment of the probability that if he or she allows the presentation of evidence about y a bad defendant will present such evidence and the observed value \hat{y} will not exceed y^* :

$$(4.4) \quad \begin{aligned} \sigma_{2t} &= \int_{y^*}^{\max(y^*, y^* + \bar{\theta}(1 - \frac{2k}{M}))} \Pr(\theta < *y^* - y) f(y) dy \\ &= \int_{y^*}^{\max(y^*, y^* + \bar{\theta}(1 - \frac{2k}{M}))} (\frac{1}{2} - \frac{y^* - y}{2\bar{\theta}}) f(y) dy \end{aligned}$$

Note that for $k > \frac{M}{2}$, the probability of a type 2 error is zero and that the probability of a type 1 error decreases as k increases relative to M . For $k < \frac{M}{2}$,

¹⁹This assumption is made to simplify the analysis. However, it can be understood in terms of the requirement that judges not merely decide cases, but that they decide on the basis of articulable reasons. Then, even if a judge could use the presentation of evidence as a signal, he or she would have to interpret the evidence and argument presented substantively and be able to explain his or her result in those terms. It is in the judge's competence to engage in this substantive analysis that the judicial error, θ , resides. There is an extensive literature on the reliability and interpretation of reports or signals from litigants. See, e.g., Milgrom and Roberts (1986), Dewatripont and Tirole (1999).

the probability of both types of error is increasing as the level of uncertainty, $\bar{\theta}$ increases. For $k > \frac{M}{2}$, the probability of a type 1 error in a given case is increasing in $\bar{\theta}$, while the likelihood that evidence is presented in a particular case is decreasing. I will assume $f(y)$ such that the net effect is that type 1 errors increase with $\bar{\theta}$ and that $f(y)$ is such that it is possible to set 4.3 or 4.4 equal to a given value and solve for the level of $\bar{\theta}$ that induces that error.²⁰

Last, I turn to the determinants of uncertainty, $\bar{\theta}$. I assume that there is an initial level of uncertainty, $\bar{\theta}_1$. Uncertainty in future periods, $\bar{\theta}_t$, is influenced by the accumulated legal human capital K_t . I will say that legal human capital is *informative* if $\frac{d\bar{\theta}_t}{dK_t} < 0$. I will say that legal human capital is *disinformative* if $\frac{d\bar{\theta}_t}{dK_t} > 0$. Legal human capital could be disinformative if the accumulated legal argument and evidence produced by bad defendants degrades the ability of courts to distinguish between good and bad defendants; this is the objective of the investments made by bad defendants who seek to induce type 2 errors in a given case. If being misled in a particular case accumulates over time in the legal system as a greater tendency to be misled overall, then legal human capital may be disinformative. On the other hand, it may be that any learning, even through cases in which individual courts confuse bad defendants with good, results in informative legal human capital. Learning only from good defendants, for example, may cause courts to overgeneralize and assume that all defendants are good. I do not make an assumption either way, but demonstrate the results for the model under these different, ultimately epistemological, conditions.²¹ To develop these results, I will sometimes decompose K_t into two components: legal human capital accumulated from investments by good defendants, K_t^G , and legal human capital accumulated from investments by bad defendants, K_t^B . I assume that all investments by good defendants are informative. Furthermore, I assume that the net effect of investments by good and bad defendants is determined by the ratio of good to bad defendants and in particular

$$\frac{d\bar{\theta}_t}{dK_t} < 0 \text{ if } K_t^G \geq K_t^B$$

and

$$\frac{d\bar{\theta}_t}{d\frac{K_t^G}{K_t^B}} < 0$$

The net effect on shared legal human capital is thus informative if there are more good defendants than bad presenting evidence and argument to courts. These assumptions allow us to derive a corollary from Propositions 1 and 2:

Corollary 1. *The accumulation of legal human capital always leads to reductions in uncertainty, $\bar{\theta}$, although if legal costs are low relative to damages ($k < \frac{M}{2}$) and*

²⁰Any uniform density function satisfies this assumption ($f(y) = C$) for example.

²¹I consider this an important and overlooked areas for research in law, namely the impact of evidentiary presentations on legal 'knowledge' over time. This may require more than epistemology. Robert Proctor has coined the term "agnotology" to describe the cultural production of ignorance, and explored this process in connection with tobacco research and litigation. Robert Proctor *Cancer Wars: How Politics Shapes What We Know and Don't Know About Cancer* (New York: Basic Books, 1995) 8. He argues that tobacco companies generated research and litigation claims intended to create uncertainty about what was reliably known about the effects of tobacco on health.

investments by bad defendants are disinformative, the rate at which uncertainty falls is slower the higher the proportion of bad to good defendants.

Proof. From Proposition 1 we know that when $k > \frac{M}{2}$ only good defendants invest and hence all legal human capital is informative and $\bar{\theta}$ declines. From Proposition 2 we know when $k < \frac{M}{2}$ that if any bad defendants invest, it must be the case that all good defendants also invest and hence more evidence is produced by good than by bad defendants, implying that if investments by bad defendants are disinformative, on net the accumulated legal human capital is informative but decreasingly so in the ratio of good to bad defendants. Furthermore, if legal costs are not too much greater than $\frac{M}{2}$ then nearly all good defendants invest, producing informative human capital; as legal costs fall, there is increasing disinformation coming from the investments of bad defendants and increasing uncertainty on net. \square

5. ANALYZING THE MODEL: FACTORS AFFECTING RULE-ADAPTATION

I am interested in investigating the conditions under which a legal regime can be expected to adapt rules, shifting from R^x to R^y . The analysis is positive in nature, looking to the evolution of rules that expand the complexity of rules and the evidentiary basis for legal outcomes. I have assumed that, if both x and y are known with certainty and legal costs are negligible, the more complex rule is socially optimal. I will discuss the normative implications of the analysis in light of the errors associated with including y as a consideration in legal decisionmaking in section 5.2, below.

We look first at the factors that affect a judge's decision about whether to follow the existing rule R^x or announce a new rule, R^y . A utility-maximizing judge will choose R^y over R^x in period t when $EU_{tj}^x \leq EU_{tj}^y$, giving us the following lemma:

Lemma 5.1. *In any given period, t , a judge of type j will adopt the new rule, R^y , indicating a willingness to hear evidence and argument about y , when*

$$\begin{aligned} \alpha_j &\geq \frac{1}{(1 - \sigma_{1t} - \sigma_{2t})} \\ &\equiv \tilde{\alpha}_t \end{aligned}$$

Recall that a judge's utility depends only on the rule that is ultimately applied; if the judge announces R^y but the defendant is not one that chooses to present evidence of y , the rule ultimately applied is R^x . The decision whether to announce R^y , then, depends only on judicial utility in the event evidence of y is presented. I will say that judicial incentives for a judge of type j *support rule adaptation* if the condition in lemma 5.1 is satisfied. Let J_t be the set of judges for whom judicial incentives support rule adaptation in period t for a given value of $\bar{\theta}$.

I show first that a legal regime may become mired at R^x permanently, for three types of reasons: legal costs may be too high, judicial incentives might not support rule adaptation even at low levels of judicial error and the level of judicial error might be so high that judges perceive little chance that they will reap the benefits associated with maximizing social welfare. The first proposition, about high legal costs, is straightforward:

Proposition 3. *If $k > M$, defendants will never invest in producing evidence and argument about y . Thus judges will always ultimately apply R^x .*

Note that this Proposition may hold not only when legal costs are high in absolute terms, but also when damages are relatively low. Thus a regime that fails to attach high penalties to liability may produce the unintended effect of stalling the accumulation of legal human capital and rule adaptation.

More subtly, a legal regime may become stuck at R^x if judicial incentives simply do not support rule adaptation. This might be for the straightforward reason that there are no or low rewards to rule adaptation for most if not all judges. It might be the case, for example, that the structure of judicial incentives does not reward rule adaptation even when judges are perfectly capable of implementing R^y without error. But it might also happen in a regime that in theory would reward rule adaptation at low levels of error: this will happen if the initial level of error is sufficiently high that no judges are willing to risk entertaining evidence and argument. In that case, no defendants will invest in this initial period; legal error in all future periods will be as high. This shows the equilibrium nature of this result, and that it is not merely a consequence of a failure to adapt rules because a regime does not, in principle, reward rule adaptation.

Proposition 4. *For any initial level of judicial error, $\bar{\theta}_1$, including $\bar{\theta}_1 = 0$, there exists a distribution of judicial incentives $G(\alpha)$ such that all judges adopt R^x for all periods $t \geq 1$. In particular, if $\bar{\theta}_1 = 0$, then any regime with $\bar{\alpha} < 1$ (judicial rewards for error-free rule adaptation less than those for rule-following) will adopt R^x for all periods $t \geq 1$. For higher values of $\bar{\theta}_1$, any regime with insufficiently high rewards to error-free rule adaptation will adopt R^x for all periods $t \geq 1$. A judicial regime described by these distributions of judicial incentives never accumulates legal human capital and the level of legal uncertainty never falls.*

Proof. Given the initial level of judicial error $\bar{\theta}_1$, clearly if $G(\bar{\alpha}_1) = 1$, then the set J_1 is empty and all judges announce R^x in period 1. Thus $K_1 = 0$ and $\theta_2 = \bar{\theta}_1$. The same result is replicated in all future periods. \square

Conversely, we may have a legal regime that has high rewards for adapting legal rules in such a way as to increase social welfare; imagine a regime in which there is a deliberate effort to encourage judges to develop new legal rules to respond to new or changing conditions. Even so, however, it may be that such a legal regime will remain stuck in equilibrium at R^x . This will happen if the initial level of legal error is too high, causing judges to discount the likelihood that they will ever see the rewards of maximizing social welfare. This state of affairs will then be reinforced by the lack of incentives for defendants to make the investments necessary to generate legal human capital and reduce legal errors overall.

Proposition 5. *For any distribution of judicial incentives $G(\alpha)$, there exists an initial level of judicial error $\bar{\theta}_1$ such that all judges adopt R^x for all periods $t \geq 1$. A judicial regime described by this level of initial judicial error never accumulates legal human capital and the level of legal uncertainty never falls.*

Proof. Consider a distribution with $G(\alpha) = 0$ for some $\hat{\alpha} < \bar{\alpha}$. From Lemma 5.1 the set J_1 is then empty if $\bar{\alpha}_1 \geq \hat{\alpha}$, implying that $\sigma_{11} + \sigma_{21} \geq 1 - \frac{1}{\hat{\alpha}}$ yields J_1 empty. This inequality with respect to the sum of type 1 and type 2 errors can then be achieved by setting either equation 4.3 or equation 4.4 equal to $1 - \frac{1}{\hat{\alpha}}$ and solving for the initial level of uncertainty $\bar{\theta}_1$. \square

Together, Propositions 3, 4 and 5 give us a corollary that identifies three independent conditions that must be met in a regime in order for at least some rule adaptation to occur

Corollary 2. *In order for any rule adaptation to occur in a legal regime, three independent conditions must be met: 1) judicial incentives must support rule adaptation for at least some judges at the initial level of judicial error ($G(\hat{\alpha}_1) < 1$), 2) the initial level of judicial error must not be too high and 3) legal costs must not be too high relative to damages ($k < M$).*

This corollary identifies the possibility of a stark result, the complete absence of legal adaptation (by courts) over time. Although there may be circumstances in which a legal regime fails to adapt—I will discuss the possibility that at least one or two of the conditions in Corollary 2 may fail—it is clear that in any real world comparison between legal regimes we will be more interested not in a complete failure to adapt but rather in the factors that will affect the speed with which adaptation occurs and the level of judicial error over time. These results are presented in the next three propositions.

Proposition 6. *If legal costs are lower relative to damages in one legal regime than another, but the distribution of judges is the same in these regimes, then more legal human capital will accumulate in the relatively low-cost regime. If all legal human capital is informative, legal uncertainty falls faster in the lower-cost regime. If investments by bad defendants are disinformative and $k > \frac{M}{2}$ in both regimes, then uncertainty falls more slowly in the higher-cost regime. If investments by bad defendants are disinformative and $k < \frac{M}{2}$ in both regimes, then uncertainty falls more slowly in the lower-cost regime. If $k < \frac{M}{2}$ in the relatively low-cost regime, legal costs in the high-cost regime are high but not too high ($k = \frac{M}{2} + \varepsilon$ for ε small) and investments by bad defendants are disinformative, then the rate at which uncertainty falls will be faster in a high-cost regime than a low-cost regime.*

Proof. Follows directly from Propositions 1 and 2. If $k > \frac{M}{2}$ in both regimes only good defendants invest in both regimes and all legal human capital is informative. More good defendants invest in the low-cost regime, leading to greater human capital accumulation and hence a lower rate of legal error. If $k < \frac{M}{2}$ in both regimes both good and bad defendants invest and the higher rate of human capital accumulation in the lower cost regime comes from bad defendants; if their investments are disinformative, the reduction in legal error is smaller in the low-cost regime. If $k < \frac{M}{2}$ in the relatively low-cost regime and $k = \frac{M}{2} + \varepsilon$ for ε small in the high-cost regime, then (almost) all good defendants invest in both regimes; the investments by bad defendants in the low-cost regime lead to a slower rate at which legal error falls. \square

Proposition 6 identifies what I believe is an unrecognized potential benefit from legal regimes that have either high legal costs or low damages: fewer defendants engage in an effort to undermine the court's effort to improve its ability to apply rules accurately. Proposition 6 also demonstrates, however, that while a regime may have more investment coming from bad defendants than good, that so long as there are symmetric errors in the courts, with unbiased judges just as likely to overestimate as underestimate the true value of y , there will always be more investment from good than bad defendants, which I have assumed results, on net,

in a stock of human capital that has an informative effect on legal error. The impact of low legal costs and the disinformation coming from bad defendants is to slow the rate at which legal error falls.

Proposition 6 also suggests a rather surprising corollary about the impact of the increases in legal costs that may result from legal systems that become increasingly specialized and complex.

Corollary 3. *Suppose $\frac{dk}{dK} > 0$, meaning that as legal human capital accumulates the cost of producing evidence and legal argument increases. This shrinks the number of defendants who invest, and increases the proportion of good to bad investments relative to an initial condition in which $k < \frac{M}{2}$. Although fewer defendants invest, those that do invest more and hence overall total investments may increase or decrease. If overall investments do not decrease, then the rate at which legal uncertainty falls will increase.*

I turn now to the basic results of the model, showing the impact of different distributions of judicial incentives on the diffusion of rule adaptation, the accumulation of legal human capital and the reduction of legal error.

Proposition 7. *Consider two legal regimes, A and A' with $G^A(\alpha) < G^{A'}(\alpha)$ for all α , $G^A(\tilde{\alpha}_1) < 1$, and with the same level of initial judicial uncertainty ($\bar{\theta}_1^A = \bar{\theta}_1^{A'}$) and assume legal costs are relatively high ($\frac{M}{2} \leq k \leq M$.) Then $|J_t^A| > |J_t^{A'}|$ for all $t > 1$, $K_t^A > K_t^{A'}$ for all $t > 1$ and $\bar{\theta}_t^A < \bar{\theta}_t^{A'}$ for all $t > 1$. That is, when legal costs are relatively high, rule adaptation spreads more quickly, human capital accumulates at a faster rate and legal error falls at a faster rate in a legal regime in which more judges perceive greater returns to rule adaptation.*

Proof. If $G^A(\tilde{\alpha}_1) < G^{A'}(\tilde{\alpha}_1)$ then more judges support rule adaptation in period 1 in regime A than in regime A' , giving $|J_1^A| > |J_1^{A'}|$. Given $k \leq M$ some defendants appearing before rule-changing judges invest in producing evidence and argument in period 1; the fact that there are more such judges in A than A' then implies that $K_2^A > K_2^{A'}$. From Proposition 1 we know that if $k \geq \frac{M}{2}$ only good defendants invest in human capital, thus all investments in period 1 are informative: $\bar{\theta}_2^A < \bar{\theta}_1^A$ and $\bar{\theta}_2^{A'} < \bar{\theta}_1^{A'}$, $\sigma_{12}^A < \sigma_{11}^A$, $\sigma_{22}^A < \sigma_{21}^A$, $\sigma_{12}^{A'} < \sigma_{11}^{A'}$ and $\sigma_{22}^{A'} < \sigma_{21}^{A'}$. Thus $\tilde{\alpha}_2^A < \tilde{\alpha}_1^A$ and $\tilde{\alpha}_2^{A'} < \tilde{\alpha}_1^{A'}$ and thus more judges in both regimes are rule-changers in period 1 than in period 2. Moreover, $\bar{\theta}_2^A < \bar{\theta}_1^A$ and $\bar{\theta}_2^{A'} < \bar{\theta}_1^{A'}$ implies that more defendants appearing before rule-changing judges invest in both regimes in period 2 than in period 1. However, $K_2^A > K_2^{A'}$ implies $\bar{\theta}_2^A < \bar{\theta}_2^{A'}$ which implies that $\sigma_{12}^A < \sigma_{12}^{A'}$ and $\sigma_{22}^A < \sigma_{22}^{A'}$. These higher error rates in regime A' in period 2 imply that $\tilde{\alpha}_2^A < \tilde{\alpha}_2^{A'}$. Then $G^A(\tilde{\alpha}_2^A) < G^A(\tilde{\alpha}_2^{A'}) < G^{A'}(\tilde{\alpha}_2^{A'})$ and $|J_2^A| > |J_2^{A'}|$. \square

The result in Proposition 7 tells us more than that a regime with more judges who face judicial incentives that encourage rule adaptation will in fact display more rule adaptation. The key insight in Proposition 7 is that the greater orientation of judges to rule-adaptation in one regime encourages defendants to invest more in producing the legal human capital that ultimately encourages even more judges to adapt rules. The process is self-reinforcing, and rule adaptation occurs at an increased rate in tandem with a greater rate of human capital accumulation and a

greater rate at which legal errors fall. Note that because of these reinforcing effects, the set of judges who are willing to adapt rules at what may be a high initial level of uncertainty may be quite small. So long as some judges are willing to adapt rules, the process of human capital evolution and falling errors is triggered, causing rule adaptation to spread to other judges who see lower rewards to change.

Proposition 7 gives the rosiest view of the process of rule adaptation, human capital accumulation and reductions in legal error. With relatively high costs of producing evidence and argument, only good defendants invest in human capital and, by assumption, the human capital that accumulates is informative and reduces legal error. The next proposition demonstrates that the same result holds for lower legal costs if we think that even the investments made by bad defendants are informative. In the more likely case that investments by bad defendants are to some extent disinformative, however, low legal costs imply that the benefits of the human capital accumulation due to good defendants are degraded by the fact that bad defendants are also encouraged to invest in efforts to, essentially, confuse the court and blur the distinction between good and bad defendants.

Proposition 8. *Consider two legal regimes, A and A' with $G^A(\alpha) < G^{A'}(\alpha)$ for all α , $G^{A'}(\tilde{\alpha}_1) < 1$, and with the same level of initial judicial uncertainty ($\bar{\theta}_1^A = \bar{\theta}_1^{A'}$) and assume legal costs are relatively low ($k \leq \frac{M}{2}$). Proposition 7 holds if all investments in evidence and argument are informative. However, if investments by bad defendants are disinformative, there are distributions $G^A(\alpha_1)$ and $G^{A'}(\alpha_1)$ such that while rule adaptation spreads more rapidly and there is more human capital accumulated in regime A , legal error falls more slowly in regime A than in regime A' .*

Proof. If $G^A(\tilde{\alpha}_1) < G^{A'}(\tilde{\alpha}_1)$, some judges announce R^y in period 1 in both regimes but more judges announce R^y in regime A than in regime A' . If $k \leq \frac{M}{2}$, from Proposition 1 we know that in the first period all good and some bad defendants invest in producing evidence and argument in both regimes; because more defendants appear before rule-changing judges in regime A there is more investment (by bad defendants) in period 1 in regime A . If all investments in evidence and argument are informative, then this higher rate of investment leads to lower error and the result in Proposition 7 holds. Suppose now that investments by bad defendants are disinformative. Because all good defendants invest and less than all bad defendants invest at the initial level of legal uncertainty ($y^* + \bar{\theta}_1 < \bar{y}$), the ratio of good to bad human capital is greater than 1 and so on net investments are informative in both regimes and $\bar{\theta}_2 < \bar{\theta}_1$ in both regimes. However, because $K_2^{B,A} > K_2^{B,A'}$ the amount of disinformative human capital is higher in period 2 in regime A than A' . This implies $\bar{\theta}_2^A > \bar{\theta}_2^{A'}$, implying that more bad defendants appearing before rule-changing judges invest in k in A than in A' . Moreover, $\sigma_{12}^A > \sigma_{12}^{A'}$ and $\sigma_{22}^A > \sigma_{22}^{A'}$, and thus $\tilde{\alpha}_2^A > \tilde{\alpha}_2^{A'}$. Then if $G^A(\tilde{\alpha}_2^A) \leq G^{A'}(\tilde{\alpha}_2^{A'})$ at least as many judges announce R^y in period 2 in regime A than in regime A' , again leading to a greater accumulation of disinformative legal human capital in regime A than A' . This sequence continues for all t . If, however, $G^A(\tilde{\alpha}_2^A) > G^{A'}(\tilde{\alpha}_2^{A'})$ fewer judges announce R^y in period 2 in regime A than in regime A' . The net effect on legal human capital and legal error going forward is then ambiguous: fewer judges are rule-changers in regime A but more of the defendants appearing before these rule-changers present evidence and argument than do those appearing before rule-changers in regime A' . \square

Proposition 8 again shows us that high legal costs (or low damages) may have a beneficial effect on the rate at which legal error is reduced in a legal regime. When legal costs are low, a higher propensity to rule adaptation may be on net costly, encouraging more investment from bad defendants focused on confusing the courts. Alternatively, although I have not shown this explicitly in Proposition 8, we may have regimes in which the propensity for rule adaptation may produce such increases in legal error that even pro-adaptation judges become reluctant to change rules and the slower reduction in legal error may on net slow the diffusion of rule adaptation as well.

6. EXTENSIONS: PUBLICATION, CORRUPTION, LEGISLATION

Like all models, the above is a stylized version of real settings that suppresses many elements to develop the key insights about the role of judicial incentives and legal error on the accumulation of legal human capital throughout a legal system and legal adaptation over time. In this section I consider a few extensions to the model to address some important attributes of real-world settings.

6.1. *Publication and the Distribution of Information.* I have not described an explicit way in which the investments in evidence and legal argument in a particular case accumulate as legal human capital shared by all judges. Implicitly I am assuming that what one judge learns, all others learn. Moreover, the model assumes that the rate at which investments k are translated in shared legal human capital K is constant across regimes. This process, however, is likely to vary across regimes. The written decision in a case would seem to be the fundamental method by which such communication among judges occurs in any legal regime, although there are other methods as well such as meetings and education. We have seen that one of the apparent differences between legal regimes is the nature of this communication. Modern American common law judges, for example, tend to write long opinions, with extensive descriptions of facts and reasons; a large proportion of these opinions, particularly if they announce a development in the law, are published. French judges, on the other, write much shorter opinions, which are brief about the facts and may not demonstrate their reasoning at all; in addition, apparently many fewer of these decisions are published. On the other hand, civil code regimes involve substantial peer assessment and civil service review, largely missing from common law settings. The key variable we are interested in, then, is the extent to which the investments in a particular case are translated into shared human capital. I will call that translation "publication" with the caveat that publication may not be limited to opinions published in reporters or databases, but could include publication through internal organizational mechanisms in the judiciary and legal profession. We can state a fairly straightforward proposition about the impact of publication:

Proposition 9. *Ceteris paribus, the lower the rate of publication of facts and reasons in a regime, the slower the rate at which rule adaptation occurs, and, the higher the rate of judicial error.*

Proof. The amount of legal human capital K_2 accumulated in period 1 is lower in a regime with a lower publication rate, all other factors being equal. Let superscripts L and H represent the low and high publication regimes, respectively. Then

$\bar{\theta}_2^L > \bar{\theta}_2^H$ and $\bar{\alpha}_2^L > \bar{\alpha}_2^H$, implying that $|J_2^L| < |J_2^H|$. If all legal human capital is informative or if $k > \frac{M}{2}$, then by Proposition 2 total investments in evidence and argument production in period 2 are lower in the low-publication regime. It is straightforward to see then that in all future periods, investments in evidence and argument production will be lower, total human capital will be lower, legal error will be higher and the regime will be slower to adopt R^y . If investments by bad defendants are disinformative and $k < \frac{M}{2}$, then by Proposition 2 total investments in evidence and argument production by defendants who appear before rule-changing judges in period 2 are higher in the low-publication regime, with the additional investments composed entirely of disinformative human capital. I will show that even if $|J_2^L| = |J_2^H|$, $\bar{\theta}_3^L > \bar{\theta}_3^H$, implying that the rate of error and the diffusion of R^y is slower in the low-publication regime and that by replication of the proof this relationship holds for all $t > 3$ as well. Let $0 < \beta < 1$ be a discount factor representing the reduction in the rate at which investments in evidence and argument are translated into legal human capital in the low-publication as compared to the high-publication regime. Then in period 2

$$\begin{aligned} K_2^{G,L} &= \beta \int_0^{y^*} kf(y)dy \\ &= \beta K_2^{G,H} \end{aligned}$$

$$\begin{aligned} K_2^{B,L} &= \beta \int_{y^*}^{y^* + \bar{\theta}_2^L(1 - \frac{2k}{M})} kf(y)dy \\ &= \beta K_2^{B,H} + \beta \int_{\bar{\theta}_2^H(1 - \frac{2k}{M})}^{\bar{\theta}_2^L(1 - \frac{2k}{M})} kf(y)dy \end{aligned}$$

and

$$\begin{aligned} \frac{K_2^{G,L}}{K_2^{B,L}} &= \frac{\beta K_2^{G,H}}{\beta K_2^{B,H} + \beta \int_{\bar{\theta}_2^H(1 - \frac{2k}{M})}^{\bar{\theta}_2^L(1 - \frac{2k}{M})} kf(y)dy} \\ &< \frac{K_2^{G,H}}{K_2^{B,H}} \end{aligned}$$

given that $\bar{\theta}_2^L > \bar{\theta}_2^H$. Then, given $\frac{d\bar{\theta}_t}{d\frac{K_t^G}{K_t^B}} < 0$, we have that $\bar{\theta}_3^L > \bar{\theta}_3^H$ as well. \square

Note that this result depends on the assumption we have maintained throughout that if investments by bad defendants are disinformative, the net effect of investments by good and bad defendants is positive so long as there are at least as many good defendants investing as bad defendants. If this condition does not hold, and in particular if a small amount of bad legal human capital has a disproportionate effect in degrading the value of good legal human capital, then it is possible that a regime that restricts the transmission of legal human capital could have a lower rate of error. This is an important consideration because of the role that restrictions on publication and the diffusion of one judge's work may have on regimes dealing with a high probability of corruption. I turn to the problem of corruption now.

6.2. *Corruption.* I have assumed in the development of the results above that all judges have socially aligned incentives, in that they perceive a net benefit from avoiding type 1 and type 2 errors and the losses in social welfare associated with these errors. This assumption that judges are faithful is what allows us to assume that errors are a result of good faith efforts to interpret and apply the evidence and argument presented in a given case, and captured by the distribution of θ . This also allows us to treat the likelihood of error by all judges as essentially the same with respect to accumulated legal human capital. But what if some judges are corrupt? This is a key factor to analyze in any comparative setting given the perceived prevalence of corruption in many developing and transition economies and the critical role that control of judicial corruption played in the design of civil code regimes such as the French.

Corrupt judges do not base their decisions on a good faith effort to interpret evidence and legal argument and apply a rule; rather they are motivated by considerations of the private returns associated with type 1 and type 2 legal errors. We can interpret the presence of corrupt judges in this model in a few ways. One is to treat the increase in judicial returns to type 1 and type 2 errors as a shift in the distribution of judges to lower values of α . Under this interpretation, the results in Propositions 7 and 8 hold. This interpretation, however, seems a bit strained because it does not take seriously that corrupt judges solve a different utility maximization problem than the one described in the basic problem. As an alternative, we can model the corrupt judge as one who engages in 'cheap talk' with respect to the announcement of rules and results: the judge reaches a legal result based on the private returns to type 1 and type 2 errors, and then announces a 'rule' that coincides with the result. In the model above, this means that if the judge's corruption amounts to a bias towards a plaintiff, he or she can simply always announce R^x . If the judge's corruption amounts to a bias towards a defendant, he or she can announce R^y and "observe" $\hat{y} < y^*$. I do not model corruption fully—although this is clearly an essential next step—but it seems clear that corruption either reduces the rate at which defendants will invest in the effort to produce evidence and legal argument or, if pro-defendant judges still need evidence and argument with which to 'mask' their announced result, the investments produced through corruption are made by bad defendants and especially likely to be disinformative. We could imagine that such investments do not even contribute to the accumulation of legal human capital at all if it is known that the judge's announcement is cheap talk; indeed, the presence of corrupt judges could reduce the rate at which all investments in evidence and argument accumulate as legal human capital, if judges cannot identify corrupt judges and hence must discount the 'lessons' of any given case. We can get to the following conjecture:

Conjecture 1. *The greater the number of corrupt judges in a regime, the lower the rate at which legal human capital accumulates, the higher the rate of judicial error among faithful judges, and the slower the rate at which rule adaptation occurs.*

Note however that if judges must publish facts and reasons for their decisions, then their capacity to 'mask' their corrupt choices may be described by the basic model. If they cannot manipulate the facts, then they must represent their findings as legitimately based on the evidence. Those who are monitoring their work—other judges and lawyers—experience the same observational error θ as a good faith judge. Then defendants will be encouraged to invest in k to 'cover' a corrupt result when

they can expect that the judge's monitors will observe a value consistent with a no liability result. And judges will have an incentive to produce a corrupt result only when it is observationally equivalent with a corrupt result. Notice then that the interpretation of the reduction of legal uncertainty is that corruption becomes more difficult, forcing results that are consistent with good faith judging. Moreover, note that publication then plays a key role in the implementation of the legal human capital to reduce legal error.

6.3. Legislation. The model I have presented focuses on the process of rule adaptation in courts. The theory of civil code regimes, however, is that it is appropriate for legislatures or government agencies, not courts, to adapt rules. It is important, therefore, to consider what the impact might be of introducing the possibility of legislative rule change. In this model, this would imply that legislators announce R^y . This eliminates the problem of ensuring adequate judicial incentives for rule adaptation. But we know that the mere announcement of a rule does not lead to accurate rule implementation when the level of legal human capital is low. If error is observational—as I have assumed—the introduction of a novel factor y challenges the capacity of the courts to achieve the legislature's intended results. More importantly, however, if legal uncertainty is sufficiently high or if legal costs k are high relative to damages M , as we have seen in Propositions 3 and 5, defendants may have no incentive to present evidence of y to courts, resulting in the continued persistence of R^x in practice. This gives us a simple proposition:

Proposition 10. *Even if a legislature announces R^y at time $t = 1$, if $k > M$ and/or if $\bar{\theta}$ is too high, R^x will be applied by judges all $t > 1$.*

Note that if the reluctance of defendants to present evidence of y is caused by high legal uncertainty, despite the legislative effort to develop a more refined and sophisticated (ultimately a presumably welfare-enhancing) rule, the rule applied in practice stagnates because of the failure of the system to generate the specialized legal human capital necessary to implement the rule with at least an adequate level of accuracy. Furthermore, if judges are penalized for errors in the application of rules and they have methods for limiting the capacity of defendants to present evidence of y , they may do so, further constraining the accumulation of legal human capital.

7. OPTIMALITY

I have shown a set of results that make positive predictions about the possibility of rule adaptation and the rates of rule adaptation in different legal regimes. I have not, however, made claims as yet about the welfare implications of rule adaptation other than to construct a model in which, with perfect information and zero legal costs, it is welfare-maximizing for a court to shift from the existing rule to a new rule, R^y . What else can we say about whether and when it is optimal for a legal regime to display a faster rate of rule adaptation or a faster rate of reducing legal errors?

Observe first that the first problem for a social planner is to compare R^x to R^y . We have looked extensively at the probability of type 1 and type 2 errors under R^y . Let ρ be the probability of a type 1 error under R^x ; there are no type 2 errors under that rule. Then we can say the following about welfare-maximization in a given case at a given point in time:

Lemma 7.1. *It is optimal for a court to adopt R^y in a given case if*

$$(\rho - \sigma_1)\omega_1 \geq k + \sigma_2\omega_2$$

Lemma 7.1 says that it is optimal to shift to the new rule if there is a sufficient reduction in the losses associated type 1 errors to compensate for two costs: the costs of producing the evidence and argument necessary to implement R^y and the social losses associated with introducing the potential for type 2 errors. Note that judicial incentives (see 4.2) bear no necessary relation to this optimality condition: if a legal regime wants to induce optimal rule choice in a given case, it has to do this by adjusting the rewards and penalties facing judges for rule-following and rule-adaptation.

The dynamic nature of the social optimization problem, however, makes it difficult to say whether it is optimal for a legal regime that does not satisfy the condition in Lemma 7.1 at the initial level of legal uncertainty to get onto a path to legal adaptation that is faster rather than slower. This is essentially a problem of optimal capital accumulation, which involves a tradeoff between costs incurred today in exchange for benefits enjoyed tomorrow. The costs are the costs of errors when σ_1 and σ_2 are high—meaning premature adoption of R^y involves welfare losses greater than those imposed by the existing rule—and the costs of producing evidence and legal argument, k . If these costs are high and/or if legal errors fall only slowly as legal human capital accumulates, the losses incurred as the system evolves to a point at which Lemma 7.1 is satisfied are relatively high and it may be optimal for a regime not to evolve, or to evolve more slowly. This emphasizes the importance of the initial level of legal uncertainty. It is important to understand that it might therefore be optimal for a legal regime to remain anchored at an existing rule, or adapt only slowly, and that this may occur not because judges face sub-optimal incentives to adapt the law. Even if there are worlds in which it would be clearly optimal to switch to a new more elaborate rule, by refusing to adjust, judges may be responding appropriately to the initially high rate of legal error in the regime.

Rule adaptation may also be too costly because of the costs defendants incur in presenting evidence and legal argument, and as we have seen, these costs may increase in a self-reinforcing manner over time, making a flexible approach to rule-change excessively costly from a social perspective. If increasing complexity and specialization, captured by the accumulation of legal human capital, also leads to increased per-case legal costs, then these costs may outweigh the benefits of rule adaptation.

For the most part, however, it is clear that the problem of optimal adaptation is complex. The model I have presented identifies the factors affecting optimality—legal costs, damages, the incentives of judges, the likelihood of type 1 and type 2 errors, the relationship between accumulated legal human capital and legal errors, and the extent to which the investments of bad defendants are disinformative—but it is not possible to say anything general about optimal rule adaptation. Only once we have determined whether it is optimal to adapt rules can we say whether the legal regimes compared in the model lead to better or worse social outcomes.

8. IMPLICATIONS FOR THE COMMON LAW VERSUS CIVIL CODE DEBATE

We now want to return to the earlier discussion of the institutional differences between common law and civil code institutional settings, and determine whether

we can say anything generalizable about the relationship between those settings and the parameters that the model identifies as relevant for predictions about the rate at which a regime will engage in rule adaptation, accumulate legal human capital and reduce the rate of legal errors. Because the body of comparative research on institutional attributes relevant to my analysis is slim, I will present some conjectures here which should be read as invitations for further comparative work.

Consider first the key parameter of judicial incentives, α , the reward facing judges for error-free rule adaptation. Recall that this is evaluated relative to the reward for following rules, γ . I conjecture first that the distribution of judicial incentives in civil code regimes is more heavily weighted to rewards for rule-following than for rule-adaptation. Indeed, several observers (e.g., Merryman 1985) have claimed that judges in civil code regimes, in general, place a greater value on certainty in the law than common law judges; and that common law judges are, in general, more oriented to problem-solving and willing to adapt rules to particular circumstances. The model in this paper predicts that these behavioral regularities will emerge and in equilibrium be stabilized by the structure of judicial rewards and penalties. Civil code regimes do display institutional features that we can understand as structuring greater rewards for rule-following relative to rule adaptation than is the case in common law regimes. Recall that civil code judges operate in an extensive bureaucracy, entering the judiciary as junior or apprentice judges. They are then, throughout their more junior careers, evaluated almost exclusively by senior judges; promotion to higher ranks, better locations, more prestigious courts is a function of seniority but also of the extent to which they impress those judges.²² Common law judges, on the other hand, appear to be evaluated by a wider audience, one that includes litigants, practitioners, politicians, the media and the general population. Civil code and common law judges are, in effect, evaluated by different audiences. We can imagine that both the civil code judge's audience and the common law judge's audience value both rule-following and rule-adaptation to improve the welfare effects of court decisions. But I think we can also imagine that an audience of judges is less likely to weigh the welfare effects than is an audience that includes not only judges and lawyers but also lay-people and politicians.

Even if there were no inherent differences in the evaluative criteria that these two audiences might bring to bear, differences in the information available to these audiences, I believe, support the claim that judges in common law regimes face judicial rewards that place greater weight on rule adaptation to achieve welfare-improvements in legal rules. The common law audience contains those who bear the welfare effects of legal rules (litigants and potential litigants), and those who have incentives to discover, publicize and respond to welfare effects (the media, politicians, etc.) The civil code judge's audience, on the other hand, is much more insulated. Even if senior judges in the civil code regime are interested in the welfare effects of the rules implemented by the judges they supervise, they face higher costs of discovering and interpreting those effects. Indeed, it is hard to see how any judges learn about welfare effects systematically other than through the mechanism I have modeled in this paper: the evidence and argument presented to them in the course of their work as judges. It is true that the greater degree

²²For a detailed analysis of this phenomenon in Japan's civil code regime, see Ramseyer and Rasmussen (1997).

of subject matter specialization in civil code courts, and the more frequent and systematic process of peer review likely increases the information available to the judge's audience relative to a more generalist court with less frequent peer review. Nonetheless, the limitations on this audience's information set would seem to cabin the benefits of specialization and systematic peer review.

The common law judge also likely faces greater rewards for rule-adaptation than the civil code judge because of the many ways in which information about particular judges is more likely in the common law setting to reach a wider audience that values the welfare effects of rules. Common law judges are more likely to sit as individual judges, and more likely on multi-judge panels to sign their opinions (whether the majority opinion or a dissent or concurrence) and hence to be identifiable as the author of a particular opinion. Responsibility for rule change can thus be attributed. In addition, civil code judges are more likely to decide cases in an environment in which decisions about what evidence to hear are made by a different judge, probably a particularly invisible judge. The model I have presented emphasizes the connection between the decision to adapt rules and the decision to allow evidence and argument about new rules; civil code regimes appear more likely to separate these decisions and hence diffuse the potential for any one judge to move the system to a new rule and the capacity for the public to attribute responsibility for changes that do emerge. Finally, although the specialization and systematic peer review in civil code courts would increase the information available to senior judges about their colleagues, it is clear that civil code systems produce less information in general for a relatively public audience than do common law systems: judicial opinions are brief, perhaps very unhelpful as to the particular facts heard and reasons relied upon, and much less likely to be published. The civil code regime, indeed, seems tailored to the anonymity of the judge and, in some cases such as France, the opacity of legal reasoning. But the reward to rule adaptation requires that the judge's audience be able to determine whether the judge 'got it right' or not; α represents the reward for adapting rules only when type 1 and type 2 errors are thereby avoided. This is clearly much more difficult if a public document is not produced or if any public document fails to reveal the facts or reasons in play. If the potential for legal error cannot be judged, its avoidance cannot be rewarded.

It is conceivable that these institutional attributes structure a system of judicial rewards in civil code regimes that support one of the more stark conclusions of the paper, namely that incentives may deter rule adaptation so extensively that courts never adapt legal rules and never accumulate legal human capital (specifically about the particular rule adaptation in question—there is no claim here that civil code regimes would "lack" legal human capital, only legal human capital specific to potentially welfare-improving rule changes). Note that this does not require that judges perceive zero rewards for rule adaptation, only that the rewards for error-free rule adaptation be less than those for rule-following. Moreover, if the initial rate of legal error is relatively high, the rewards for error-free rule adaptation could be relatively high, and still the regime could display no rule adaptation. And there is reason to believe that 'initial' rates of legal error may be higher in civil code regimes. Judges entering the judiciary in civil code regimes do so directly from law school with a degree that is generally a first undergraduate degree in law. Their entire professional experience then is accumulated through the lens

of what the judge sees. Judges in common law regimes, in contrast, enter the judiciary with an educational background that includes an undergraduate degree in a subject other than law and only after a relatively lengthy period of time in practice. Their professional experience therefore reflects exposure to the impact of legal rules, particularly through their close relationship with clients and the facts about their legal predicaments. Conceivably, then, a civil code regime may be one that becomes mired, as per Proposition 4, at R^x .

Less dramatically, the lower rewards for error-free rule adaptation in civil code regimes may result in a slower rate of rule adaptation, as was demonstrated in Proposition 7. They would also, under that Proposition, lead to lower rates at which legal human capital about the welfare effects of rules accumulates and higher rates of judicial error. These effects might in fact be reinforced by other differences between the civil code and common law regimes. Civil code regimes follow a sequenced process of decision, in which fewer issues may be ultimately relevant for litigants because of initial decisions; the common law process keeps all issues about contested facts alive to the final trial. Moreover, judges in civil code regimes have the capacity to collect evidence themselves, which may reduce litigants' incentives to collect evidence, and may restrict the use of, for example, experts to a single court expert. In the model I have presented I assume that litigants can invest in evidence production in all regimes. This not only captures what must be true in practice, even in civil code regimes—the phenomenon of judicial control of evidence in the "inquisitorial" regimes is a behavioral equilibrium, not a limitation on possible behavior—it also makes the results in the model conservative. If judges do play a larger role in evidence production in civil code regimes, we might conjecture that judicial incentives to collect compensating evidence directly are, on net, weaker than those facing defendants seeking to avoid monetary damages. Moreover, it is likely that the cost of evidence to the court is higher than it is for defendants, although the civil code restriction on testimony from interested parties may mitigate this difference. In the model, these features would on net translate into lower rates of investment in evidence and legal argument, k , and hence ultimately lower rates of legal human capital accumulation, K .

Civil code regimes, as we have noted in connection with judicial incentives, also appear to produce much less public information about the facts and reasons that lead to particular outcomes in a given case. Civil code courts, because of their specialization and peer review systems, may have higher rates of information sharing within a particular court through informal means. Transmission of information beyond a particular court, however, seems to be more restricted. This would translate into a lower rate at which individual investments in evidence and legal argument, k , accumulate as shared legal human capital, K , throughout the profession and specifically beyond a particular court at a particular time. If judges never publish decisions, for example, investments made by individual litigants to educate the judge in a particular case may never diffuse into the legal system as a whole; they are then largely lost in terms of reducing the rate of error in the court system. If this effect were significant, it would not necessary for judicial incentives in civil code regimes to differ substantially from those in common law systems in order for us to predict that civil code regimes would display slower rates of rule adaptation and higher rates of judicial error on an ongoing basis.

From a positive perspective, the model in this paper appears to predict several of the differences in behavior that we see in common law and civil code regimes. If the institutional structure of judicial incentives in civil code regimes accords lower returns to outcome-oriented rules, then the model predicts that we will see more rule-following and less rule-adaptation in civil code regimes. This is consistent, for example, with the conventional observation—attributed to legal ideology or culture in the literature, but here explained by rational responses to institutional differences—that civil code judges are more interested in certainty of the law than flexibility. It is also consistent with the view that civil code judges value the elaboration of existing rules over the more pragmatic attention to problem-solving and the social effects of rules. The less frequent publication of judicial decisions and the less frequent citation to the decisions of other courts in civil code regimes is also predicted by this model: if judges are less likely to entertain innovative legal theories and the evidence necessary to apply those rules, they have less need to refer to the way in which other judges have resolved novel issues in other cases. The premise of the model is that there is a well-worked out existing legal rule, and nothing further to be learned or discovered about the relationship between facts and law for the accurate application of that rule. Although I have not explored this overtly in this model, we can also imagine a basis for the differential approach to precedent in different regimes, based on the rate of error. If judges look to the number of other cases in which a rule has been adapted in the past in order to assess the likelihood of error, then regimes with higher error rates may be inclined to a more conservative approach to precedent, along the lines of the principle of *jurisprudence constante*, meaning that precedent is only taken into account when a rule has been announced by several courts.²³ A principle of *stare decisis*, where the decision of even a single judge is taken into account, may be more likely to emerge in an environment with lower error rates. This is consistent with the observed differences in the treatment of precedent in civil law and common law.

Does this mean that the common law regimes are better than civil code regimes at producing efficient legal rules and economic value? As I have noted, the question of optimality in this dynamic setting is complex. If rule adaptation is important enough, then it may be that we have identified attributes of the civil code regime that hamper optimal rule change. The fact that rule change is likely to be an evolutionary process that involves the cost of errors on the path to change makes it difficult to say much *a priori*. I do want to make two general claims about the optimality of rule adaptation, however. First, it has been observed that the transplantation of legal systems in different settings is more or less successful depending on how effectively the law is adapted to particular local conditions. (Berkowitz, Pistor and Richard, 2003). To the extent that there is any empirical regularity to this claim, it suggests that the value of the particular type of rule adaptation I have modeled here—expanding the sensitivity of rules to a wider range of variables—may be substantial. If the value of rules is substantially affected by local and changing conditions, then rule adaptation by judges may be critical. Second, and more generally, in virtually all legal regimes the question of optimality for the legal system as whole involves not only the question of the extent to which courts should adapt legal rules to local and changing circumstances, but also the prior question

²³For an analysis of the evolution of law under the principle of *jurisprudence constante* see Fon and Parisi (2004).

of which legal adaptations should be left to courts and which to legislatures. If optimal rule adaptation through legislatures has already been exhausted when rules are delegated to the courts—if the legislature has already determined, for example, how much tailoring of rules to local and changing circumstances it is optimal to incorporate into statutory provisions—then the rules implemented by courts are ones that legislatures have determined should be adapted, if at all, by judges. The more we think that rulemaking in legislatures is affected by potential failures—rent-seeking by various interests, the problems of collective action and free-riding among the beneficiaries of legal rule change—the more legal adaptation in courts may be optimal. This is of course a very big and difficult question, one that the literature on the relative merits of legal evolution through courts and legislatures has already to some extent canvassed (see, e.g., Rubin 1982). But it is important to realize that legal adaptation through courts may be essential precisely because there are some things legislatures cannot do or can only do at much greater cost. The very fact that much legislation—in both common law and civil code regimes—is of a general character, requiring substantial interpretation by judges, is at least some evidence that rule adaptation by judges is considered valuable and unavoidable. Moreover, as I show in Proposition 10, even if legislators assume responsibility for rule-adaptation and impose elaborated rules on judges, these rules may not be implemented in practice if judicial errors are so high as to discourage defendants from presenting more elaborate evidence. Without that, the process of achieving lower rates of error and greater accuracy in the implementation of an elaborated rule cannot take hold.

The focus on rule adaptation, of course, causes us to focus on the benefits of the common law system. The model I have presented formalizes the benefits and shows how they are linked to specific institutional differences between common law and civil code regimes, specifically with respect to attributes that impact judicial incentives and the accumulation of legal human capital. But the model also identifies some cautionary notes about the common law system, ones that are consistent with the criticisms civilian lawyers might be heard to level at their common law counterparts. Common law systems, as this model predicts, display higher rates of accumulation of legal human capital. This is increasing the complexity of law. I have argued elsewhere (Hadfield 2000) that high rates of complexity contribute to high legal costs, in part directly through the increased investments in specialization required by lawyers who seek to deploy the law but also by disrupting competition in the market for lawyers. The model in this paper does not explore these dimensions in detail but it does point to an interesting, and perhaps unexpected, effect of legal costs on complexity and legal human capital. Very high legal costs, we have seen, choke off the process by which legal human capital is accumulated in a system. Proposition 3 shows a simple but perhaps important fact: if the costs of litigation exceed the damages at stake, then defendants, even good defendants, do not invest the effort in producing evidence and legal argument that can in the long run educate the courts and lead to optimal rule adaptation. It may seem unlikely that costs would be that high, but I argue in Hadfield (2000) that there are reasons to in fact expect that for many matters, legal costs can quickly exceed the damages at stake. In part this is because legal costs are not moored to the value of a case (other than in contingency actions) and in part because of a more sinister process by which the arms race (or sunk cost auction) structure of litigation expenditures

leads to investments in legal costs that exceed stakes. If litigants anticipate this, their only recourse is to avoid litigation all together.

Spiralling legal costs can thus have a long-run impact on the capacity of the common law system to exercise its advantage in long-run optimal rule adaptation. This effect would be exacerbated if, as I think is probably true, increasing levels of human capital accumulation lead to increasing legal costs. And, of course, the basic optimality condition in Lemma 7.1 requires that we note that the higher are legal costs the less valuable is an adaptation to a more elaborate rule. Complexity has its costs, and as I note also in Hadfield (2000), there is no mechanism in the common law system for regulating complexity to an optimal level. Civil code systems, to the extent they accumulate less human capital, may achieve a better end result if the costs of specialization weigh down the common law regime.

The model I have developed also introduces an important caution about the value of legal human capital accumulation by focusing on the question of whether all human capital is, so to speak, created equal. Specifically, I have emphasized the possibility that the contributions to legal human capital that come from the specific evidence and arguments put forward by bad defendants in an effort to exploit type 2 errors may degrade the capacity of courts to implement rules accurately. If the investments made by bad defendants, intended to confuse the courts about the correct application of the rule in their case, increase judicial uncertainty and error, then the goal of accumulating legal human capital is more complex. The impact of low legal costs may be to, on net, reduce the value of legal human capital.

This is also a criticism of common law regimes—that they encourage excessive complexity that in fact makes the correct outcome in any given case harder to determine and predict. This model has observed that this is likely to happen when legal costs are low relative to damages. This suggests the need to be much more careful about our statements about relative legal costs in common law and civil code regimes. While absolute legal costs (k) are relevant to the optimality of rule adaptation and complexity, it is relative legal costs that have an impact on the composition of the legal human capital accumulated in a regime. Common law systems, particularly the American systems, are not only known for high legal costs; they are also known for high damages (M). It is an open question, then, whether relative legal costs are higher or lower in common law regimes as compared to civil code regimes, and thus whether we should be predicting more or less 'bad' human capital in common law regimes. Moreover, the greater latitude afforded civil code judges to obtain evidence on their own initiative may mitigate the problem of bad human capital. I suspect, however, that the public financing of evidentiary investigation that some civil code regimes employ also reduces the overall quantity of investment in legal human capital, both good and bad. Thus the great advantage seen by Langbein (1985) in the ability of the German judge to control the development of evidence may, on net, constrain the development of legal human capital. The model above assumes that civil code regimes are open to the litigants' efforts to present evidence and argument, harnessing the private incentive to invest in the cost of evidence and argument. If this is not the case, then the capacity of the system to generate legal human capital may be even further reduced.

Finally, it is important to put the analysis in this model into some historical perspective. The civil code regimes, particularly the French, were deliberately designed to display the attributes I have emphasized: the anonymity of judges,

restrictions on the extent to which what one judge does in a particular case is communicated to others as material on which those future judges may draw, the use of separate examining judges, limitations on the extent to which the 'law' can become increasingly complex. The design features were not put in place out of a mistaken understanding of how legal human capital and error reduction occurs in courts; they were put in place in the Napoleonic Code in order to control corruption among judges, to constrain judicial adaptation of rules and with a specific goal to make the law the province of non-specialists. (Merryman 1985) It is an open question as to whether this legal design was appropriate for that time. But it is clear that the world in which a 21st century legal regime operates is vastly more complicated, heterogenous and dynamic than the one regulated by the first Napoleonic Code. The features of that system that control corruption by individual judges also limit the extent to which the law is capable of responding to today's more complicated, dynamic environment. The analysis in this paper emphasizes that this comes not only directly from the discouraging of rule adaptation by judges, but also indirectly through the impact that these controls on judges have on the incentives for litigants to invest resources in producing evidence and legal argument that ultimately can redound to the benefit of the system as a whole. We have seen that this is true even if legislatures control rule adaptation. This is not to say that corruption is not a problem—all legal regimes struggle with the potential for judges to decide on the basis of personal benefits, be they financial, political or ideological—but rather that the institutional features intended to control corruption may extract today an increasingly high cost.

9. CONCLUSION

We began with the question of which legal regimes better support economic growth and the development of markets. The analysis in this paper suggests that making progress on that question will require moving beyond the simple dichotomy between common law and civil code regimes. I have emphasized that the important distinctions between legal regimes are found not in the reliance on code versus caselaw but rather in the determinants of judicial incentives and the capacity for a legal regime to generate investments in legal human capital that reduce legal error. From a research perspective, this highlights the need for two important empirical projects. First, we clearly need to deepen our attention to the specifics of the insitutional environments in different countries that affect judicial incentives and the accumulation of legal human capital. Classifying regimes as either civil code or common law is not likely to prove helpful. Rather, we need to know far more, country-by-country, about the structure of judicial rewards and the information available to those who judge the performance of judges. This suggests a far more refined comparative project than the one that currently engages comparative scholars. The model in this paper suggests that the key variables include the identity of those who evaluate judges (senior judges? politicians? lawyers? journalists?) and the information available to those evaluators (are decisions published? with what level of detail on factual findings and reasoning? is the information filtered by a judge or available in its original form as verbatim testimony and exhibits?). The structure of courts is important (are judges identified? do they sit alone or in panels? are opinions attributable to individual judges? who determines evidentiary questions?) The exposure of judges to the welfare effects of their decisions may

also be important (have judges been exposed to the practical problems of clients? do they enter the judiciary directly from their legal education or only after a period of practice?) And, critically, how is information learned by judges in a particular case diffused through the system (again, are decisions published and how detailed is the presentation of facts and reasoning?)

With a more refined descriptive catalogue of differences between legal regimes, we will be in a position to conduct a second important empirical project: more careful study of the relationship between these institutional variables and economic growth. As many have noted, the current classification of regimes on the basis of legal origins is somewhat crude and makes it difficult to sort out the effect of a particular legal history from other cultural or human capital imports. The analysis in this paper suggests more specific legal variables—which undoubtedly vary across countries that are otherwise classified as belonging to a particular legal family—on which empirical work can focus in the effort to assess the role of legal factors in economic growth and development. Not only might this help disentangle confounding effects from the inheritance not only of legal rules but also human capital and other cultural attributes, but it may also help to increase the precision of our estimation techniques, as we can make use of the substantial variability in legal regimes, variability that is masked by the gross division into legal families.

Further theoretical work is also clearly needed. In order to simplify the analysis, I have suppressed several features of litigation and the response to litigation that clearly will have an impact on the incentives of judges, the accumulation of legal human capital and the path of legal evolution. Settlement behavior is obviously a critical component of litigation and as many have noted, settlement is not random. It has a systematic effect on the nature of the cases that reach final decision in a court. Legal rules also affect activity levels, the behavioral choices plaintiffs and defendants make about the conduct implicated by a legal rule. As I have argued elsewhere (Hadfield 1992), this will also affect the information set reaching a court. A more general model would also relax the assumption that only defendants present evidence and argument, and the strategic behavior that surrounds information revelation to a court. Several economists have explored in particular the impact of signaling, strategic revelation and the competition between plaintiff and defendants on the nature of the evidence presented to a court. (See, for example, Milgrom and Roberts 1986.) That work has focused on the impact of strategic behavior on the accuracy of a court's determination of the facts in a given case. The model presented in this paper identifies another important effect that may flow from strategic evidentiary behavior, namely the effect on the informative quality of the legal human capital stock and thus on the likelihood of error in the legal system as it evolves. And although I have de-emphasized the importance of the relative reliance on statutes or regulation as opposed to judge-made law because of the exaggeration of this difference in the existing literature, it will ultimately be important in a fuller model to situate the analysis of learning through litigation in the context of legislative determinations about the extent to which regulation will be accomplished through courts as opposed to legislatures and agencies. If there are significant obstacles to the accumulation of legal human capital, for example, that do not confront the development of bureaucratic expertise in legislatures and agencies, optimal legal regulation may involve heavier reliance on statutes and regulations. In the end however, even the most refined statutes require interpretation

and application and hence depend on the quality of legal human capital available to judges. Finally, it will be important for further work to assess more carefully the tradeoffs between controlling corruption within courts and facilitating the capacity of judges to engage in welfare-promoting rule adaptation. The effort to control of corruption is a key reason for many of the institutional features that I have identified as critical to the capacity of a legal regime to learn and adapt over time. But the tradeoffs may not be as stark as they first appear. The capacity of a system to detect corruption is also dependent on the level of legal human capital: indeed, this is one of the principal justifications for public and reasoned decisionmaking. Like rule adaptation, the elimination of corruption may be best analyzed as a dynamic problem of structuring the mechanisms that contribute to the organic accumulation of legal human capital.

The policy prescriptions that flow from the analysis I have presented demonstrate that the choice facing transition and developing economies is not between writing codes or borrowing volumes of caselaw. Rather it is a series of choices about institutional attributes such as the publication and expansiveness of legal opinions, the institutional structuring of judicial incentives for rule adaptation and the mechanisms by which information about the welfare effects of particular rules (or, more to the point, particular interpretations of statutory provisions) makes its way to judges and those who evaluate judges. The model also links the effectiveness of courts to the organization and regulation of the legal profession. Lawyers play a key role in the generation and transmission of specialized legal human capital, specifically expertise about the relationship between legal rules and welfare. As the model makes clear, the adaptation of law to local and changing circumstances over time requires that litigants face incentives to invest in lawyers' efforts to produce evidence and innovate legal arguments. The organization and regulation of the legal profession—the extent to which the market for lawyers is competitive, for example—will influence the path of the law, both through the cost of legal services and the cost of generating a certain level of expertise. Rules governing the organization of legal practice—limitations on firm size or prohibitions on employment²⁴ for example—influence the extent to which legal human capital is shared among those in the profession. The model also suggests that countries attempting to transition quickly to a legal regime that supports economic growth and market development may need to take specific steps to overcome both inadequate judicial incentives and an initially high level of legal error. Particularly in systems transitioning from socialist or communist governance to market democracy, it is likely that the shared level of legal human capital about the relationship between legal rules and outcomes will be low by virtue of the lack of experience with markets. In these settings, policy efforts to effectively 'import' legal human capital into the profession and judiciary may be necessary. This has implications, for example, for the rules governing the access of foreign lawyers and law firms to practice in the new regime as well as for the access the profession and judiciary has to the work of lawyers and courts in other jurisdictions.

The principal lesson is that law that supports economic growth and market development has to be seen in dynamic terms, as an organic entity that evolves over time in response to local and changing conditions. In order for that process to take

²⁴Slovakia, for example, has a rule that lawyers may not be employed by other lawyers. In the interests of independence, lawyers must personally represent a client.

place, it is necessary for judges to face incentives that support welfare-improving rule adaptation and for litigants to invest in presenting to courts the evidence and arguments they need to evaluate proposed rules or statutory interpretations. Whether a system is denominated a code system or a common law system, it is the institutions that structure incentives for judges and litigants to learn over time and the mechanisms by which this learning is translated into shared legal human capital that determine the quality of a legal regime.

10. REFERENCES

- Bailey, Martin J and Paul H. Rubin. 1994. "A Positive Theory of Legal Change" *International Review of Law and Economics* Vol. 14, pp. 467-477
- Berkowitz, Daniel, Katharina Pistor and Jean-Francois Richard. 2003. "The Transplant Effect." *American Journal of Comparative Law*. Vol. 51, pp. 163-203.
- Botero, Juan, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer. 2003. "Judicial Reform." *The World Bank Research Observer*.
- Cooter, Robert, Lewis Kornhauser and David Lane. 1979. "Liability Rules, Limited Information and the Role of Precedent." *The Bell Journal of Economics*. Vol 10, pp. 366-373.
- Davis, Kevin. 2004. "What Can the Rule of Law Variable Tell Us About Rule of Law Reforms?" *Michigan Journal of International Law*. Vol. 26, pp. 141-161.
- Dewatripont, Mathias and Jean Tirole. 1999. "Advocates." *Journal of Political Economy*. Vol. 107, pp. 1-39.
- Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer. 2003. "Courts: The Lex Mundi Project." *The Quarterly Journal of Economics* Vol. 118, pp.
- Epstein, Richard A. 1980. "The Static Conception of the Civil Law." *Journal of Legal Studies*. Vol 9, pp. 253-275.
- Fon, Vincy and Francesco Parisi. 2004. "Judicial Precedents in Civil Law Systems: A Dynamic Analysis." *George Mason University School of Law Working Paper* 04-15.
- Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer. 2004. "Do Institutions Cause Growth?" *Journal of Economic Growth*. Vol 9, pp. 271-303.
- Glaeser, Edward L. and Andrei Shleifer. 2002. "Legal Origins." *Quarterly Journal of Economics*. Vol. 117, pp. 1193-1229.
- Glendon, Mary Ann, Michael Wallace Gordon and Paolo G. Carozza. 1999. *Comparative Legal Traditions in a Nutshell*.
- Goodman, John C. 1978. "An Economic Theory of the Evolution of Common Law." *Journal of Legal Studies*. Vol 7, 393-406.
- Hadfield, Gillian K. 1992. "Bias in the Evolution of Legal Rules." *Georgetown Law Journal* Vol. 80, pp. 583-616.
- . 2000. "The Price of Law: How the Market for Lawyers Distorts the Justice System." *Michigan Law Review* Vol. 98, pp. 953-1006.
- Hylton, Keith N. 2005. "Information, Litigation and Common Law Evolution." *Boston University School of Law, Working Paper* 05-07.

Klerman, Daniel M. and Paul G. Mahoney. 2005. "The Value of Judicial Independence: Evidence from Eighteenth Century England." *American Law and Economics Review* Vol. 7 pp. 1-25.

Landes, William M. and Richard A. Posner. 1976. "Legal Precedent: A Theoretical and Empirical Analysis." *Journal of Law and Economics*. Vol. 19 pp. 249-.

Langbein, John. H. 1985. "The German Advantage in Civil Procedure" *The University of Chicago Law Review* Vol. 52, pp. 823-866.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert Vishny. 1998. "Law and Finance." *Journal of Political Economy* Vol. 106, pp. 1113-1155.

Mahoney, Paul G. 2001. "The Common Law and Economic Growth: Hayek Might Be Right." *Journal of Legal Studies*. Vol. 30, pp. 503-525.

Merryman, John. 1985. *The Civil Law Tradition* (Stanford, CA: Stanford University Press).

Milgrom, Paul and John Roberts. 1986. "Relying on the Information of Interested Parties." *The RAND Journal of Economics*. Vol. 17, pp. 18-32.

Miller, Geoffrey P. "The Legal-Economic Analysis of Comparative Civil Procedure." *The American Journal of Comparative Law*. Vol. 45, pp. 905-918.

Posner, Richard A. 1993. "What Do Judges Maximize? (The Same Thing Everybody Else Does.)" *Supreme Court Economic Review*. Vol. 3, pp. 1-41.

_____. 1999. "An Economic Approach to the Law of Evidence." *Stanford Law Review*. Vol. 51, 1477-1546.

_____. 1977. *Economic Analysis of Law*.

Priest, George L. 1977. "The Common Law Process and the Selection of Efficient Rules." *Journal of Legal Studies*. Vol 6, pp. 65-

Ramseyer, Mark J. and Eric B. Rasmussen. 1997. "Judicial Independence in a Civil Law Regime: Evidence from Japan." *Journal of Law, Economics and Organization*. Vol. 13, pp. 259-286.

Rubin, Paul H. 1977. "Why is the Common Law Efficient." *Journal of Legal Studies*. Vol. 6, pp. 51-63.

_____. 1982. "Common Law versus Statute Law." *Journal of Legal Studies*. Vol. 11, pp. 205-223.

Schneider, Martin J. 2003. "Employment Litigation on the Rise? Comparing British Employment Tribunals and German Labor Courts." *Comparative Labor Law and Policy Journal* Vol. 22, pp.

Schwartz, Alan and Robert Scott. 1995. "The Political Economy of Private Legislatures." *University of Pennsylvania Law Review* Vol. 143, pp. 595-692.

Tullock, Gordon. 1980. *Trials on Trial*.

Whitman, Douglas Glen. 2000. "Evolution of the Common Law and The Emergence of Compromise." *Journal of Legal Studies*. Vol. 29, pp. 753-781.