

# Are bank mergers good news for shareholders?

## The Effect of Bank Mergers on Shareholder Value in Japan

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Banking sector consolidation made headlines following the global financial crisis of 2008, but was already a salient feature of the global banking sector even before the crisis intensified the trend. Over the past two decades banking sector consolidation has been a global trend. Part of that decline is due to bank failures, but from the early 1990s up to 2007 the global banking industry as a whole was relatively healthy, yet the number of commercial banks continued to decline, mostly due to consolidation (Mishkin, 2012, pp. 338-339). What are the effects of this global trend toward more consolidated banks on the non-financial client firms of those banks?

Previous studies on the impact of bank mergers on the banks themselves have generally found that bank mergers bring positive excess returns to shareholders of the target bank (Campa & Hernando, 2006; Cybo-Ottone & Murgia, 2000; DeLong & DeYoung, 2007; DeLong, 2001; Houston, James, & Ryngaert, 2001), although there is some evidence that the shareholders of the acquiring banks may also benefit during periods of financial crisis (Beltratti & Paladino, 2013), in the case of megamergers (Kane, 2000), diversifying mergers (Filson & Olfati, 2014) or when the target is in a low investor protection environment (Hagendorff, Collins, & Keasey, 2008).

There is less in the literature about how bank mergers affect the shareholders of the bank client firms because data matching up banks to their non-financial firm clients is not readily available. The few existing studies of bank mergers in the U.S. and Europe suggest that what is good for the bank is not always good for the borrower. Researchers have generally reported welfare losses for shareholders of client firms of the target bank, especially if the client firm is small or credit constrained (Carow, Kane, & Narayanan, 2006; Fraser, Kolari, Pynnönen, & Tippens, 2011; Karceski, Ongena, & Smith, 2005). Two studies of megamergers in Japan,

however (Miyajima & Yafeh, 2007; Shin, Fraser, & Kolari, 2003), do not find evidence of any negative effects of bank mergers on client firms overall.

This study addresses this tension in the literature with the first comprehensive analysis of all bank mergers in Japan over a 23 year period, examining the effect of bank mergers on shareholder wealth of the client firms and on bank-firm relationship termination. This research question is particularly relevant now, as Japanese policymakers ponder how to support the banking sector in the current environment of negative interest rates.

This study also makes several methodological contributions to the existing academic literature on the effect of bank mergers on client firms. Firstly, exploiting the comprehensive data set, which includes the full universe of announced bank mergers over the sample period, the analysis reveals heterogeneous impacts of different kinds of mergers<sup>1</sup>.

In addition, the full sample of firms, including firms affiliated with banks that did *not* merge, is analyzed, rather than focusing on the sub-sample of firms affiliated with banks that merged. This allows use of difference-in-difference techniques to isolate the effect of mergers on the merging banks' affiliated client firms from the effect of mergers on clients of banks that do not merge or unaffiliated firms.

Analysis of the full-sample of client firms also allows inclusion of bank-firm pair fixed effects, which control for potential endogenous matching of bank-firm pairs that might bias analysis of the effect of bank mergers on affiliated client firms.

Finally, this study makes a contribution to the existing event study literature on the wealth effects of bank mergers by using adjusted return analysis rather than the traditional

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<sup>1</sup> Existing studies have not ignored merger-specific characteristics, but have tended to focus on either a single merger event or a sub-sample of extremely large merger events. While the findings are suggestive, they cannot conclusively determine whether mega-mergers are statistically significantly different from “normal” mergers.

market model analysis. Fuller, Netter, and Stegemoller (2002) have shown that when other events enter in the estimation window, the estimated beta is affected by those events, contaminating the “normal” return that is used in market model analysis. If this is the case, adjusted return analysis is preferable for events like bank mergers which occur frequently within a short time interval, meaning there is a high probability of other events contaminating the estimation window.

Even though our sample is made up of publicly listed firms that presumably have access to sources of finance other than bank loans, the empirical analysis demonstrates that bank mergers have significant short-term and even long-term effects on the client firms of merging banks.

In general, announcements of bank mergers lead to shareholder *gains* for the client firms of the merging banks in the short-run. Gains are especially large for credit constrained, sick “zombie” firms. However, client firms of undercapitalized banks involved in the announced merger suffer significant shareholder losses. Consistent with previous research, mega-mergers in Japan do not seem to incur significant shareholder gains or losses for the client firms of the merging banks.

Bank-firm relationships are also influenced by bank merger announcements. In general, bank-firm relationships are more likely to be terminated and the client firms switch to a new main bank, following a bank merger announcement. However, zombie firms, which presumably have the highest switching costs, are indeed less likely to terminate their bank relationship and switch to an alternate bank following a merger announcement by their main bank.

Long-term buy-and-hold returns are not significantly affected by bank merger announcements overall, but again, have significant implications for zombie firms. As in the

short-run, zombie firms post statistically significant returns over the long-run following bank merger announcements. However, zombie clients of under-capitalized banks involved in mergers exhibit significant shareholder losses over the long-run.

The rest of this paper is organized as follows. The next section provides some background on bank-firm relationships in Japan. Section 2 presents a theoretical model that is used to frame and interpret the empirical analysis. Section 3 describes the data used and section 4 presents an event study analysis of the wealth effects of bank merger announcements on client firms in the short-run. Section 5 turns to difference-in-difference analysis to investigate the effect of bank merger announcements on bank-firm relationship termination. Section 6 returns to the question of the wealth effects of merger announcements in the long-term, analyzing the four-year buy-and-hold abnormal returns of client firms following bank merger announcements. Section 7 concludes.

## **1. Bank-Firm Relationships in Japan**

This study defines a bank-firm relationship using survey data published in The Japan Company Handbook in which firms identify their “main bank”. What is a main bank? The term main bank, used to refer to a special relationship between a bank and its non-financial client firm, is probably unique to Japan, but shares characteristics with relationship lending the world over. Although some main bank relationships have their roots in another Japanese economic institution, the *keiretsu* enterprise groups, or even their antecedent, the pre-war *zaibatsu* industrial groups, the concepts are different. Member firms of enterprise groups usually consider the affiliated city bank in their same *keiretsu* as their main bank, but even firms not affiliated with any *keiretsu*, including small firms, have a main bank.

Thus, while there is no official definition of a main bank, nearly every Japanese company reports having one<sup>2</sup>. And the main bank–firm relationships in Japan are remarkably stable. After controlling for the effect of mergers, most of the nearly 5,000 firms in our sample stayed with the same main bank for all 23 years of the sample. This is especially striking given that the sample period includes some periods of economic turmoil and malaise.

However, a graph of the data suggests that the stability of these relationships is changing. Figure 2 plots the total number of bank-firm relationship terminations over the years 1990-2012. There is an increase in the number of bank-firm relationship terminations starting in the late 1990s to early 2000s, soon after the sharp consolidation of Japan’s banking sector began.

*<Figure 1: Number of Bank Mergers and Bank-Firm Relationship Terminations in Japan, 1990 - 2012>*

Even if bank mergers trigger bank-firm relationship termination, does it matter? Academics familiar with the term probably think of the main bank as a client firm’s top lender. Indeed, listed firms in Japan rely on their declared main bank for about a third of their total loans. But in their book on The Japanese Main Bank System, Aoki and Patrick (1995) explain that that definition does not accurately capture the role of a main bank. A firm’s main bank is not simply a firm’s top lender. In fact, it may not even *be* the top lender. Looking at the same data in another light, among listed firms, less than half (46%) of the firms have their main bank as their top lender<sup>3</sup>. Recently, large firms, which traditionally have the strongest main bank

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<sup>2</sup> Aoki, Patrick, & Sheard (1995) report that “according to a survey of some 110,000 companies with annual sales of 1 billion yen or more.... almost every Japanese company has what it calls a main bank relationship” (p. 5). In our sample of 4,971 firms listed on the first and second section of the Tokyo Stock Exchange or other regional exchanges in Japan, all but one declare a main bank at some point in our sample of the 29 years from 1984-2012 and all but 12 firms declare a main bank in every year of the sample.

<sup>3</sup> Although the share of firms for which the main bank is also the top lender is declining over time, this is not a completely new phenomenon. Before deregulation made such categorizations obsolete, it was common for firms

relationships, may not need to borrow from their main bank at all. We find that this ratio has been rising and that now about 41% of all listed firms do not have any outstanding loans from their main bank.

But even for firms for which the main bank is not the main lender – and even for firms that do not borrow from their main bank at all - the main bank relationship may still be an important one. Research shows that the main bank provides many other services to client firms such as trustee administration; guarantee and underwriting of bond issues; investment banking and advisory services relating to issue of securities and to corporate acquisitions and divestments; operation of payment settlement accounts and foreign exchange dealings. The main bank may play an important role in corporate governance through its holding of firm equity, supply of management resources, including directors, monitoring of firm performance and intervention in times of financial distress (Aoki, Patrick, & Sheard, 1995).

During Japan's high-growth period from the early 1950s to the early 1970s, the unique features of the main bank system were credited with contributing to Japan's economic success. Main banks were thought to overcome the problem of asymmetric information more efficiently than more arms-length approaches to corporate financing (Diamond, 1984; Hoshi, Kashyap, & Scharfstein, 1990). Even after deregulation of Japan's financial system in the mid-1970s provided large firms with access to many other, usually cheaper, sources of corporate finance than bank loans, the main bank system continued to provide firms with other benefits. Intervention by the main bank in times of financial distress was shown to enhance restructuring and post-restructuring firm performance (Kang and Shivdasani, 1997; Hoshi, Kashyap, & Scharfstein, 1990). Academics have speculated that the role of the main bank in corporate governance and monitoring may compensate for the lack of other, more market-oriented

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to borrow more from some other "trust bank" or "long-term credit bank" than its main bank, which was usually categorized as a "city bank".



approaches to corporate governance such as hostile takeovers, which even now remain rare in Japan.

But empirical evidence on the role of the main bank is not all positive. Weinstein and Yafeh (1998) find that while a close main bank relationship increases a firm's access to credit, the firms pay dearly for this privilege through higher borrowing costs. Further, they find that the improved access to credit does not lead to higher growth or profitability for the client firms. While bank lending to financially distressed but fundamentally viable firms is associated with improved firm performance in the 1980s, Peek (2010) finds that during the period 1998-2002, increased main bank loans to distressed firms is associated with worse subsequent firm performance. This may be because, as Peek and Rosengren (2005) report, troubled Japanese banks were more likely to increase loans to weak firms. That tendency was more pronounced for firms with strong bank ties. Caballero, Hoshi, and Kashyap (2008) show that this practice by banks of continuing to provide credit to insolvent "zombie" firms, depressed job creation and productivity in Japan.

Thus, the Japanese main bank system, which used to be considered one of the secrets to Japan's phenomenal economic success, is now accused instead being the country's economic Achilles heel. Once viewed as an enviable, but uniquely Japanese economic institution that contributed to Japan's phenomenal economic growth from the early 1950s to 1970s, the main bank system has recently come under attack as an outdated, inefficient institution that has helped keep unviable "zombie" firms alive and contributed to Japan's economic malaise over the past two decades.

In the analysis to follow, we empirically examine the impact of bank merger announcements on short-run abnormal returns, main bank-client firm relationship termination and long-run buy-and-hold returns of the client firms of the merging banks. Given the debate over the role

of the main bank system in sustaining zombie firms, we focusing particular attention on market evaluation and the main bank relationships of such zombie firms around the announcement of a merger by their main bank.

## 2. Model of Borrower Welfare and Switching Costs

Assume there are many firms, indexed by  $i$ . A given firm  $i$  wants to carry out a project which requires an initial investment of  $X$  dollars and yields rate of return  $\bar{r}_i$ . To finance that project, firm  $i$  can turn to its main bank,  $M$ , or another bank, not its main bank,  $N$ . The main bank offers  $X$  dollars of loans to firm  $i$  at interest rate  $r_{iM}$  and the non-main bank with interest rate  $r_{iN}$ .  $\bar{r}_i$  is adjusted for the risk of the project failing and  $r_{iM}$  and  $r_{iN}$  are adjusted for loan-related service quality, so that they are all comparable on a same scale.

Firm  $i$  can switch its main bank from  $M$  to  $N$ , but with a switching cost  $\tilde{S}_i$ <sup>4</sup>. This switching cost is the cost of building a relationship with new main bank, with a temporary loss of benefits of the main bank relationship in the interim.

Firm  $i$ 's unit profit from its project if it is financed with loans from the main bank is

$$\pi_{iM} = \bar{r}_i - r_{iM} \quad (1)$$

On the other hand, if firm  $i$  finances its project by switching its main bank from  $M$  to  $N$ , its unit profit is

$$\pi_{iN} = \bar{r}_i - r_{iN} - \tilde{S}_i \quad (2)$$

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<sup>4</sup> This model builds on the “switching costs model” of Karceski et al. (2005), incorporating some adaptations to reflect institutional detail in Japan. As in the original model, we

### ***A. Welfare Effects of Bank Mergers***

What is the impact of a bank merger in this model? To keep the model simple, we assume that banks do not ration credit, so mergers only affect the interest rate banks charge to client firms. If a merger results in improved performance or efficiency by the bank, then  $r_{iM}$  will decline and firm  $i$ 's welfare will increase. On the other hand, if the merger increases bank market power then  $r_{iM}$  may increase and firm  $i$ 's welfare will decrease.

### ***B. Heterogeneous Welfare Changes***

The welfare effects of bank mergers may not be homogenous, however. For example, the newly consolidated bank, which results from the merger of two main banks –  $M_{HC}$ , a strong, high-capital (HC) bank and  $M_{LC}$ , a weak, low-capital bank – may not raise the interest rate charged to client firms uniformly. The new bank may hold loan conditions (in this model, the interest rate charged to its clients) constant for a subset of its client firms, perhaps those firms that were clients of the strong bank,  $i_{HC}$ , constant. But after the merger, the new bank may raise the interest rate charged to another subset of client firms, perhaps those that were clients of the weak bank,  $i_{LC}$ . Both subsets of firms – those that are charged a higher interest rate and those that are charged the same interest rate – face the same switching cost,  $\tilde{s}_i$ . In the case of a welfare-reducing bank merger, the welfare loss of client firms of the weak bank, the subset  $i_{LC}$  firms, will be greater than the welfare loss of client firms of the strong bank, the subset  $i_{HC}$  firms.

### ***C. Heterogeneous Switching Costs***

If not all client firms enjoy welfare gains after bank merger events, the probability of client firms' switching their main bank may rise after bank merger announcements. Again, there may be heterogeneity across firms since switching costs also may not be uniform across firms. If there are firms with different switching costs, the impact of a merger of the firm's main bank

will be different. Rather than representing all firms with  $i$ , let firms with low switching cost be designated  $g$  (for “good” firms) and firms with high switching cost be designated  $z$  (for “zombie” firms). Low switching cost firms,  $g$ , may be less information-opaque or simply healthy firms. High switching cost firms,  $z$ , may be information-opaque small firms or so-called zombie firms that cannot profitably finance projects without subsidized loans (Caballero et al., 2008). Imagine that, as a result of a merger that increases market power, the main bank increases the interest rate it charges to client firms. That is welfare-reducing for all client firms of the merged bank. Further, imagine that the increase in the interest rate charged to client firms is above the (low) switching cost for healthy  $g$  firms but below the (high) switching cost for zombie  $z$  firms. Under this scenario, the healthy  $g$  firms will switch their main bank after a merger event and incur a relatively lower loss of welfare. However, for the zombie  $z$  firms, the switching costs will be too high. They will not switch their main bank after merger events – at least not voluntarily – and they will incur relatively higher loss of welfare as a result of the merger.

#### ***D. Implications of the Model***

The model above has several implications. If bank mergers improve bank performance, then client firms of banks that merge will experience welfare gains. But those welfare gains may not be spread equally across all clients of the consolidated bank. If the weaker bank in the merger has less power than the stronger bank in the newly consolidated bank, clients of the weaker bank may experience welfare losses.

Some firms may choose to terminate the relationship and switch to another bank soon after the merger. But firm switching costs may vary by firm. Regardless of the welfare effects of merger, sickly zombie firms with very high switching costs would be expected to exhibit lower bank-firm termination rates after merger, rather than incur very large switching costs.

### 3. Data

#### A. Data Sources

The data set used to explore the implications of the model above combines several different databases over the sample period of 1990 to 2012. The first database is Nikkei Telecom 21, an archive of Japan's leading newspapers. Among the newspapers available from Nikkei Telecom 21, the *Nihon Keizai Shimbun* (*Nikkei Shimbun*) and *Nikkei Kinyu Shimbun* are referred to determine merger announcement date<sup>5</sup>. Merger announcement date is defined as the first date on which bank names, the term merger, forming a bank holding company or subsidiarization and certain word strings such as “reached an agreement”, “entered final negotiations”, “announced”, “decided” or “anticipated” (in Japanese) appear in these newspaper articles, which yields 46 completed merger announcements from 1990 to 2011. If announcements appear on a weekend or holiday, announcement date is set to next business day.

The Japan Company Handbook published by *Toyo-Keizai* is used to match up banks and their client firms. This study focuses only on domestic commercial banks. Foreign, *shinkin* (credit union) and government banks are excluded since mergers of those kinds of bank may have motivated for different reasons, such as expansion of operation in Japan, demand from member of the union or in order to promote specific industries.

Stock price and financial data of banks and their client firms are from the Nikkei NEEDS database, which covers all the listed non-financial firms and listed and unlisted banks in Japan. Financial data in the Nikkei NEEDS database are from *yukashoken* report, a public disclosure required by the Ministry of Finance of all listed firms and banks as well as large<sup>6</sup> firms and

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<sup>5</sup> To confirm the accuracy of the announcement date, Japan's leading industry and logistics newspapers, the *Nikkei Sangyo Shimbun* and the *Nikkei Ryutsu Shimbun*, respectively, were also referred to.

<sup>6</sup> More specifically, a firm or a bank is required to submit a yukashoken report if the firm or the bank satisfies one of the following criteria: (i) listed on stock exchange, (ii) listed over-the-counter market, (iii) size of initial

banks, even if they are not publicly listed. Financial data for those few unlisted banks which do not file a *yukashoken* report are supplemented with the Japanese Bankers Association's (JBA) "Financial Statement of All Banks"<sup>7</sup>. Unconsolidated financial statements are used as they more accurately reflect the individual firm or bank condition.

## ***B. Firm, Bank and Merger Heterogeneities***

### ***Zombie Firms***

To examine possible heterogeneous effects of bank mergers on firms, we construct a dummy variable to identify so-called "zombie" firms: unprofitable firms that nevertheless continue to receive forbearance lending from their main bank. Although the concept existed in the literature much earlier, Caballero et al. (2008) popularized the term "zombie" firm to denote firms that are receiving subsidized credit through a direct interest rate subsidy from their main bank, or more specifically, a firm which pays an interest rate lower than the minimum possible interest rate at which banks can get some benefit from lending other than evergreening.

Fukuda and Nakamura (2011) point out two shortcomings in Caballero et al.'s (2008) definition. One is that healthy firms that borrow at low interest rates due to their lower risk may be misclassified as "zombies". The other is that unhealthy firms that are actually "zombies" may not be correctly classified as zombies, because their main bank keep lending to those unhealthy firms so that those firms can repay loans with interest rates higher than the minimum possible rate. Fukuda and Nakamura (2011) argue that this misclassification of zombie firms is most egregious from 2002, when Japanese banks finally started to recover from the banking crisis of the late 1990s, as evidenced by the decline in their non-performing loan ratio.

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public offering or seasoned equity offering was 100 million yen or more or (iv) number of equity holders is 1,000 or more.

<sup>7</sup> "Financial Statement of All Banks" are publicly available from [http://www.zenginkyo.or.jp/stats/year2\\_02/index.html](http://www.zenginkyo.or.jp/stats/year2_02/index.html) (in Japanese).

Consistent with Fukuda and Nakamura's (2011) argument, using Caballero et al.'s (2008) zombie-firm definition, the fraction of zombie firms in the sample of firms for this study also steadily increases over time, and there is no structural break in the trend even after 2002.

Since this misclassification originates in the use of information on interest rate payments only, combining Caballero et al.'s (2008) “zombie” definition with Peek and Rosengren's (2005) “sick” firm definition, which relies on firms’ balance sheet and income statement-based financial conditions, addresses the problem. In the analysis to follow, a firm is identified as a zombie if the firm’s interest rate payment is below the theoretical minimum *and* the firm’s ROA and working capital ratio are in the bottom quartile of the sample in a given year.

### ***Undercapitalized Banks***

To examine possible heterogeneous behavior of merged banks as well, a dummy variable identifying unhealthy or undercapitalized banks is included. “undercapitalized” Following Peek and Rosengren's (2005) definition, a bank is considered “undercapitalized” if it is within 2 percentage points of its minimum required regulatory capital ratio.

### ***Mega Mergers***

Finally, to examine possible heterogeneous effect of bank merger events, we construct a dummy variable to identify mega-mergers – mergers in which total assets of newly formed bank exceed 80 trillion yen. Of 46 mergers in the sample, 4 mergers are mega-mergers under this definition: the formation of Mizuho, Sumitomo-Mitsui Banking Corporation (SMBC) and Tokyo-Mitsubishi-UFJ, as well as one internal merger within SMBC.

### ***C. Summary Statistics***

The final sample includes data on 161 banks, 4,450 publicly listed non-financial firms and 46 bank merger announcements over the period 1990 to 2012. Over the entire 23 year sample

period there are 63,373 total observations for most series in the client firm data. Summary statistics for the full sample of banks, client firms and merger events are presented in Table 1.

< *Table 1: Summary Statistics for Banks, Client Firms and Mergers, 1990-2012 (23 years)*>

### *Client Firms*

This study focuses on listed firms, some of which are very big. As reported in Table 1, mean annual sales of the firms in our sample is JPY 128 billion (about USD 1.3 billion). This is much larger than the Norwegian firms studied by Karceski et al. (2005) (median sales of USD 58 million), but less than half the size of the mean annual sales for firms listed in the US (USD 3.0 billion). Although very few of the firms in our sample are considered “small and medium enterprises” by the Japanese government, Weinstein and Yafeh (1998) make the point that many listed firms in Japan are not large firms. Median sales for the firms in our sample are JPY 27 billion (about USD 270 million), which means that half the firms have annual sales less than that amount. Five percent of the firms in the sample have sales of less than JPY 1.3 billion (USD 13 million). Aside from the size of the firms in the sample, readers should note that of the 4,450 firms in the sample, about half, 2,177 firms, are credit constrained at some point in the sample. Half as much again, 1,012 firms, are not only credit-constrained, but qualify as sick “zombie” firms at some point in the sample period.

### *Banks*

Banks in Japan are large by any standard. Mean total assets of the banking sector over our sample period were JPY 6 trillion (approximately USD 60 billion), which is 30 times the size of the average U.S. bank. Even the median bank had total assets of JPY 2 trillion (about USD 20 billion), which would put it in the top 1.6% of US banks by size. Merging banks in Japan tend to be even larger than average.



Of the 161 banks in the sample, 64 banks have experienced a merger during the sample period. Of that banks that merged, most did so only once, although there is one bank in the sample that was involved in 4 of the 64 mergers.

Of the 161 total banks, an even larger number, 114, were within 2 percentage points of their minimum required regulatory capital ratio at some point in the sample period, which we label as “undercapitalized”. In addition to having lower capital ratios, undercapitalized banks are less profitable on average, although this is due to some outliers at the lower end since the median ROA is still 0.1%.

### ***Mergers***

Over the sample period, there were a total of 46 announced bank mergers that were eventually carried out. The average announced merger was between two banks and was a huge event, involving JPY 28 trillion (approximately USD 280 billion) in assets and potentially affecting 140 affiliated client firms. Note that just one “average” sized merger in Japan is three times larger than the entire Norwegian banking sector studied by Karceski et al. (2005).

Of those 46 merger announcements, 4 mergers<sup>8</sup> qualify as mega-mergers involving at least JPY 80 trillion in assets and an average of JPY 126 trillion in assets. In the analysis to follow, we investigate whether mega-mergers, which may be more likely to enhance bank market power, affect client firms differently than other mergers.

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<sup>8</sup> The formation of Mizuho Financial Group, Sumitomo-Mitsui Banking Corporation (SMBC), Mitsubishi-UFJ Financial Group, as well as one internal merger within SMBC.

### 3. Wealth Impacts of Bank Mergers - Abnormal Return Analysis

We start our empirical analysis with the question of whether bank merger announcements bring welfare gains or losses for affiliated client firms. This research question is investigated with an analysis of client firm abnormal returns around bank merger announcement dates.

#### A. Methodology

The abnormal return for firm  $i$  is defined as the difference between firm  $i$ 's return and a market index return:

$$AR_{i,t} = r_{i,t}^{stock} - r_t^{market} \quad (3)$$

Where  $r_{i,t}^{stock}$  is the return of firm  $i$ 's stock on day  $t$ <sup>9</sup> and  $r_t^{market}$  is the return of the market index on day  $t$ . The TOPIX, a market-capitalization-weighted index, is used for the market index<sup>10</sup>. The cumulative abnormal return is defined as the sum of abnormal returns over an event window of 1 week surrounding the merger announcement date,  $(t-3,t+3)$ , where  $t$  represents the announcement date.

This “adjusted return” definition of abnormal return is not yet standard in the existing literature, but is increasingly used in emerging studies (see, for example, Bouwman, Fuller, and Nain, 2009; and Rosen, 2006) because of its advantage over traditional abnormal return estimated via a “market model” or other multifactor models (Fama & French, 1993; Carhart, 1997) in eliminating the problem of contamination of the normal return. In analysis of events like bank mergers, where multiple events occur within a short interval, there is a high likelihood

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<sup>9</sup> Firm stock returns are defined as the change in the firms' stock price over a day, adjusted for stock splits and dividend payments.

<sup>10</sup> Results are qualitatively similar using the Nikkei-225, an equal-weighted index.

of other events entering the estimation window for any given event, meaning the normal return may no longer serve as an appropriate counterfactual (Fuller et al., 2002)<sup>11</sup>.

### ***B. Univariate Analysis***

Table 2 presents the results of univariate analysis of cumulative abnormal returns of the client firms of merged banks around merger announcements.

#### ***<Table 2. Univariate Analysis of Abnormal Returns around Bank Merger Announcement>***

The results reported in table 2 provide no strong evidence that announcements of bank mergers affect affiliated client firms any differently than unaffiliated firms (panel A). However, analysis of different bank, firm and merger characteristics within the group of client firms of merging banks reveals significant heterogeneity. Panels B-D show that, consistent with the implications of the model, bank merger announcements result in significantly higher welfare gains for healthier client firms and any clients of stronger, more well-capitalized banks. Welfare effects also appear to differ depending on the type of merger. Client firms of banks involved in mega-mergers, which microeconomic theory suggests would increase bank market power, experience statistically significant welfare losses.

### ***C. Multivariate Analysis of Welfare Effects for Firms***

Next, we investigate the effect of bank merger announcements on shareholder value in a more rigorous multivariate regression setting. The analysis starts with a basic regression based upon equation 4:

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<sup>11</sup> In addition, a subtle but important shortcoming of the market model or factor model approach is that the abnormal return is an estimate, so it may or may not be statistically significantly different from zero. Comparisons of this point estimate without accounting for its confidence interval may not have any meaning. Therefore, the adjusted return model which adjusts for market and risk factors using a market index return is preferred here.

$$AR_{i,b,e} = \beta_1 Merged_{b,e} + FirmControls_{i,b} + Bank \cdot Firm_{i,b} + \varepsilon_{i,b,e} \quad (4)$$

Where subscripts  $i$  and  $b$  stand for client firm and bank, respectively, and  $e$  stands for a merger announcement event. Thus  $AR_{i,b,e}$  represents the abnormal return of firm  $i$ , affiliated with bank  $b$ , in the week surrounding merger event  $e$ .

$Merged_{b,e}$  is a dummy variable that takes the value of one if a client firm's declared main bank,  $b$ , was involved in merger event  $e$ . In contrast to most event studies in the existing literature, the analysis includes not only firms affiliated with the banks announcing a merger in a given event (the "treated" group), but also firms affiliated with other banks that did *not* announce a merger in a particular event<sup>12</sup>. Bank mergers may affect *all* client firms, not just those affiliated with the merging banks. Including the entire universe of listed firms makes it possible to control for the possible effects of bank merger announcements on unaffiliated firms and better isolate any differential impacts of bank merger announcements on client firms affiliated with the merging banks<sup>13</sup>.

$FirmControls_{i,b}$  include a small-firm dummy, a low and medium book-to-market value dummy and firm annual returns in the year prior to the bank merger announcement.

The key assumption required for a clean estimate of the impact of bank merger announcements is that there is no omitted variable that simultaneously affects both client firm abnormal returns and the banks' decision to merge. To ensure that this assumption is met, we include bank-firm pair fixed effects: the interaction of a bank fixed effect and a firm fixed effect. This bank-firm

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<sup>12</sup> Acemoglu, Johnson, Kermani, Kwak, and Mitton (2013) take a similar approach in their analysis of the effects of political events on financial firms.

<sup>13</sup> Note, however, that for any given event we exclude from the "control group" of client firms of non-merging banks any firm-bank pairs that experienced a merger four years prior to the merger announcement. This ensures that the post-"treatment", or bank merger announcement, period of a separate event does not contaminate the control group.

pair fixed effect,  $Bank \cdot Firm_{i,b}$ , controls for potential endogeneity in bank-firm matching. Thus, our specification exploits within bank-firm pair variation, comparing the same bank-firm pair in events in which the main bank merges and in other events in which the main bank does not merge.

$\varepsilon_{i,b,e}$  is the error term. Standard errors are clustered at the individual firm level because potential violation of the assumption of an independently and identically distributed error term (iid)<sup>14</sup> is particularly serious in a setting such as this one, where the time dimension is long and the difference-in-difference term is constant during the treatment period. Bertrand, Duflo, and Mullainathan (2004) have shown that failure to address potential serial correlation within a difference-in-difference framework leads to dramatically underestimated standard errors.

We also estimate a variant of equation 4 that includes dummy variables to account for client firm heterogeneity:  $CreditConstrained_i$ , a dummy variable indicating a client firm is credit constrained and  $Zombie_i$ , a dummy variable indicating a client firm is not only credit-constrained, but a sick, presumably bank-dependent “zombie” firm.

$$\begin{aligned}
 AR_{i,b,e} = & \beta_1 Merged_{b,e} + \beta_2 CreditConstrained_i \\
 & + \beta_3 CreditConstrained_i x Merged_{b,e} + \beta_4 Zombie_i \\
 & + \beta_5 Zombie_i x Merged_{b,e} + FirmControls_{i,b} + Bank \cdot Firm_{i,b} \\
 & + \varepsilon_{i,b,e}
 \end{aligned} \tag{5}$$

Table 3 reports the regression results of both equation 4 and 5 on the full sample and several sub-samples.

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<sup>14</sup> Consistency of OLS standard error estimate rests on an assumption that the error term is iid (independently and identically distributed), but panel data typically violate the independence assumption due to serial correlation within cross-sectional units (Petersen, 2009).

*<Table 3. Multivariate Analysis of Abnormal Returns around Bank Merger  
Announcements>*

Columns 1-2 of table 3 report the results for the entire sample. Overall, client firms of the merging banks post shareholder gains in the three days surrounding a merger announcement by their main bank. Interestingly, zombie firms post particularly high gains around merger events, regardless of whether their main bank is involved in the merger or not. Market participants apparently view bank merger announcements as good news for any zombie firms.

However, columns 3-4 show that bank merger announcements bring shareholder *losses* to client firms of weak, undercapitalized banks involved in mergers. Those shareholder losses are particularly sharp for unhealthy, zombie firm clients of merging unhealthy, undercapitalized banks. Mega-merger announcements, analyzed in columns 4-5, do not bring significant welfare gains or losses for client firms of the merging banks.

#### **4. Bank Mergers and Bank-Firm Relationship Termination**

We next explore the effect of bank merger announcements on the likelihood of main bank – client firm relationship termination using difference-in-difference analysis. Difference-in-difference analysis isolates the policy effect from effects of unrelated events and pre-existing trend differentials in the treated and control groups by including dummy variables identifying the post-intervention period,  $Post_t$ , and individuals receiving intervention, here a merger announcement by the main bank,  $Merged_b$ .

A straightforward application of difference-in-difference techniques to estimation of the effect of bank merger on bank-firm relationship termination would look like the following equation:

$$Termination_{i,b,t} = \beta_0 + \beta_1 Merged_b + \beta_2 Post_t + \beta_3 Merged_b \cdot Post_t + \varepsilon_{i,b,t} \quad (6)$$

Where subscripts  $i$ ,  $b$  and  $t$  stand for the client firm, its main bank and the year, respectively. The outcome variable,  $Termination_{i,b,t}$ , is a dummy variable indicating whether a main bank-client firm relationship is terminated between client firm  $i$  and main bank  $b$  in year  $t$ .

The parameter of interest in difference-in-difference analysis is the coefficient estimate on the interaction term of the two dummy variables,  $Merged_b \cdot Post_t$  in this case. The parameter estimate on the difference-in-difference term,  $\beta_3$  in equation (4), captures the average effect of treatment, a main bank merger announcement, isolated from unrelated changes over time and any differentials in pre-existing trends for the treatment and control groups.

Homogeneity between the treated and control group is maintained through something similar to sampling with replacement. The “treated” group of client firms of merged banks is replaced in the sample as part of the control group once the effects of merger announcement have passed, which we assume to be 3 years after announcement.

To ensure unbiased estimation, the final specification bank-firm pair fixed effects,  $Bank \cdot Firm_{i,b}$ , and time fixed effects,  $Year_t$ . The inclusion of time fixed effects accounts for unobserved time-varying factors such as macroeconomic conditions. The inclusion of bank-firm pair fixed effects accounts for any potential endogeneity in bank-firm matching<sup>15</sup>, including the possibility that bank-firm relationship termination is correlated to the banks’ tendency to merge. Therefore, the  $Merged_b$  (representing “treatment”) and  $Post_t$  dummies

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<sup>15</sup> Note that matching endogeneity can be more complex than simply the case of weak firms pairing with weak banks, as is often assumed in the literature (Chodorow-Reich, 2014; Gan, 2007). Bank-firm pair fixed effects capture the effects of any unobserved factors, including things like geographic and corporate cultural proximity between banks and client firms, banks’ specialization in the client firm business, etc...

are absorbed into the bank-firm pair fixed effects and time fixed effects, respectively, yielding the following final specification:

$$\begin{aligned}
Termination_{i,b,t} & \\
&= \beta_1 Merged_b \cdot Post_t + FirmControls_{i,b} + Bank \cdot Firm_{i,b} \quad (7) \\
&+ Year_t + \varepsilon_{i,b,t}
\end{aligned}$$

All variables are defined as above and standard errors are clustered within each firm to address concerns about potential serial correlation of the error term as discussed above.

As above, dummy variables for the main firm characteristics of interest,  $CreditConstrained_i$  and  $Zombie_i$  are also included. Here, the dummy variables are interacted with the difference-in-difference term,  $Merged_b \cdot Post_t$ . The resulting triple-difference (difference-in-difference-in-difference) terms allow investigation into whether the effects of bank merger announcements on client firms vary with those characteristics.

$$\begin{aligned}
Termination_{i,b,t} & \\
&= \beta_1 Merged_b \cdot Post_t + \beta_2 CreditConstrained_i \\
&+ \beta_3 CreditConstrained_i \cdot Merged_b \cdot Post_t + \beta_4 Zombie_i \quad (8) \\
&+ \beta_5 Zombie_i \cdot Merged_b \cdot Post_t + FirmControls_{i,b} + Bank \\
&\cdot Firm_{i,b} + Year_t + \varepsilon_{i,b,t}
\end{aligned}$$

Table 4 reports the results of difference-in-difference analysis of the likelihood that a main bank – client firm relationship is terminated in the year of or 3 years following announcement of a bank merger. Note that there are almost no terminations without switching, what Degryse et al. (2011) call “dropping”, in our sample of firms.



**<Table 4. Bank-Firm Relationship Termination after Bank Merger Announcement>**

The results support some of the hypotheses posited in the model above. Client firms of banks involved in mergers are statistically significantly more likely to terminate their main bank relationship and switch to a new main bank in the years following announcement of the merger. Client firms of under-capitalized banks and banks involved in mega-mergers may be less likely to switch, although the difference is not statistically significantly different from zero. Of the affected firms, the least likely to switch are the credit-constrained, sick “zombie” firms. In fact, consistent with the implications of the model above, zombie firms with presumably high switching costs, are statistically significantly *less* likely to switch their main bank after it announces a merger.

### 5. Long-Run Buy-and-Hold Abnormal Returns

The final step in our analysis looks at the long-run effects of bank mergers on client firm shareholder value. To analyze long-run performance, we use a 4-year buy-and-hold abnormal return (BHAR), which is conceptually similar to the<sup>16</sup> adjusted return. The BHAR is calculated as follows:

$$BHAR_i = \prod_{t=1}^{48} R_{i,t}^{Stock} - 1 - \left( \prod_{t=1}^{48} R_t^{Market} - 1 \right) \quad (9)$$

Where  $R_{i,t}^{Stock}$  is the gross return on stock  $i$  at month  $t$  and  $R_t^{Market}$  is the gross return on the market index, TOPIX, at month  $t$ , with  $t=0$  being the month of the bank merger

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<sup>16</sup> This is another advantage of using actual abnormal returns over the more common market model. The adjusted return has a conceptually similar long-run counterpart – buy-and-hold abnormal return (BHAR) – which is also of interest. Unfortunately, the market model cannot estimate long-run stock performance, nor does it have a conceptually similar counterpart, since the market model’s predicted counterfactual return changes as the underlying economic environment changes.

announcement. The buy-and-hold abnormal return measures the performance of stock  $i$  over a holding period of 4 years relative to the performance of a reference portfolio which is market portfolio in our definition.

The effect of bank mergers on the long-run buy-and-hold returns is estimated using a specification similar to equations 3 and 4, above:

$$BHAR_{i,b,e} = \beta_1 Merged_{b,e} + FirmControls_{i,b} + Bank \cdot Firm_{i,b} + \varepsilon_{i,b,e} \quad (10)$$

$$\begin{aligned}
 BHAR_{i,b,e} = & \beta_1 Merged_{b,e} + \beta_2 CreditConstrained_i \\
 & + \beta_3 CreditConstrained_i x Merged_{b,e} + \beta_4 Zombie_i \\
 & + \beta_5 Zombie_i x Merged_{b,e} + FirmControls_{i,b} + Bank \cdot Firm_{i,b} \\
 & + \varepsilon_{i,b,e} \quad (11)
 \end{aligned}$$

Table 5 reports the regression results of both equation 10 and 11 on the full sample and several sub-samples.

**< Table 5: Multivariate Analysis of Abnormal Returns around Bank Merger  
Announcement – Long-Term (4-Year BHAR)>**

The results in table 5 demonstrate that overall, client firms of merging banks do not post any statistically significant buy-and-hold abnormal returns over the long-run. Nonetheless, there are a few interesting results in the long-run that bear emphasizing. Zombie firms, which as we saw above post particularly high gains around bank merger announcements - regardless of whether their main bank is involved in the merger or not - maintain those positive abnormal

returns in the long-run as well. However, zombie firm clients of merging unhealthy, undercapitalized banks and zombie firm clients of banks involved in mega-mergers, exhibit statistically significantly negative long-run buy-and-hold returns following the announcement of their main bank's merger.

## 6. Conclusions

This study analyzes the effect of bank merger announcements on client firms of those banks. First, we analyze the market evaluation of the bank merger announcements in the short-run. We then turn to an examination of the effect of bank merger announcements on termination of bank-firm relationships. Finally, we return to the question of market evaluation, examining the long-run buy-and-hold returns of client firms following bank merger announcements.

Our main findings can be summarized as follows. In general, bank merger announcements bring positive abnormal returns to shareholders of their client firms. However, client firms of weak, undercapitalized banks experience statistically significant *negative* abnormal returns around the announcement of a merger by their main bank, and those losses are even larger if the client firm is a credit-constrained, sick, “zombie” firm.

Despite the apparent welfare gains that bank merger announcements bring to client firms of the merging banks on average, client firms of banks that announce a merger are more likely to terminate the bank-firm relationship and switch to another main bank. Again, the results are reversed for zombie firms. The credit-constrained, sick “zombie” firms, which we expect have the highest switching costs, are statistically significantly *less* likely to switch their main bank following announcement of its merger.

As might be expected, the abnormal returns to client firms of merging banks do not hold over the long-run. Yet again, zombie firms are the exception. Although they are more likely to avoid switching costs by remaining with their declared main bank after a bank merger

event, zombie firms that are clients of under-capitalized banks or banks involved in mega-mergers experience statistically significant negative abnormal returns, even in the long-run.

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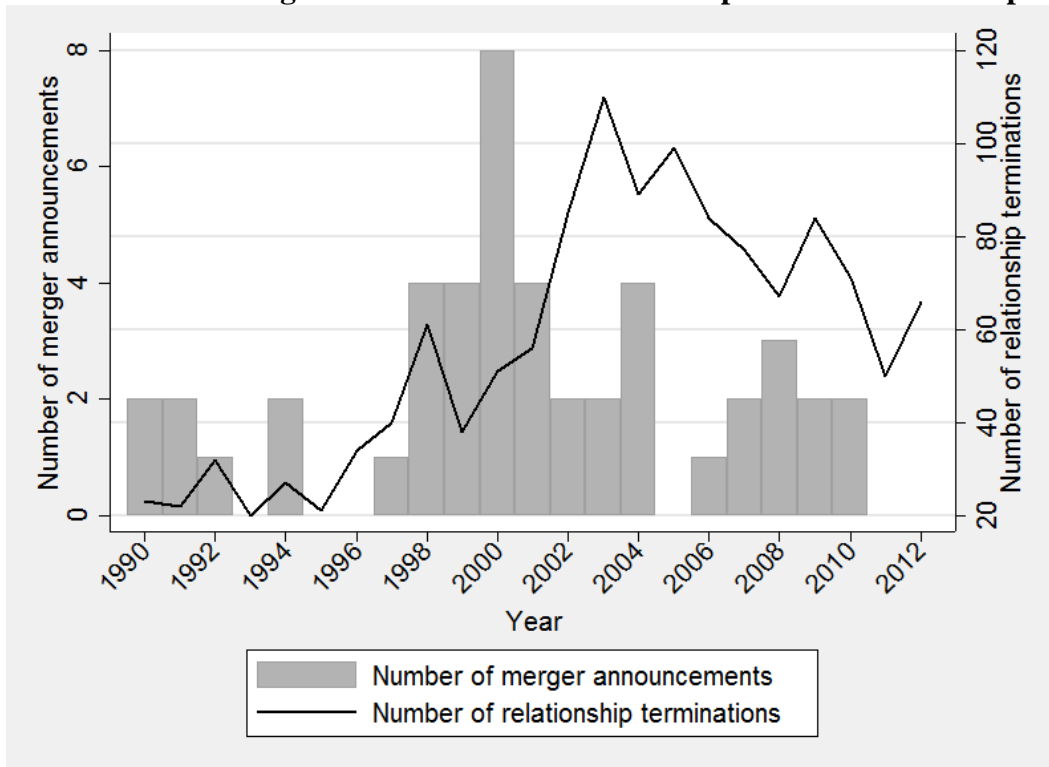
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## Figures, Tables & Graphs

### 1. Description of Banking Sector

**Figure 1. Number of Bank Mergers and Bank-Firm Relationship Terminations in Japan, 1990-2012**



**Table 1: Summary Statistics for Banks, Client Firms and Mergers, 1990-2012 (23 years)**

	n	# obs., N	Mean	Median	1 <sup>st</sup> percentile	99 <sup>th</sup> percentile
<b>Client Firms</b>	4,450					
Sales, billion yen		63,373	128	27	1	1,873
ROA, %		63,352	3.9%	3.3%	-8.2%	17.5%
Working capital ratio, %		63,376	16.2%	15.8%	-29.1%	62.5%
<b>Credit Constrained Firms</b>	2,177					
Sales, billion yen		15,847	148	29	1	2,122
ROA, %		15,844	2.8%	2.5%	-8.5%	14.3%
Working capital ratio, %		15,850	-9.1%	-7.0%	-34.3%	3.8%
<b>Zombie Firms</b>	1,012					
Sales, billion yen		1,960	131	24	0.4	2,680
ROA, %		1,961	-1.3%	-0.2%	-12.0%	2.8%
Working capital ratio, %		1,961	-9.8%	-7.5%	-34.7%	3.6%
<b>Banks</b>	161					
Total assets, trillion yen		3,128	5.9	2.0	0.2	74.2
Regulatory capital ratio surplus, %		2,508	4.6%	4.5%	0.1%	12.9%
ROA, %		3,127	-0.1%	0.1%	-4.0%	1.2%
<b>Merged Banks</b>	64					
Total assets, trillion yen		1,111	11.3	2.7	0.2	111.1
Regulatory capital ratio surplus, %		888	4.1%	3.4%	0.0%	22.4%
ROA, %		1,111	-0.1%	0.1%	-4.0%	2.4%
Merger events, number		102	1.6	1	1	4
<b>Undercapitalized Banks</b>	114					
Total assets, trillion yen		630	8.9	2.7	0.3	61.1
Regulatory capital ratio surplus, %		630	0.7%	1.1%	-5.0%	2.0%
ROA, %		630	-0.3%	0.1%	-4.5%	0.3%
<b>Mergers</b>	46					
Size of the deal, trillion yen			28.3	6.3	1.1	184.0
Number of merged banks		53	2	2	0	3
Number of merged banks' client firms		2,883	140	15	0	937
<b>Mega Mergers</b>	4					
Size of the deal, trillion yen			126.0	114.5	91.1	184.0
Number of merged banks		7	2	2	0	3
Number of merged banks' client firms		2,321	711	677	552	937

## 2. Analysis

**Table 2: Univariate Analysis of Abnormal Returns around Bank Merger Announcement**

	(1)	(2)	(3)
<i>Panel A</i>	Clients of Non-Merged Banks (37 events)	Clients of Merged Banks (37 events)	Difference
Mean	0.002***	0.003**	-0.001
Median	-0.002***	-0.0002	-0.002*
Obs.	80,010	5,140	
<i>Panel B: Firm Characteristics</i>	Non-Credit Constrained Clients (35 events)	Credit Constrained Clients (31 events)	Difference
Mean	0.004***	0.004	0.0004
Median	0.000	0.004	-0.003
Obs.	3,903	947	
<i>Panel C: Bank Characteristics</i>	Clients of Healthy Banks (31 events)	Clients of Undercapitalized Banks (13 events)	Difference
Mean	0.004***	-0.002	0.007**
Median	0.001**	-0.004**	0.005***
Obs.	3,895	1,242	
<i>Panel D: Merger Characteristics</i>	Regular-Mergers (33 events)	Mega-Mergers (4 events)	Difference
Mean	0.007***	-0.003*	0.010***
Median	0.004***	-0.004***	0.008***
Obs.	2,752	2,388	

**Table 3: Multivariate Analysis of Abnormal Returns around Bank Merger Announcement – Short-Term (CAR(t-3,t+3))**

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	All Merged & Control		Under Capitalized Banks & Control		Mega Mergers & Control	
Main bank merged	0.003*** [0.001]	0.005*** [0.001]	-0.008*** [0.003]	-0.006** [0.003]	0.003 [0.002]	0.004 [0.003]
Credit constrained firm		-0.002 [0.002]		0.007 [0.005]		-0.014 [0.009]
Credit constrained firm x Main bank merged		0.003 [0.004]		-0.003 [0.007]		0.006 [0.009]
Zombie firm		0.008** [0.004]		0.009 [0.009]		0.001 [0.015]
Zombie firm x Main bank merged		-0.012 [0.013]		-0.038* [0.020]		-0.000 [0.019]
Small firm dummy	0.011*** [0.001]	0.009*** [0.002]	0.010** [0.004]	0.009** [0.004]	0.034*** [0.006]	0.046*** [0.008]
Low book-to-market firm dummy	-0.008*** [0.001]	-0.005*** [0.002]	0.001 [0.003]	-0.000 [0.003]	-0.015*** [0.005]	-0.016** [0.007]
Medium book-to-market dummy	-0.005*** [0.001]	-0.003** [0.001]	0.003 [0.003]	0.002 [0.003]	-0.010*** [0.004]	-0.006 [0.005]
Pre-annual return	-4.767*** [0.224]	-3.539*** [0.267]	0.351 [0.671]	0.555 [0.684]	-11.027*** [0.574]	-11.691*** [1.197]
Bank-firm pair fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	93,011	56,762	10,854	10,686	9,076	6,096
R-Squared						

**Table 4: Client Firm Outcomes after Bank Merger Announcement – Main Bank Switching**

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	All Merged & Control		Under Capitalized Banks & Control		Mega Mergers & Control	
Main bank merged x Post merger	0.004** [0.002]	0.001 [0.002]	-0.002 [0.002]	-0.002 [0.002]	-0.001 [0.002]	-0.003 [0.002]
Credit constrained firm		0.001 [0.002]		0.000 [0.003]		-0.000 [0.003]
Credit constrained firm x Main bank merged x Post merger		0.002 [0.003]		-0.003 [0.006]		0.002 [0.004]
Zombie firm		0.001 [0.003]		0.001 [0.004]		0.001 [0.003]
Zombie firm x Main bank merged x Post merger		-0.014*** [0.005]		-0.004 [0.007]		-0.013** [0.006]
Working capital ratio	0.004*** [0.002]	0.005** [0.002]	0.004** [0.002]	0.005** [0.002]	0.004** [0.002]	0.004** [0.002]
Firm size	0.010 [0.019]	0.004 [0.020]	0.003 [0.022]	-0.004 [0.023]	0.011 [0.020]	0.010 [0.021]
Firm profitability	-0.013* [0.007]	-0.008 [0.008]	-0.018** [0.008]	-0.008 [0.010]	-0.014* [0.008]	-0.010 [0.009]
Bank-firm pair fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	61,353	53,044	49,182	41,619	54,917	47,101
R-Squared						

**Table 5: Multivariate Analysis of Abnormal Returns around Bank Merger Announcement – Long-Term (4-Year BHAR)**

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	All Merged & Control		Under Capitalized Banks & Control		Mega Mergers & Control	
Main bank merged	0.000 [0.000]	0.001 [0.000]	-0.001 [0.001]	-0.001 [0.001]	0.000 [0.001]	-0.000 [0.001]
Credit constrained firm		0.002* [0.001]		0.002 [0.002]		0.004* [0.003]
Credit constrained firm x Main bank merged		0.002* [0.001]		0.001 [0.003]		0.005** [0.002]
Zombie firm		0.010*** [0.002]		0.008*** [0.002]		0.007* [0.004]
Zombie firm x Main bank merged		0.002 [0.003]		-0.014** [0.006]		-0.007** [0.004]
Small firm dummy	0.020*** [0.001]	0.018*** [0.001]	0.017*** [0.002]	0.016*** [0.002]	0.018*** [0.002]	0.013*** [0.003]
Low book-to-market firm dummy	-0.010*** [0.001]	-0.012*** [0.001]	-0.017*** [0.001]	-0.017*** [0.001]	-0.013*** [0.002]	-0.013*** [0.002]
Medium book-to-market dummy	-0.006*** [0.001]	-0.007*** [0.001]	-0.009*** [0.001]	-0.010*** [0.001]	-0.006*** [0.001]	-0.008*** [0.001]
Pre-annual return	-0.052 [0.099]	0.123 [0.101]	0.257 [0.200]	0.367* [0.202]	-0.837*** [0.219]	-0.545 [0.390]
Bank-firm pair fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	79,704	44,581	9,980	9,803	11,298	7,867
R-Squared						

## Appendix: Supplementary Tables for Bank Merger Events

**Table A1: Summary of Banking Sector Consolidation in Japan, 1990-2012**

Year	Number of Banks	Number of Announced Bank Mergers	Number of Completed Bank Mergers	Number of Client Firms of Banks Announcing a Merger	Number of Client Firms of Banks Not Announcing a Merger	Main Bank HHI	Percent of City Bank as Main Bank
1990	154	2	0	109	1,920	694	77
1991	153	2	2	1	2,149	737	77
1992	151	1	2	0	2,272	745	76
1993	150	0	1	0	2,275	744	76
1994	150	2	1	239	2,117	723	76
1995	150	0	0	0	2,492	713	75
1996	149	0	1	0	2,652	704	75
1997	148	1	0	1	2,777	707	75
1998	144	4	3	546	2,340	708	75
1999	144	4	1	1,334	1,611	718	75
2000	140	8	5	1,167	1,850	726	75
2001	138	4	10	292	2,858	732	75
2002	133	2	2	653	2,616	1,060	76
2003	130	2	2	45	3,245	1,186	81
2004	128	4	2	976	2,338	1,189	81
2005	125	0	2	0	3,395	1,207	81
2006	124	1	1	21	3,448	1,599	81
2007	123	2	3	25	3,551	1,630	81
2008	122	3	0	7	3,576	1,616	81
2009	119	2	4	51	3,434	1,636	81
2010	118	2	1	13	3,376	1,633	81
2011	119	0	1	0	3,309	1,622	81
2012	116	0	2	0	3,260	1,621	81
<b>Average</b>	<b>136</b>	<b>2</b>	<b>2</b>	<b>238</b>	<b>2,733</b>	<b>1,072</b>	<b>78</b>

Post-merger bank name	Announcement date	Completion date	Acquirer bank	Target bank	Type of merger	Mega merger?	Number of acquirer bank's client firms	Number of target bank's client firms
Kyowa Saitama Bank (later Asahi Bank)	Nov. 14, 1990	Apr. 1, 1991	*Kyowa Bank	*Saitama Bank	Merger	No	64	43
San-In Godo Bank	Nov. 18, 1990	Apr. 1, 1991	*San-In Godo Bank	Fuso Bank	Merger	No	2	0
Iyo Bank	Jul. 24, 1991	Apr. 1, 1992	*Iyo Bank	Toho Sougo Bank	Merger	No	1	0
Kumamoto Family Bank	Aug. 30, 1991	Apr. 1, 1992	*Kumamoto Bank	*Higo Family Bank	Merger	No	0	0
Hokuto Bank	Oct. 16, 1992	Apr. 1, 1993	Ugo Bank	Akita Akebono Bank	Merger	No	0	0
-	Oct. 12, 1994	Nov. 10, 1994	*Mitsubishi Bank	*Nippon Trust Bank	Subsidiarization	No	227	3
Bank of Tokyo Mitsubishi	Mar. 28, 1995	Apr. 1, 1996	*Mitsubishi Bank	*Bank of Tokyo	Merger	No	227	9
Namihaya Bank	Oct. 9, 1997	Oct. 1, 1998	*Fukutoku Bank	Bank of Naniwa	Merger	No	1	0
Minato Bank	May 15, 1998	Apr. 1, 1999	*Hanshin Bank	Midori Bank	Merger	No	0	2
-	Oct. 31, 1998	Jan. 19, 1999	*Sumitomo Bank	*Bank of Kansai	Subsidiarization	No	239	0
Chuo Mitsui Trust & Banking	Jan. 20, 1999	Apr. 1, 2000	*Chuo Trust & Banking	*Mitsui Trust & Banking	Merger	No	0	26
-	Jan. 23, 1999	Mar. 31, 1999	*Fuji Bank	*Yasuda Trust & Banking	Subsidiarization	No	272	7
Kinki Osaka Bank	May 18, 1999	Apr. 1, 2000	*Bank of Osaka	*Bank of Kinki	Merger	No	2	1
Mizuho Holdings (later Mizuho FG)	Aug. 19, 1999	Sep. 29, 2000	*Dai-Ichi Kangyo Bank	*(i) Fuji Bank, *(ii) Industrial Bank of Japan	BHC Formation	Yes	333	419
Sumitomo Mitsui BC	Oct. 14, 1999	Apr. 1, 2001	*Sumitomo Bank	*Sakura Bank	Merger	Yes	251	313
Sapporo Hokuyo Holdings	Feb. 9, 2000	Apr. 2, 2001	*North Pacific Bank	*Sapporo Bank	BHC Formation	No	14	1
Mitsubishi Tokyo FG	Apr. 18, 2000	Apr. 2, 2001	*Bank of Tokyo Mitsubishi	*(i) Mitsubishi Trust & Banking, *(ii) Nippon Trust Bank, (iii) Tokyo Trust Bank	BHC Formation	No	315	32
-	Jun. 9, 2000	Jul. 24, 2000	*Sakura Bank	*Minato Bank	Subsidiarization	No	315	0
UFJ Holdings	Jun. 15, 2000	Apr. 2, 2001	*Sanwa Bank	*(i) Tokai Bank, (ii) Tokai Trust Bank	BHC Formation	No	278	217
UFJ Holdings	Jul. 5, 2000	Apr. 2, 2001	*(i) Sanwa Bank, *(ii) Tokai Bank, (iii) Tokai Trust Bank	*Toyo Trust & Banking,	BHC Formation	No	495	0
-	Sep. 28, 2000	Jan. 17, 2001	*Sanwa Bank	*Senshu Bank	Subsidiarization	No	278	1
Momiji Holdings	Nov. 1, 2000	Sep. 28, 2001	*Hiroshima Sogo Bank	*Setouchi Bank	BHC Formation	No	1	1
Kyushu Shinwa Holdings	Mar. 13, 2001	Apr. 1, 2002	*Shinwa Bank	*Kyushu Bank	BHC Formation	No	0	0
-	Mar. 13, 2001	Dec. 21, 2001	*Fukuoka City Bank	Bank of Nagasaki	Subsidiarization	No	7	0
-	May 23, 2001	Jun. 29, 2001	*Chuo Mitsui Trust & Banking	Sakura Trust & Banking	Subsidiarization	No	28	0



Daiwa Bank Holdings	Aug. 1, 2001	Dec. 12, 2001	*Daiwa Bank	*(i) Kinki Osaka Bank, (ii) Nara Bank	BHC Formation	No	78	2
Daiwa Bank Holdings (later Resona Holdings)	Sep. 7, 2001	Mar. 1, 2002	*(i) Daiwa Bank, *(ii) Kinki Osaka Bank, (iii) Nara Bank	*Asahi Bank	BHC Formation	No	80	184
Kanto Tsukuba Bank	Mar. 12, 2002	Apr. 1, 2003	*Kanto Bank	Tsukuba Bank	Merger	No	0	0
Nishi-Nippon City Bank	Apr. 19, 2002	Oct. 1, 2004	*Nishi-Nippon Bank	*Fukuoka City Bank	Merger	No	8	8
Sumitomo Mitsui BC	Dec. 25, 2002	Mar. 17, 2003	Sumitomo Mitsui Banking Corporation	Wakashio Bank	Merger	Yes	636	1
Kansai Urban Banking Corporation	Apr. 1, 2003	Feb. 1, 2004	*Bank of Kansai	Kansai Sawayaka Bank	Merger	No	0	0
Hokuhoku FG	May 23, 2003	Sep. 1, 2004	*Hokuriku Bank	*Hokkaido Bank	BHC Formation	No	31	14
Mitsubishi UFJ FG	Jul. 14, 2004	Oct. 1, 2005	*Mitsubishi Tokyo Financial Group	*UFJ Holdings	BHC Formation	Yes	422	542
Kirayaka Holdings	Oct. 29, 2004	Oct. 3, 2005	*Shokusan Bank	Yamagata Shiawase Bank	BHC Formation	No	2	0
Kiyo Holdings	Nov. 19, 2004	Feb. 1, 2006	*Kiyo Bank	Wakayama Bank	BHC Formation	No	0	0
Yamaguchi FG	Mar. 18, 2005	Oct. 2, 2006	*Yamaguchi Bank	*Momiji Holdings	BHC Formation	No	9	1
Fukuoka FG	May 13, 2006	Apr. 2, 2007	*Bank of Fukuoka	*Kumamoto Family Bank	BHC Formation	No	21	0
Fukuoka FG	May 2, 2007	Oct. 1, 2007	*Fukuoka Financial Group	*Kyushu Shinwa Holdings	BHC Formation	No	21	2
Senshu Ikeda Holdings	Feb. 21, 2008	Oct. 1, 2009	*Bank of Ikeda	*Senshu Bank	BHC Formation	No	1	1
Fidea Holdings	May 13, 2008	Oct. 1, 2009	*Shonai Bank	Hokuto Bank	BHC Formation	No	0	0
Tomony Holdings	Jan. 27, 2009	Apr. 1, 2010	*Kagawa Bank	*Tokushima Bank	BHC Formation	No	4	0
Kansai Urban Banking Corporation	Feb. 25, 2009	Mar. 1, 2010	*Kansai Urban Banking Corporation	*Biwako Bank	Merger	No	3	0
Tsukuba Bank	Apr. 29, 2009	Mar. 1, 2010	*Kanto Tsukuba Bank	Ibaraki Bank	Merger	No	0	0
Sumitomo Mitsui Trust Holdings	Oct. 27, 2009	Apr. 1, 2011	*Sumitomo Trust & Banking	*Chuo Mitsui Trust Holdings	BHC Formation	No	32	19
Juroku Bank	Jul. 30, 2010	Sep. 18, 2012	*Juroku Bank	*Gifu Bank	Merger	No	10	0
Jimoto HD	Oct. 25, 2010	Oct. 1, 2012	*Kirayaka Bank	Sendai Bank	BHC Formation	No	3	0

Note: Acquirer bank is determined by the surviving JBA code.