

Bank Ties and Firm Performance in Japan: Some Evidence since Fiscal 2002

Patrick McGuire

Since the mid-1990s, major Japanese banks have sold off a significant portion of their holdings of corporate equity. Using information on the identity of Japanese firms' top 10 shareholders, this paper explores the process of banks' equity disposal. There is some evidence that, after fiscal 2001, banks' sales of equity accelerated, even holdings in firms for which the bank served as the main bank. However, affiliation with a main bank—proxied by firm-bank loan and shareholding ties—continues to be negatively associated with firm performance through fiscal 2004. Regression estimates suggest that firms with strong bank ties are less profitable, face higher interest payments, and yet do not seem to enjoy lower stock price volatility than other firms. These effects are strongest for firms with a history of outside financing options, consistent with earlier arguments that the benefits of main bank relationships accrue to the banks themselves.

Keywords: Cross-shareholding; Main bank; Japanese banks; Firm performance

JEL Classification: G21, G32, L25

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I. Introduction

The Japanese financial sector has undergone significant changes since 2000. The number of major banking groups decreased from eight to four, with a wave of mergers in 2001–02 and again in 2005. The major Japanese banks, overall, returned to profitability in 2004 and 2005, and the nonperforming-loan (NPL) problem has largely been brought under control. Coincident with these changes, Japanese banks have continued to unwind their shareholding ties with corporate borrowers, a process that began in the mid-1990s. Since fiscal 2000, equity holdings by major banks in Japan fell from close to ¥35 trillion to around ¥15 trillion by March 2006 (Bank of Japan [2006]).

Large commercial banks have historically played an important corporate governance role in Japanese firms, and cross-shareholding ties were but one channel through which firm-bank relationships were maintained. Yet the significant changes in the size and structure of banks' equity portfolios would suggest that the strength of the traditional main bank relationships has weakened, raising questions about whether Japan's "main bank" system continues to function as it once did. Has banks' disposal of corporate equity led to a loosening of the main bank ties? Do main banks continue to monitor client firms as they were reported to have done in the pre-bubble period? Do they, as some have argued, continue to extract rents from client firms?

This paper adds to the growing body of work that attempts to address these questions. The analysis proceeds in three parts, and the focus is on the years fiscal 2002–04 (April 2002 to March 2005), when Japanese banks came under increased scrutiny from regulatory authorities to address their NPL problems and to unwind their cross-shareholding relationships with client firms. In the first part, the mechanical process of banks' share disposal is analyzed using a database of the top 10 shareholders in Japanese firms. These data confirm that the size of banks' equity portfolios decreased significantly between 1996 (when equity disposal began) and 2005, although the *structure* of these portfolios—judged by industry composition and firm characteristics—changed little over this period. As a result of banks' equity disposal, rough firm-specific measures of bank affiliation indicate that fewer firms have what would have previously been characterized as a "main bank," or a bank that is both a stable long-term lender and shareholder. In other words, in a mechanical sense at least, main bank ties seem to have loosened.

The following section examines in more detail banks' decision to sell corporate equity. Miyajima and Kuroki (2007) (hereafter MK2007) analyze in some detail the decision of banks to sell corporate equity in the 1995–2001 period, and find that banks' were reluctant to dispose of shares of firms for which the bank served as the main bank (henceforth "client firms"). The question of interest here is whether banks' equity disposal increased in and after fiscal 2002 in the wake of increased regulatory scrutiny, and, if so, whether banks also unloaded shares of their client firms. Using an empirical framework similar to MK2007, the analysis suggests that banks remained reluctant to dispose of shares in these firms, even after these banks returned to profitability in fiscal 2004. That said, fiscal 2002 seems to have been an exceptional year when banks unloaded shares of all types of firms.

To further explore the degree to which main bank relationships have weakened, the final section investigates whether the empirical relationships between bank affiliation and firm performance that were evident in the 1980s and early 1990s have persisted. There is a large literature that documents the supposed benefits and costs of Japan's main bank system. Main banks were thought to serve as effective firm monitors, helping to solve many of the asymmetric information problems evident in more arms-length financial systems, and providing credit to firms in distress when other creditors would not. At the same time, one theme running throughout the large body of empirical work, discussed in more detail below, is that affiliation with a main bank (measured in a variety of ways) has been empirically associated with below-average firm performance. For example, Nakatani (1984) finds a negative relationship between *keiretsu* membership and firm profitability in the 1970s, while Weinstein and Yafeh (1998) and Morck, Nakamura, and Shivdasani (2000) document similar results for the 1980s. More recently, MK2007 find a negative relationship between firm performance and bank affiliation for the 1990s.

One interpretation of these results is that banks had been able to use their market power to extract rents from their client firms. Weinstein and Yafeh (1998) and Morck, Nakamura, and Shivdasani (2000) document that bank-affiliated firms often faced higher interest payments, but did not necessarily enjoy lower volatility, suggesting that the benefits of main bank relationships accrued to the main bank itself. Further supporting this hypothesis, the latter show that the negative effects of ownership by the main bank on firm performance were stronger for bank-*independent* firms. In other words, the shareholding tie was perhaps a channel through which banks were able to extract rents from those firms that had outside financing options.

A priori, it could be argued that the strength of these statistical relationships has weakened, or even disappeared, if banks' disposal of corporate equity constituted a fundamental change in their relationships with client firms. This issue is examined for the fiscal 2002–04 period using a series of regressions of firm performance metrics on measures of the strength of the firm-bank tie (i.e., firm- and bank-specific shareholding and lending relationships) and control variables. Results at both the level of individual banking groups and by year suggest that the negative relationship between firm performance and bank affiliation has persisted through fiscal 2004. Moreover, this negative relationship is larger and generally more significant for firms that historically have had access to the bond market, and thus been considered to be the least bank dependent. Taken together, the results suggest that main bank relationships may not have weakened as much as banks' significant disposal of corporate equity might suggest.

The remainder of this paper proceeds as follows. Section II presents further background on banks' equity disposal and the changes in Japanese financial sector since 2000. The construction of the dataset is discussed in Section III, followed by a discussion of how banks' equity portfolios have changed since 2000 in Section IV. Section V presents broad-level evidence on whether firm-bank ties are loosening, while the issue of bank affiliation and firm performance is addressed in Section VI. Section VII offers some concluding remarks.

II. Background

A. Changes in the Japanese Financial Landscape

The Japanese financial system has undergone enormous changes over the last decade. Mergers, restructuring of distressed banks, and bankruptcies had, by 2005, transformed the major financial groups centered around the large city and long-term credit banks (the so-called “financial *keiretsu*” or “main bank” system) into four “mega-banks.”¹ In some cases, these mega-banks were created from mergers of banks that originally belonged to different financial *keiretsu* groups.

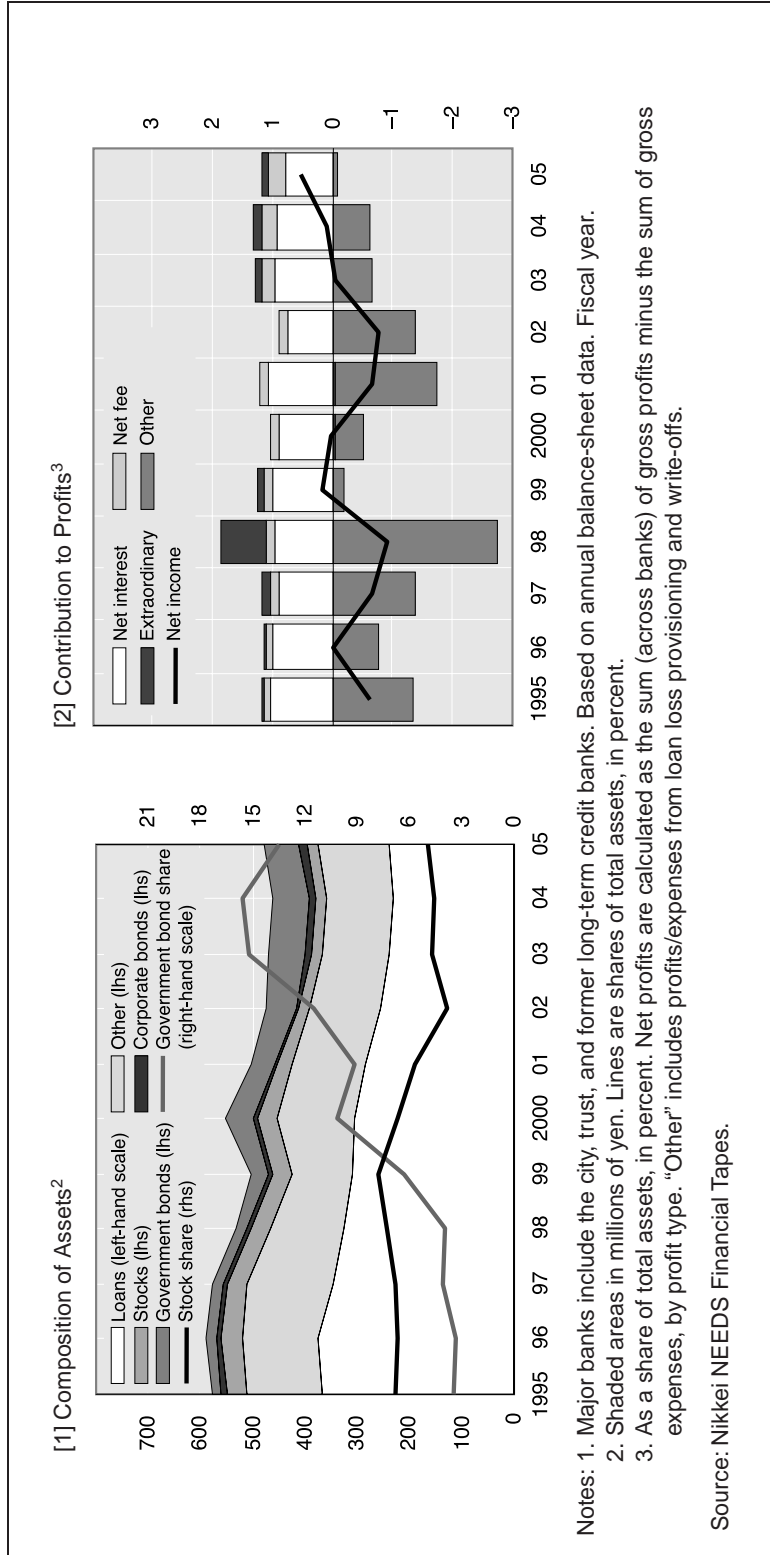
This process of consolidation in the financial sector occurred as banks were tackling their NPL problems, which had become acute by the second half of the 1990s. As shown in Figure 1 (right-hand panel), banks’ negative profits in the late 1990s and again in fiscal 2001–02 were the result of negative net income on “other” accounts, which includes loan loss provisioning and the write-off of NPLs. In March 2002, total NPLs—defined under the Financial Reconstruction Law as loans requiring special attention, doubtful loans and unrecoverable loans—reached ¥28.3 trillion for the major Japanese banks, or an estimated 8.7 percent of their total loans. By March 2005, NPLs had fallen to ¥7.6 trillion, or 2.9 percent of total loans (this then fell to 1.8 percent by March 2006, and 1.5 percent in March 2007).² As credit costs associated with loan write-offs fell, banks’ overall net profits rose to near zero in fiscal 2003, and turned positive in fiscal 2004 for the first time since fiscal 2000.³ Bank profits hit an all-time high in fiscal 2005, before declining somewhat in fiscal 2006.

Since the mid-1990s, the major Japanese banks have been unloading their equity portfolios. As shown in the left-hand panel of Figure 1, holdings of corporate equity constituted roughly 8 percent of major banks’ total assets in the mid-1990s, but fell to near 4 percent by fiscal 2005.⁴ These figures are based on mark-to-market values, as recorded on banks’ balance sheets, and thus include valuation effects. For example, the fiscal 2000–02 period, when this share dropped the most, was also a period of declining equity prices in Japan.⁵ However, the (partial) data on banks’ corporate shareholding (described in more detail below) also indicate significant equity disposal by banks in these years.

What are some of the factors behind banks’ disposal of corporate equity, in particular after fiscal 2001? Consolidation within the banking sector, which accelerated after fiscal 2000, played a role. Most of the major banking groups that existed in fiscal 2005 experienced at least one merger of their core banks in the fiscal 2001–02 period. Since banks are not permitted to hold more than 5 percent of the outstanding equity

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1. The financial *keiretsu* groups which existed until (at least) 1998 were centered around the following city banks: Sumitomo, Daiichi Kangyo, Sanwa, Tokai, the Industrial Bank of Japan, Mitsui, Mitsubishi, Asahi, and Daiwa.
 2. Figures are taken from the Financial Services Agency (<http://www.fsa.go.jp/en/regulated/npl/20060808.html>).
 3. Income from core operations, primarily lending, had actually remained relatively stable since fiscal 1995, while fee income has been on the rise.
 4. That said, concern about the market risk associated with banks’ equity holdings remains. For example, the Bank of Japan’s 2007 *Financial System Report* noted that this has become “the largest component of risk borne by the banking sector overall” (Bank of Japan [2007]).
 5. Between end-1998 and end-1999, the Nikkei 225 index rose by 50 percent, and then declined until early 2003. By end-2006, it was again up by 102 percent.

Figure 1 Major Japanese Banks' Assets and Profits¹



Notes: 1. Major banks include the city, trust, and former long-term credit banks. Based on annual balance-sheet data. Fiscal year.
 2. Shaded areas in millions of yen. Lines are shares of total assets, in percent.
 3. As a share of total assets, in percent. Net profits are calculated as the sum (across banks) of gross profits minus the sum of gross expenses, by profit type. "Other" includes profits/expenses from loan loss provisioning and write-offs.

Source: Nikkei NEEDS Financial Tapes.

of any client firm, the mergers themselves created selling pressures in cases where the combined equity holdings of the merged bank surpassed this threshold.⁶

Government initiatives aimed at structural reform of the financial sector also stimulate banks' sale of equities. The Law Regarding the Restriction of Banks' Shareholding, introduced in November 2001, required banks to reduce the value of their on-balance-sheet equity holdings (excluding holdings shares of affiliates) to below their Tier I capital. The target date for compliance was originally set for September 2004, but later changed to September 2006, a deadline which the major banks were able to meet (Bank of Japan [2006]). In order to cushion the market impact of large equity sales, the Banks' Shareholding Purchase Corporation (BSPC)⁷ was created in January 2002 as a vehicle to purchase, and then later unload, banks' corporate equity holdings. By April 2003, equity purchases by the BSPC totalled ¥218 billion.

Finally, increased scrutiny from the regulatory community as banks' capital adequacy worsened in fiscal 2001 may have also been a factor. The sustained decline in equity prices in Japan in fiscal 2000–02 increasingly put downward pressure on banks' capital adequacy, since unrealized gains on equity holdings had, for the most part, disappeared by the end of fiscal 2000, forcing banks to recognize losses with each equity sale. However, capital adequacy ratios for the major banks fell to below 10 percent in fiscal 2002, while Tier I capital adequacy ratios fell to around 5 percent for the major banks (Bank of Japan [2007]). Banks active use of deferred tax assets (DTAs) to boost their Tier I capital,⁸ and evidence suggesting that banks were "evergreening" loans to arguably insolvent borrowers,⁹ put banks' capital adequacy further in doubt.

As equity prices continued to fall in the autumn of 2002, the Financial Services Authority (FSA) assembled a task force in October, under the direction of Heizo Takenaka, which demanded improvements in NPL disposal and banks' corporate governance. This task force proposed (1) a further tightening of loan classification and provisioning standards, (2) stricter evaluation of the treatment of DTAs and (3) a scheme for injecting public funds into weak but solvent banks (via the Deposit Insurance Law). These measures, widely covered in the media, were geared at forcing banks to recognize losses in calculating their capital bases.

Shortly thereafter, in November 2002, the BOJ announced its intention to purchase corporate equities from commercial banks under the "bank share purchase program." Although the terms of this program placed performance and credit risk limits on the shares that the BOJ would acquire, it was aimed at helping banks' dispose of their equities with a minimal impact on overall stock market prices. Although banks were initially reluctant to sell their shares, they began to unload a portion of their shareholding as

6. Prior to 1977, banks were permitted to hold up to 10 percent of their client firms' outstanding shares. The Anti-Monopoly Law of 1977 gave banks a 10-year window to reduce this to 5 percent. Banks were given some time to reduce their holdings when 5 percent ceiling was breached following bank mergers.

7. See <http://www.fsa.go.jp/news/newse/e20010626-1.html> for details.

8. Major Japanese banks recorded ¥8.1 trillion in DTAs at end-March 2002, constituting approximately 47 percent of Tier I capital. See Bank for International Settlements (2002) for background. Skinner (2008) argues that, since DTAs are very subjective, managers had considerable discretion in calculating their value, and used these to smooth earnings and massage capital values.

9. See Peek and Rosengren (2005) and Kobayashi, Saita, and Sekine (2002). Caballero, Hoshi, and Kashyap (2006) find that the percentage of firms receiving subsidized loans—the so-called "zombie firms"—was as high as 15 percent in 2002, compared with 1–6 percent between 1981 and 1991.

equity markets picked up over the course of fiscal 2003. By the end of fiscal 2003, the total market value of shares purchased under this program reached ¥1.8 trillion.

B. Firm-Bank Ties in Japan

Main bank relationships typically operated through three channels: (1) lending ties, (2) shareholding ties, and (3) the placement of directors by the bank on the firm's board. Many empirical studies have demonstrated that these channels give banks a strong voice in the corporate governance structure of the bank.¹⁰ However, banks' disposal of equity means that, potentially, at least one of these channels has weakened.

Much of the early literature argued that main bank relationships helped to solve asymmetric information problems. Because of their insider knowledge, main banks stood ready to provide credit to client firms during periods of distress or when other lenders would not, thus helping firms reach their first-best investment path (Aoki [1994] and Hoshi, Kashyap, and Scharfstein [1990]). For example, Hoshi, Kashyap, and Scharfstein (1991) found that bank-affiliated firms had lower investment-cash flow sensitivity than non-affiliated firms in the 1980s, supporting the hypothesis that main banks helped to solve the asymmetric information problems that can arise in arms-length financing arrangements.

The alleged benefits of the main bank system were challenged in later work as the health of the Japanese financial system deteriorated in the 1990s.¹¹ One strand of this literature has attempted to empirically pin down whether bank affiliation has been a net positive for client firms.¹² On the one hand, a dual shareholding-lending relationship with a client firm may actually help to align the incentives of the various claimants of firm revenue. That is, when a creditor holds equity in a client firm, the incentive to extract surplus through the debt relationship should be reduced, since expropriation reduces the return on equity. On the other hand, the lack of a fully developed bond market meant that, for many years, banks had enjoyed significant market power in the intermediation of credit in Japan, meaning their role as creditors was, arguably, larger than their role as shareholders. If the benefits to the bank from holding equity are small relative to their debt interests, equity ownership may simply enhance rent extracting behavior by giving the bank an extra toehold. As argued by Morck, Nakamura, and Shivdasani (2000, p. 543) "maximization of the value of the client firms' equity might have a low weight in the objective function for Japanese banks, compared to the maximization of the value of their debt claims."

Early work on firm performance seemed to indicate that main banks were a source of stability for their client firms. Nakatani (1984), using data from the 1960s

10. Kaplan (1994), Kaplan and Minton (1994), and Kang and Shivdasani (1995) present evidence that placing bank personnel on the board of directors of client firms helps those firms that enter financial distress return to profitability more quickly. Morck and Nakamura (1999), Prowse (1990, 1992), and Sheard (1989) provide evidence that cross-shareholding between firms and banks is driven less by profit-maximizing portfolio management, and more by an incentive to take shares off the market to prevent corporate takeovers. Sheard (1994) argued that main banks implicitly directed and guaranteed loans by *other* creditors, presumably other financial institutions within the same financial group, thus magnifying the main bank's role as creditor.

11. Looking again at firm investment, Gibson (1995, 1997) found that poor health of the main bank reduced investment by as much as 30 percent in some firms.

12. Agarwal and Elston (2001) investigate bank-firm relationships in Germany, and find that interest payments are higher for bank-affiliated firms. They fail to find evidence, however, that affiliated firms enjoy higher profitability or growth, and conclude that banks engage in rent-seeking behavior.

and 1970s classified firms as either bank affiliated or independent, and found that membership in a *keiretsu* group was associated with lower profitability of client firms, but also with lower variance of profitability. That is, firms enjoyed greater stability with a main bank, but may have paid a premium for it. In a later test, Horiuchi, Packer, and Fukuda (1988) examined whether main banks actually contributed to offsetting movements in the operating performance of firms, but found no evidence of such risk sharing behavior.

Later work lent some support to the view that the benefits of main bank relationships accrued to the banks themselves, at least for certain subsamples of borrowing firms and in certain time periods.¹³ Kang and Shivdasani (1999) and Weinstein and Yafeh (1995, 1998), using data from the 1980s, found that bank-affiliated firms performed worse than independent firms on a variety of profitability measures. Weinstein and Yafeh (1998) went on to show that not only did bank-affiliated firms face higher interest payments, they did *not* enjoy lower volatility of profits.¹⁴ Morck, Nakamura, and Shivdasani (2000), relying on data for 373 firms in 1986, showed that average Q is negatively correlated with bank ownership. Moreover, they found that these empirical relationships were *strongest* for those firms that had outside financing options, consistent with the hypothesis that banks used the shareholding channel to extract rents from client firms. The evidence for more recent periods suggests that bank-affiliated firms have continued to underperform; MK2007, for example, find that the negative relationship between bank ties and firm performance is evident in the 1990s as well.

The analysis below revisits these issues using firm-bank relationship data through fiscal 2004 (March 2005). Firm-bank ties *have*, in a mechanical sense, loosened considerably as banks have reduced their corporate shareholding. The following two sections attempt to quantify these changes in banks' equity portfolios, and the degree to which firm-bank ties have loosened after fiscal 2001. Section VI then provides more recent evidence on the relationship between three firm performance metrics—profitability, interest payments, and stock price volatility—and bank affiliation, and does so separately for different groups of firms (those with and without a history of bond financing).

III. The Data

The analysis rests on a panel dataset that links individual firms and banks. The primary source of data is the Kaigin financial database from the Development Bank of Japan (DBJ). These data are based on the *yukashoken hokokusho*, and contain detailed annual accounting data on all nonfinancial firms listed on the various stock exchanges in Japan.

13. Sher (2001, p. 10) cites survey results that corporate executives “generally saw the main bank relationship as lacking the benefits it purportedly accords the firm,” and results from surveys of bank practitioners suggesting that “although benefits of the relationship may have been perceived as doubtful by the client, the bankers believed the relationship was quite profitable for the bank.”

14. Beason (1999), taking a different approach, used high-frequency stock price data for bank-affiliated and independent firms and measured whether stock price volatility is lower for the former group. He found no evidence that this is the case.

Firm-bank relationships are captured by information on both the firms' lending ties to banks, and by banks' holding of firm equity. Firm-bank-specific data on outstanding loan balances are taken from Financial Quest and supplemented with similar loan data from the Kaigin database (available until 1999). For the shareholding data, the Kaigin database includes information on the identity and shareholding rate of the top 10 shareholders for each firm in each year since 1982.¹⁵ It should be pointed out that this provides a *less complete picture* of shareholding relationships than that in the data used in MK2007, since their data contain (1) information on the top 20 shareholders and (2) information on the holding of bank shares by corporations, and can thus be used to investigate the *bilateral* nature of the unwinding process. That said, one goal of this study is to see just how well the unwinding process is captured in the Kaigin data, which is used by many researchers. Moreover, the data are arguably sufficient to track changes in the (unidirectional) strength of ties with *main banks* since, as described in more detail below.

To get a sense of whether the data are sufficiently representative, the following two sections (IV and V) explore the properties of these shareholding data, and track the changes in the strength of firm-bank ties using a variety of metrics. In Section IV, estimates of the market value of banks' equity portfolios are constructed by summing a particular bank's holding of shares across firms in a particular year. These portfolios are then compared with the market value of banks' equity holdings, as listed on their balance sheets and, in Section V, are used to analyze the determinants of banks' decisions to sell equity in particular firms.

Admittedly, the estimated bank equity portfolios constructed for this exercise provide an *incomplete* picture of banks' true equity portfolios for a number of reasons. First, not all firms' accounting periods end in March (about 18 percent do not), making it impossible to get a precise point-in-time estimate of a bank's equity portfolio.¹⁶ Second, holdings of shares of firms that are not included in the Kaigin data, or of firms for which the bank is not in the top 10 shareholders, will not be captured.¹⁷ Thus, the equity portfolios constructed here represent, at best, a lower bound on the market value of banks' true portfolios.

To supplement these firm-bank relationship data, a measure of firms' *keiretsu* affiliation is taken from the 1982–99 editions of Dodwell Marketing Consultants "Industrial Groupings in Japan." A firm is classified as a "*keiretsu* member" if it appeared in Dodwell's rosters in at least half the editions published between 1982 and 1999, and independent otherwise. While the primary goal is to investigate firm-bank relationships *independent* of the *keiretsu* dummy, this is an important control variable in that it has often been the foundation of previous studies of bank affiliation and firm performance.

15. Firms list the name of the individual or corporate shareholders (in Japanese). There are many coding irregularities across firms and years, making the data difficult to use without substantial cleaning. Any errors in this cleaning process are those of the author.

16. For most firms, the fiscal year ends in March. The fiscal year for a particular observation is the previous year if the firm files before June, and the current year if the firm files after June.

17. Specifically, banks' holding of shares of other banks, trust banks, insurance companies, and other financial institutions are not captured, nor are banks' holdings of foreign shares, since these institutions are not included in the Kaigin database.

Finally, this analysis also relies on annual measures of each firm's stock market return, beta, and idiosyncratic risk. These are calculated from daily stock price data taken from Bloomberg, and supplemented with data from Nikkei NEEDS (which contains information on dead firms). Alternative estimates of firms' stock price beta and idiosyncratic risk are calculated using the standard market model (with the return on the Nikkei 225 index as a proxy for the market return), as well as a three-factor model, which also includes the yen/U.S. dollar exchange rate and changes in the long-term interest rate.

IV. A Picture of Banks' Equity Portfolios

Overall, the cleaned shareholding data in the Kaigin database show a significant decline in equity ownership by major Japanese banks, consistent with more aggregate measures banks' equity holdings. This can be seen by looking at changes in the estimated number of shares held by individual banking groups, as well as changes in the estimated market value of these banks' equity portfolios. Figure 2 provides a broad overview of the Kaigin shareholding data, broken down by type of financial institution. By fiscal 2000, the number of shares held by city banks (in firms for which these banks were among the top 10 shareholders) was 20 percent less than that in fiscal 1996.¹⁸ By fiscal 2004, this number had dropped by more than 60 percent of the 1996 value. Similarly, trust banks' holdings fell an estimated 80 percent over this same period, while holdings by life insurance companies, which started to decline earlier, in fiscal 1994, fell by roughly 60 percent.¹⁹

In contrast, the Kaigin shareholding data indicate that the number of shares held by some other types of financial institutions in Japan have either remained stable, or have grown. Estimated holdings by regional banks (which have far less often been among the top 10 shareholders) and the fire and marine insurance companies decreased only modestly between fiscal 1996–2004. At the same time, ownership by foreign-headquartered banks has shown a steady increase since the 1990s.²⁰

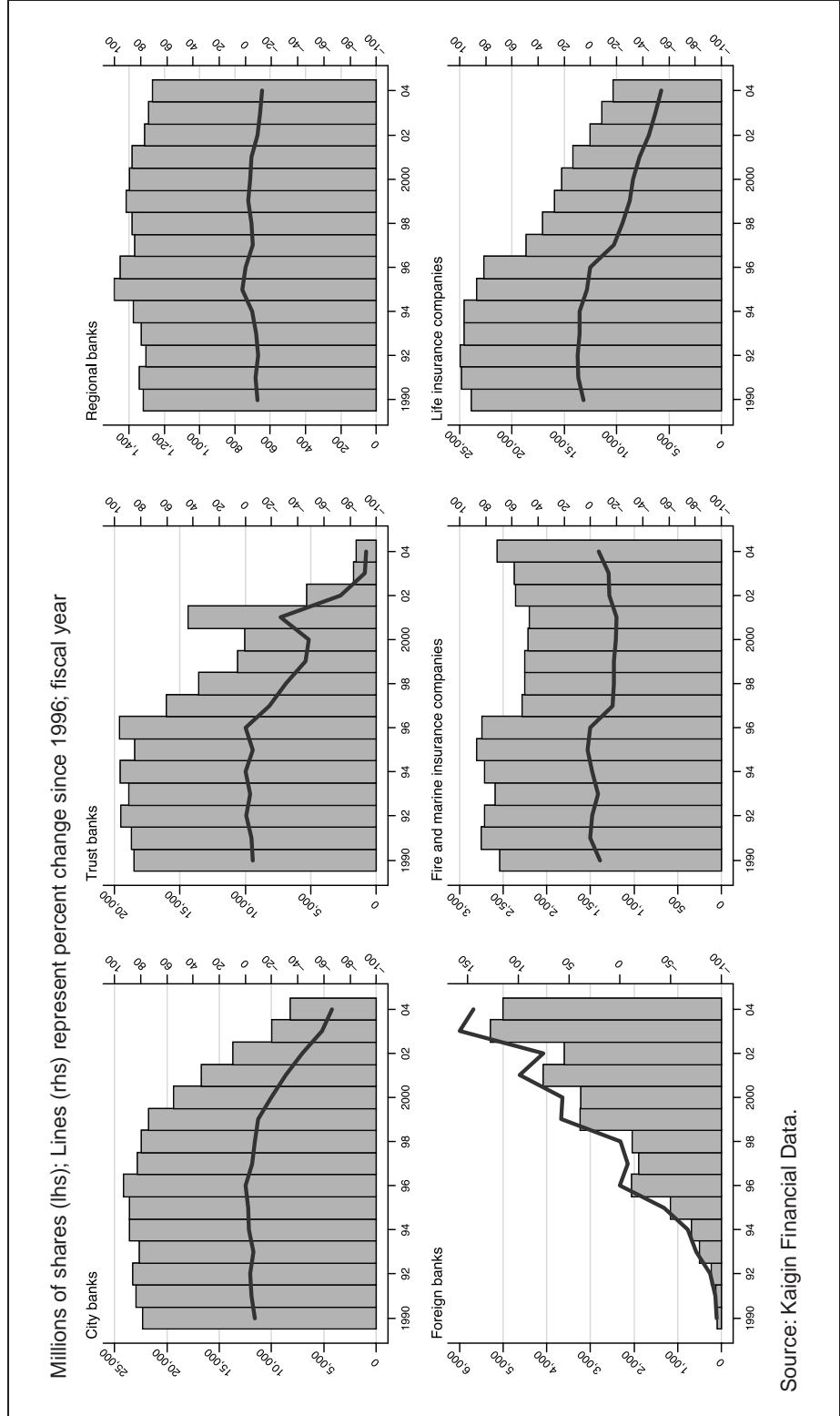
How have individual banks' equity portfolios evolved since the mid-1990s? Addressing this question directly is problematic since so many banks merged over the last decade, although Figures 3–5 attempt to shed some light on this issue.

18. Of course, individual banks may drop out of the list of a firm's top 10 shareholders because of only a partial sale of shares, or because another shareholder pushes them out, even when the bank did not actually sell any shares. The estimates throughout this paper assume that when a bank drops out of the list of top 10 shareholders for a particular firm, its holdings of shares in that firm are zero. The raw data are adjusted to reduce noise. For example, observations where the bank does not appear in the top 10 shareholders in period t , but where the banks' shareholding rates in period $t - 1$ and period $t + 1$ are positive and identical, are set equal to the positive rate.

19. The spike evident for trust banks in fiscal 2001 corresponds to the merger of Mitsubishi Trust, Nippon Trust, and Tokyo Trust banks in October 2001, and the creation of UFJ Trust Bank from Tokai Trust and Toyo Trust banks in January 2002.

20. Observations in the Kaigin data often indicated whether shares were held on the bank's balance sheet ("own account") or on the "customer account." To the extent possible, "customer account" holdings were excluded from the estimates of Japanese trust banks' equity portfolios, although there are some data irregularities that suggest a portion of the identified "own account" holdings by trust banks is actually holdings on the "customer account." For foreign banks, no such separation was feasible; much of the rise in Figure 2 for foreign banks probably reflects greater "customer account" ownership.

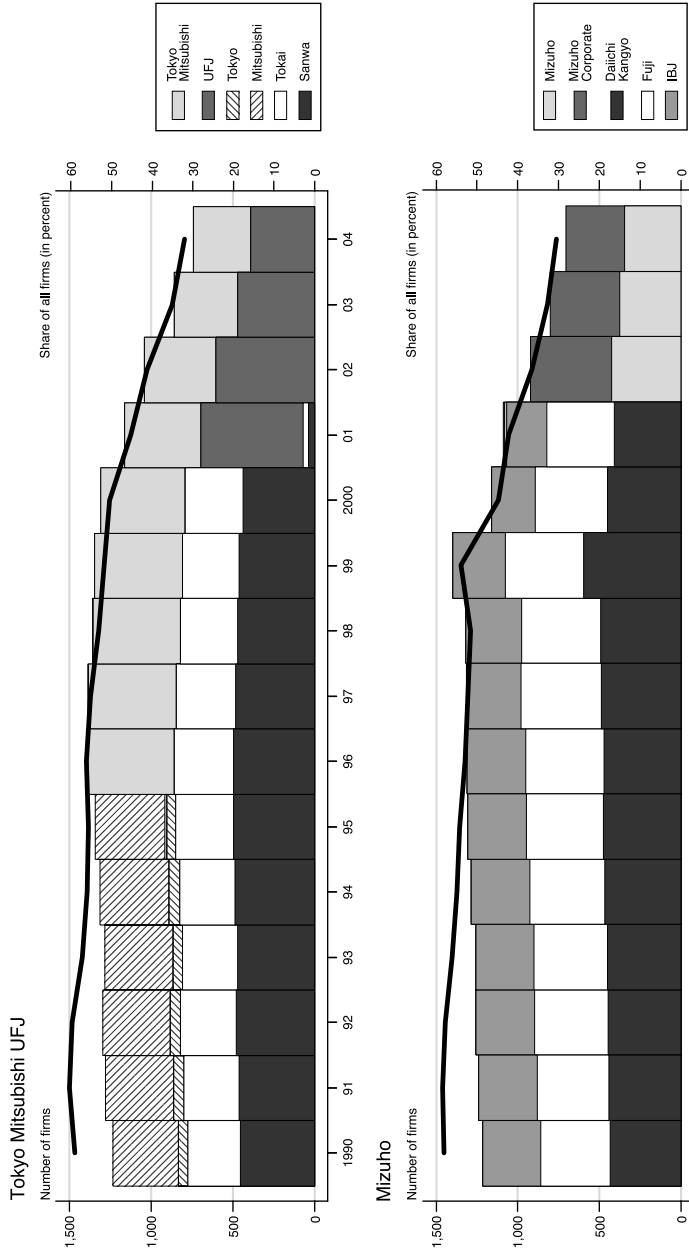
Figure 2 Shareholding by Financial Institutions in Japan



Source: Kaigin Financial Data.

Figure 3 Mega-Banks' Equity Portfolios, by Sub-Bank

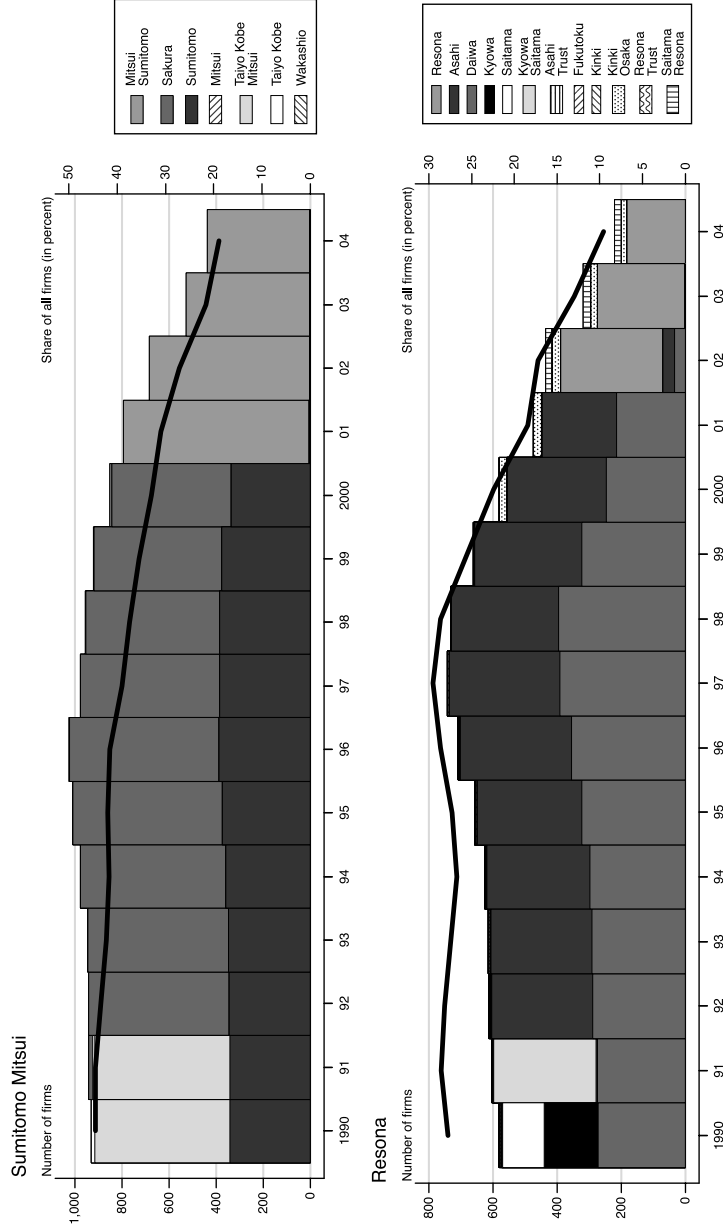
Stacked bars (lhs) indicate the number of firms in which the bank is listed in the top 10 shareholders. Lines (rhs) plot the total for each mega-bank as a share of total firms in the Kaigin database.



Source: Kaigin Financial Data.

Figure 4 Mega-Banks' Equity Portfolios, by Sub-Bank

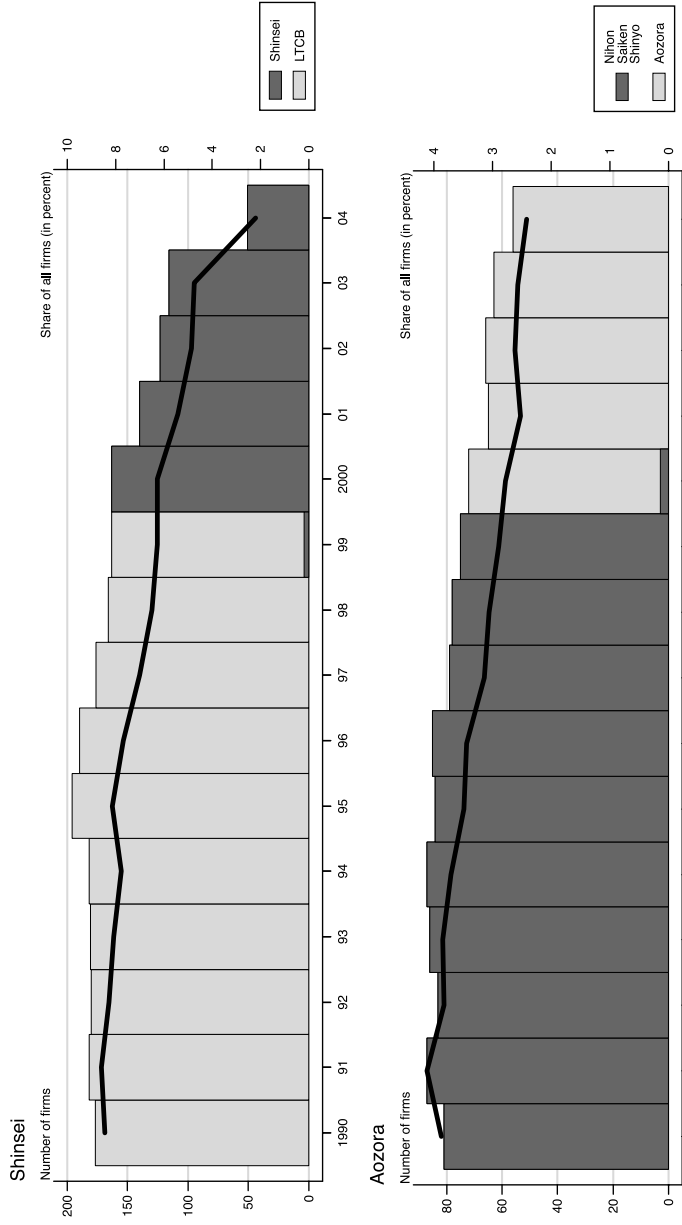
Stacked bars (lhs) indicate the number of firms in which the bank is listed in the top 10 shareholders. Lines (rhs) plot the total for each mega-bank as a share of total firms in the Kaigin database.



Source: Kaigin Financial Data.

Figure 5 Mega-Banks' Equity Portfolios, by Sub-Bank

Stacked bars (lhs) indicate the number of firms in which the bank is listed in the top 10 shareholders. Lines (rhs) plot the total for each mega-bank as a share of total firms in the Kaigin database.



Source: Kaigin Financial Data.

They illustrate the consolidation in the financial sector, as represented in the information on firms' top 10 shareholders. The vertical axis in each panel is the *number of firms* in the Kaigin database that list an individual bank as one of the top 10 shareholders. Across the panels, individual banks are grouped under the name of the so-called "mega-bank" that had emerged by 2006.²¹ Fiscal 2001 and 2002 were important in terms of merger activity, as all major banking groups, with the exception of Aozora and Shinsei banks, experienced at least one merger of their core banks in these years. A handful of city banks that existed in 1995 were the largest shareholding institutions in each of the major groups, whereas (estimated "own account") holdings by the trust banks and holdings by regional banks that were ultimately consolidated in the mega-bank were relatively small by comparison.

These figures indicate that the mega-banks were much less likely to be listed in the top 10 shareholders in 2004 than a decade earlier. For example, the number of firms listing Tokyo Mitsubishi UFJ (or one of its legacy banks) among its top 10 shareholders decreased from 1,390 firms, or 56 percent of all listed nonfinancial firms, in fiscal 1996, to 741 firms, or 32 percent, in fiscal 2004 (Figure 3). Mizuho was listed by 1,314 firms (52 percent) in fiscal 1996, but only by 705 firms (30 percent) in fiscal 2004. A similar pattern is evident for Sumitomo Mitsui, Resona, Shinsei, and Aozora (Figures 4 and 5). This simple measure suggests that firm-bank relationships, which appeared stable prior to around fiscal 1997 for most of the mega-banks, have loosened considerably over the last decade.

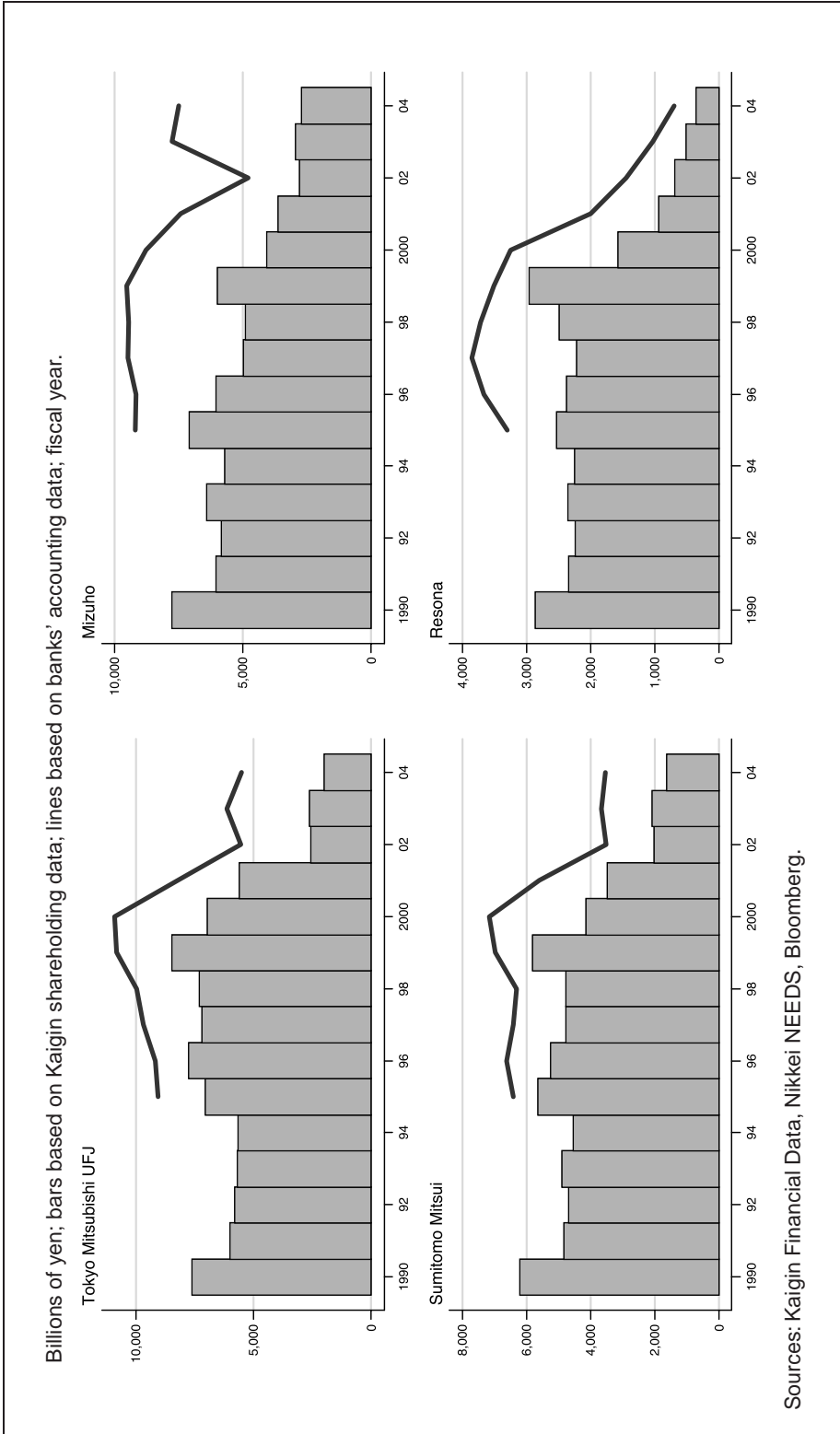
The shareholding patterns observed in the Kaigin data seem to track fairly well the information on equity holdings contained in banks' balance-sheet data, at least for the four mega-banks. Figure 6 presents a (lower-bound) estimate of the *market value* of individual banks' equity portfolios, calculated by multiplying the estimated number of shares held in each firm by the firm's end-of-period stock price. The line in each panel traces the market value of banks' equity holdings, constructed by adding up figures from individual banks' balance sheets for each mega-bank.²² The difference between the estimated market value (bars) and the actual market value (line) of banks' equity portfolios reflects differences in valuation methodologies, as well as holdings in firms that are not included in the Kaigin data. These figures suggest that the patterns observed in the Kaigin database are probably representative for city banks. However, similar figures (not presented) for the former long-term credit banks and the trust banks are much less convincing. In part, this reflects the difficulty in determining which shares are held as part of investment trusts (i.e., on customer accounts), and which are held by these banks themselves.

Even as banks disposed of corporate equity, there is some evidence that, at a broad level, the cross-sectional *structure* of their portfolios changed little. That is, there

21. The construction of these bank groups was partially driven by the data. For example, Mizuho Bank and Mizuho Corporate Bank are combined in this analysis under the name "Mizuho," since the division of equity across the two banks following the merger of Daiichi Kangyo, Fuji, and IBI is unclear. Similarly, Resona Trust is combined with Resona Bank because it is unclear how the equity holdings of Daiwa Bank were divided. The merger of Tokyo-Mitsubishi and UFJ occurred after the end of the Kaigin data sample, although the combined Tokyo Mitsubishi UFJ banking group is used for convenience. Figures similar to Figures 3-5 for trust banks are available upon request.

22. Bank balance-sheet data are taken from the Nikkei NEEDS database.

Figure 6 Market Value of Mega-Banks' Equity Portfolios



Sources: Kaigin Financial Data, Nikkei NEEDS, Bloomberg.

Table 1 Industry Composition of Mega-Banks' Equity Portfolios (Fiscal 1996–2003)

Industry	Tokyo Mitsubishi UFJ				Mizuho			
	Number of shares ¹	Percent change ²	Change in portfolio weights		Number of shares ¹	Percent change ²	Change in portfolio weights	
			Current ³	Constant ⁴			Current ³	Constant ⁴
Agriculture								
Ceramic products	102	-58.4	-0.7	-0.6	92	-57.8	-1.0	-0.7
Chemical products	318	-53.1	5.0	3.5	424	-54.9	-1.1	-3.8
Communication					0	-98.4	0.7	0.4
Construction	187	-42.7	1.3	1.4	184	-48.8	-1.1	-0.1
Electric machinery	200	-66.8	0.3	-0.3	236	-65.6	-4.5	-4.0
Electricity, gas, water	32	-83.8	-0.8	-0.8	205	-38.0	3.6	3.0
Foods manufacturing	143	-39.2	1.3	1.8	251	-32.5	1.6	2.0
General machinery	184	-67.0	-0.2	1.1	144	-76.9	-0.1	-0.2
Iron/Steel products	141	-63.6	-0.4	0.3	314	-64.3	-1.5	0.1
Wood products	0	-89.4	0.0	0.0	6	70.9	0.0	0.0
Metal products	32	-46.1	-0.1	0.2	31	-38.7	-0.2	0.0
Mining	1	13.9	0.0	0.0	8	28.8	0.2	0.2
Misc. manufacturing	50	-63.6	-0.4	-0.6	59	-40.6	-0.3	-0.3
Nonferrous metals	64	-48.9	0.0	0.3	62	-66.0	-0.7	-0.4
Petroleum products	29	-60.2	-0.4	-0.1	52	-53.1	-1.1	-0.3
Precision instruments	40	-64.0	1.6	1.1	36	-49.5	0.3	0.0
Printed products	26	-56.8	0.0	0.1	48	-46.5	-0.2	0.0
Pulp/Paper products	23	-43.3	0.1	0.2	55	-64.4	0.9	0.4
Real estate dev.	60	-46.0	1.3	1.1	14	-66.1	-0.1	-0.1
Retail trade	119	-53.3	-0.5	1.1	82	-57.9	-1.0	-0.4
Rubber products	19	-38.3	0.1	0.2	47	-39.4	-0.4	0.0
Services	52	-49.3	0.2	0.7	87	-22.3	0.1	1.2
Textile products	127	-42.0	0.3	0.7	105	-46.7	-0.2	-0.1
Transport equipment	269	-74.2	-9.4	-15.3	119	-80.2	-5.0	-7.6
Transport service	243	-56.4	2.7	4.1	489	-21.0	10.9	10.0
Wholesale trade	291	-65.8	-0.9	0.2	365	-39.6	0.3	0.3
Average	110	-54.33	0.02	0.02	135	-44.98	0.00	-0.02
Standard dev.	96	19.38	2.34	3.39	135	33.46	2.76	2.86

(continued on next page)

seem to be only small changes in the industry composition of the mega-banks' equity portfolios between fiscal 1996 and fiscal 2003, suggesting that banks disposed of equity across a wide range of industries rather than in a targeted few.²³ Table 1 presents an industry breakdown of the shares held in the four hypothetical bank portfolios. The estimated holdings (in terms of numbers of shares) in particular industries contracted significantly between fiscal 1996 and fiscal 2003, typically by 40–60 percent.²⁴ In only one industry (mining) did the estimated number of shares held by these banks increase. At the same time, the industry-level *composition* changed relatively little; the estimated change in the portfolio weights for most industries, calculated using both current and

23. The data for fiscal 2004 in the version of the Kaigin database used here do not include firms with an accounting period that ended later than end-March 2005 (about 15 percent of all firms). Calculations based on the data for fiscal 2004 are qualitatively similar to those presented below.

24. Across portfolios, the average reduction in the number of shares held in each industry was 53 percent over this period. Banks that drop out of the list of top 10 shareholders are assumed to have zero shareholding. Thus, the figures on the percent decrease in shareholding will overstate the actual decrease to the extent that shareholding by these banks is still positive.

Table 1 (continued)

Industry	Sumitomo Mitsui				Resona			
	Number of shares ¹	Percent change ²	Change in portfolio weights		Number of shares ¹	Percent change ²	Change in portfolio weights	
			Current ³	Constant ⁴			Current ³	Constant ⁴
Agriculture								
Ceramic products	60	-45.4	0.2	0.2	3	-93.0	-2.0	-3.3
Chemical products	240	-61.6	-1.1	-3.2	44	-78.8	-1.8	-4.8
Communication								
Construction	170	-55.2	-1.3	0.0	83	-69.9	-0.7	1.2
Electric machinery	247	-64.2	-4.7	-2.6	120	-67.9	0.1	-1.2
Electricity, gas, water	111	-46.8	3.6	3.5	26	-85.2	3.1	3.2
Foods manufacturing	68	-48.1	0.2	0.4	21	-74.3	-0.6	-0.8
General machinery	160	-64.0	-2.2	-2.1	80	-72.3	5.1	5.6
Iron/Steel products	148	-59.5	-0.9	0.2	32	-84.3	-2.0	-0.2
Wood products	5	-57.4	0.0	0.0				
Metal products	34	-46.5	0.3	0.6	11	-68.4	-0.5	0.0
Mining	29	87.2	0.4	0.4				
Misc. manufacturing	40	-51.0	-0.1	0.4	27	-58.5	-1.8	-2.0
Nonferrous metals	58	-60.4	-0.5	0.1	17	-71.2	0.1	0.4
Petroleum products					3	-67.5	-0.1	0.0
Precision instruments	27	-64.5	0.6	-0.1	18	-73.1	7.3	6.1
Printed products	22	-61.7	-0.4	-0.2	0	51.0	0.0	0.1
Pulp/Paper products	43	-60.8	0.9	0.5	4	-77.9	-0.3	-0.3
Real estate dev.	58	-39.0	1.5	1.4	10	-22.6	0.4	0.5
Retail trade	53	-70.5	-3.3	-1.9	18	-82.9	-4.2	-2.6
Rubber products	35	-28.5	0.4	1.1	0	-67.0	0.0	0.0
Services	52	-28.8	1.6	1.5	9	-60.0	0.0	0.3
Textile products	69	-51.9	-0.2	0.2	7	-87.8	-0.5	-0.2
Transport equipment	171	-65.6	1.7	-4.2	48	-81.0	-1.7	-4.7
Transport service	129	-63.6	4.1	3.4	52	-35.6	1.1	1.7
Wholesale trade	224	-57.9	0.5	1.1	37	-80.3	-0.9	0.9
Average	94	-48.57	0.05	0.03	29	-65.59	0.00	0.00
Standard dev.	74	30.96	1.88	1.80	31	29.94	2.41	2.64

- Notes: 1. Shares held in fiscal 2003; in millions of shares.
 2. Percent change in the number of shares held, 1996–2003.
 3. Change in the portfolio weight of shares in held in each industry. Calculated using current period equity prices, and thus includes valuation changes. In percentage points.
 4. Change in the portfolio weight of shares in held in each industry. Calculated using constant end-2003 equity prices. In percentage points.

constant equity prices in order to partially control for the valuation effects, was less than 1 percentage point over this period.²⁵

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 25. *Current value* portfolio weights use the firm's end-of-period stock price to value the banks' equity holdings in a particular year. In contrast, *constant value* weights are constructed using the fiscal 2003 end-of-period stock prices to value holdings in a particular firm in all years.

V. Loosening Bank Ties?

Has banks' equity disposal gone hand in hand with a loosening of "main bank" relationships in Japan? This section explores this question by presenting various measures of firm-bank affiliation and tracking their evolution over time. It also reexamines the determinants of a bank's decision to sell corporate equity. MK2007 explored this issue in depth for the fiscal 1997–2001 period, and found that a bank's decision to sell shares was negatively associated with measures of the strength of the firm-bank tie. Using a similar empirical methodology, the question of whether banks remained reluctant to dispose of shares of their close client firms in the fiscal 2002–04 period, when scrutiny from the media and the FSA put increased pressure on banks to reform their balance sheets, is addressed.

At a broad and fairly mechanical level, there is some evidence that firm-bank ties have started to loosen. Table 2 lists the average number of lending relationships and the average number of times banks appear among the top 10 shareholders for the dataset as a whole.²⁶ Since fiscal 1996, the average number of lenders per firm fell from just over eight to just under six in fiscal 2004. Similarly, the average number of banks among the top 10 shareholders fell from almost four to just over two during this same period. The final column of Table 2 shows that the percentage of lenders that are also among a firm's top 10 shareholders declined as well, from 91 percent of all firm-bank lending pairs in fiscal 1996 to 65 percent in fiscal 2004.

To more formally address the question of whether "main bank" ties are loosening, it is necessary to first identify each firm's main bank. A variety of methodologies have been used in the literature, some as simple as *keiretsu* affiliation, and other, more sophisticated procedures that make use of firm-bank-year specific lending data. The four-step procedure used here combines these lending data with the shareholding data in the Kaigin database, and is detailed in Table 3.²⁷ The first step is to identify banks that are both the firm's largest lender and the largest shareholder among banks (criterion 1). If no bank satisfies this criterion, then the firm's main bank is next chosen as the largest lender that is also one of the top five shareholders among banks (criterion 2). If no bank satisfies this criterion, the bank that is the largest shareholder and is among the top five lending banks is chosen (criterion 3). Finally, if a main bank has still not been identified, then the firm's largest lending bank, regardless of its shareholding in the firm, is selected (criterion 4).

Although mechanical, this selection procedure does provide a rough indication of how firm-bank relationships, when measured by the loan and shareholding channels, have changed over the last 10 years. As shown in Table 3, banks identified as the firm's largest lender still tend to be identified as the largest bank shareholder as well

26. The figures in this table are calculated *after* consolidating total loans and shareholding (for each firm) across the groups of banks that ultimately merged into one of the four mega-banks. This understates the actual number of lending and shareholding relationships in years prior to bank mergers, but captures changes in the number of these relationships independent of the bank merger process.

27. Consolidation in Japan's financial industry since the mid-1990s presents a problem, since many banks that were once separate "main banks" for different stables of firms later merged. In selecting each firm's main bank, the *unconsolidated* loan and shareholding data are used to select the bank, and then the name of the bank is changed to the name of the mega-bank that ultimately emerged after the merger process.

Table 2 Firm-Bank Lending and Shareholding Relationships

Fiscal year	Number of firms ¹	Number of bank lending relationships ²	Number of bank shareholders ²	Bank lenders with shareholding (percent) ³
1982	1,138	10.3	2.75	88.2
83	1,615	9.63	2.82	88.9
84	1,631	9.41	2.93	88.9
85	1,637	9.26	3.06	89.8
86	1,640	8.92	3.21	91.0
87	1,711	8.75	3.32	89.9
88	1,821	8.53	3.43	91.6
89	1,889	8.37	3.57	90.6
90	1,949	8.32	3.65	91.1
91	1,999	8.35	3.69	90.8
92	2,022	8.44	3.69	91.8
93	2,042	8.45	3.66	91.1
94	2,116	8.41	3.62	91.1
95	2,179	8.15	3.53	90.8
96	2,241	7.92	3.57	90.6
97	2,392	7.77	3.07	84.2
98	2,405	7.60	2.84	82.7
99	2,382	6.41	2.69	83.7
2000	2,407	6.17	2.57	79.6
01	2,422	5.92	2.48	77.1
02	2,379	5.80	2.59	75.8
03	2,295	5.82	2.18	69.1
04	2,201	5.77	2.02	64.6

Notes: 1. Total number of firms in the Kaigin database.

2. A firm is considered to have a lending relationship with a bank if the stock of outstanding loans from the bank is positive, and a shareholding relationship if the bank is listed as one of the firm's top 10 shareholders. The figures in this table are calculated *after* consolidating total loans and shareholding across the groups of banks that ultimately merged into one of the four mega-banks. This understates the actual number of lending (shareholding) relationships in years prior to bank mergers, but captures changes in the number of these relationships independent of the bank merger process.

3. Percentage of bank lenders that are also listed among the firm's top 10 shareholders.

(criterion 1), at least for the four mega-bank groups. However, the number of firm-bank pairs that meet this criterion has fallen over the last decade, as banks have reduced their holding of corporate shares. Similarly, the number of firm-bank pairs that meet the slightly less restrictive criterion 2 has also fallen for the four major banking groups. As a result, the number of banks that are selected as main banks based *solely* on the lending data (criterion 4) has been on the rise. Combined, these figures provide some evidence that the incidence of individual banks holding the top lending and shareholding positions (among banks) is no longer as common as it once was, and, to the extent that firms' *actual* main banks are identified, suggests a weakening of main bank ties.

Table 3 Identifying Main Banks

Number of firms, by selection criteria

	Fiscal year	Criterion 1 ¹	Criterion 2 ²	Criterion 3 ³	Criterion 4 ⁴	Total
Mizuho	1996	370	119	9	33	531
	2000	286	56	25	54	421
	2004	281	28	20	108	437
Tokyo Mitsubishi UFJ	1996	331	67	12	17	427
	2000	269	37	22	52	381
	2004	211	28	25	102	366
Sumitomo Mitsui	1996	239	89	7	20	355
	2000	212	29	13	30	284
	2004	148	18	29	86	281
Resona	1996	110	20	6	3	139
	2000	95	5	12	9	121
	2004	63	10	9	23	105
Aozora	1996	7	4	1	0	12
	2000	3	0	1	0	4
	2004	3	0	3	5	11
Shinsei	1996	23	14	0	2	39
	2000	3	2	6	1	12
	2004	1	0	0	2	3
Chuo Mitsui Trust	1996	36	8	7	3	54
	2000	10	3	9	3	25
	2004	6	0	2	7	15
Sumitomo Trust	1996	19	5	7	0	31
	2000	15	5	3	5	28
	2004	13	2	5	12	32
Mitsui Asset Trust	1996	10	0	2	3	15
	2000	0	0	5	0	5
	2004	0	0	0	2	2
Mitsubishi UFJ Trust	1996	27	3	4	2	36
	2000	15	2	16	2	35
	2004	15	3	9	8	35
Other main banks	1996	179	30	7	15	231
	2000	148	21	22	29	220
	2004	159	25	51	41	276
No main bank	1996	—	—	—	—	604
	2000	—	—	—	—	1,061
	2004	—	—	—	—	749

- Notes: 1. The number of firms for which the bank is the largest lender among banks *and* the largest shareholder among banks.
 2. The number of firms for which the bank is the largest lender among banks and is one of the top five shareholders (but not the largest bank shareholder).
 3. The number of firms for which the bank is the largest shareholder among banks and is one of the top five bank lenders (but not the largest bank lender).
 4. The number of firms for which the bank is the largest bank lender, but not among the top five bank shareholders.

Following a methodology similar to that in MK2007, the remainder of this section relies on a probit model to explore the determinants of banks' decision to sell equity, with a focus on sales of shares of firms for which the bank serves as the main bank. The dependent variable in these regressions, *SDUM*, is a dummy that attempts to capture the sale of shares by a particular bank in a particular firm in a particular year. To construct this variable, all firm-year observations for which the mega-bank is listed as a shareholder are selected.²⁸ Conditional on the particular bank holding shares in period $t - 1$, *SDUM* is set to one in period t if the number of shares held in period t is less than the number held in period $t - 1$.²⁹

Looking only at the statistical properties of *SDUM*, there is evidence of a pickup in the rate at which main banks disposed of shares of their main-bank client firms after fiscal 2000. Table 4 provides a breakdown of this variable for observations where one of the banks in each mega-bank has been identified as a firm's main bank.³⁰ The first column under each bank name lists the total number of firms for which the bank was identified as the main bank. The second column lists the share of these firms for which *SDUM* = 1, or where a sale of shares has been identified. For each of the four mega-banks, this share steadily picked up after fiscal 2000. The highest incidence of sales occurred in fiscal 2002 and fiscal 2003, when banks' solvency came under increased scrutiny. Banks disposed of shares in an estimated 30–50 percent of the firms for which they served as the main bank in these years, although the incidence of sales dropped in fiscal 2004.

The dummy, *SDUM*, is regressed on a host of firm-specific, bank-specific, and firm-bank-specific right-hand-side (RHS) variables. The first set of RHS regressors is meant to capture firm performance. These regressors are included to test whether or not banks have sold off their "high-performing" shares, and whether the sale of such shares accelerated in fiscal 2002 as banks became increasingly capital constrained. The firm's stock performance is captured by current and lagged values of the one-year return on the firm's stock in excess of the return on the Nikkei 225 index (*EXRET*), and by lags of year-specific estimates of the firm's market beta (*BETA*) and idiosyncratic risk (*IRISK*). A lag of the ratio of total bank loans to total liabilities (*TLN_TL*) is included to capture the firm's overall debt structure and level of bank dependence, and average Q (*Ave Q*) is included to capture the market's assessment of a firm's investment opportunities.³¹

28. The analysis is based on the hypothetical portfolios for the following four mega-banks: Mizuho, Sumitomo Mitsui, Resona, and Tokyo Mitsubishi UFJ.

29. The number of shares held is calculated as the product of the shareholding rate (in the Kaigin data) and the number of shares outstanding for a particular firm. To reduce the effect of noise, the dummy is set to one only if the reduction in shares held is larger than 1 percent of the $t - 1$ level. Cases where the number of shares held by a particular bank in a particular firm in period $t - 1$ is positive but for period t is unknown (because the bank either sold its shares or was no longer listed as one of the top 10 shareholders) are treated as a sale of shares, and *SDUM* is set to one.

30. The numbers for each of the four mega-banks in Table 4 differ from those in Table 3 because firm-year observations where one or more of the variables needed for the probit regressions presented below are missing have been dropped.

31. Average Q is constructed using a slightly modified procedure from Hayashi and Inoue (1991). Other firm-specific regressors include a lag of total assets (*TA*), a lag of the log of the interest coverage ratio (*lnCOVRAT*), dummies that are set to one if the number of outstanding shares decreased (*NOSHDEC*) or increased (*NOSHINC*) in a particular year, a dummy variable set equal to one if the bank's shareholding rate in the previous year was greater than 5 percent (*FIVE*), and a full set of industry dummies.

Table 4 Incidence of Share Sales by Mega-Banks

Fiscal year	Tokyo Mitsubishi UFJ		Sumitomo Mitsui		Mizuho		Resona	
	Total	Sale (percent)	Total	Sale (percent)	Total	Sale (percent)	Total	Sale (percent)
1991	332	0.3	282	1.8	416	2.4	96	3.1
92	335	2.4	288	0.7	435	1.8	98	2.0
93	345	3.2	297	1.7	440	3.2	100	1.0
94	351	2.3	303	1.0	450	2.4	103	3.9
95	366	7.1	304	2.0	463	1.5	103	2.9
96	401	2.5	325	4.0	491	5.7	121	3.3
97	411	12.2	331	11.8	502	9.2	133	12.0
98	383	9.7	319	11.6	474	7.6	124	13.7
99	395	11.9	321	10.0	487	11.5	126	9.5
2000	324	15.1	250	26.0	393	27.2	116	13.8
01	337	28.8	258	26.0	367	22.3	110	27.3
02	339	44.0	267	43.1	346	38.2	107	33.6
03	302	40.4	244	48.0	373	34.9	113	46.9
04	264	20.8	174	32.8	317	28.1	86	45.3

Note: The “total” columns indicate the number of firms for which the mega-bank group has been identified as a top bank (using the methodology outlined in Table 3) and in which the bank held shares in the previous period. The “sale” columns indicate the share of these firms in which the bank reduced its holdings of shares. Figures are based on the selling dummy variable, *SDUM*, which is set to one if a bank reduced its holding of shares in a firm from $t - 1$ to t .

Banks in poor health arguably faced a greater need for liquidity to boost their capital ratios, and thus were under greater pressure to dispose of shares. To control for these effects, bank-specific variables are also included. A lag of *BTA*, or total assets of the mega-bank, is used to capture bank size, and current and lagged values of *BNETINCTA*, or the mega-banks’ net income scaled by total assets, is used to proxy for bank health.³² In addition to these variables, the regressions include dummies for each of the four mega-banks to control for unobserved bank-specific effects.

The regressors of interest are those that capture the strength of the firm-bank relationship.³³ In particular, the regression includes the dummy variable *TOP*, which equals one if the bank was identified as the firm’s “main bank” in the previous year using the four-step procedure described above. Changes in the sign and significance of the coefficient on *TOP* across years should provide some indication as to whether the increase in the incidence of share sales in these firms after fiscal 2001, as indicated in Table 4, actually represented a loosening of main bank ties or rather was the result of other factors. In addition to *TOP*, a lag of the share of the firm’s total loans that were extended by the shareholding bank (*TLNSHARE*) is used as an additional proxy for the

32. These are constructed by first aggregating individual bank balance sheets to the level of the mega-bank.

33. One drawback of the current analysis is that there is no information on firms’ holding of banks’ shares. This information allowed MK2007 to examine the bilateral nature of the unwinding process. While this omission is not without cost, it is unlikely to affect the overall point of the analysis presented here.

strength of the firm-bank tie. Note that *TLNSHARE* captures this firm-bank lending tie regardless of whether the bank is identified as the firm's main bank, as captured by *TOP*.

Table 5 presents the results of regressions based on observations pooled across firms and mega-bank portfolios. The RHS variables have been added sequentially, yielding five different model specifications across the columns of Table 5. The coefficients are presented as the marginal change in the probability of a sale for an infinitesimal change in the regressor, and for a discrete change in dummy variables. Three broad points stand out in these results. First, banks' decision to sell equity was strongly related to firms' stock price performance. Banks tended to sell those shares that outperformed the market in either the current or previous period, as indicated by the positive and significant coefficients on the *EXRET* variables. In doing so, they were more likely to dispose of "high beta" shares. Second, the larger the bank and the higher the bank's net income in the current period, the less likely the bank was to realize a sale, consistent with the idea

Table 5 The Decision of Mega-Banks to Sell Shares

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>CON</i>	-0.5315 -10.79	-0.4212 -7.6	3.2645 16.03	0.6158 7.62	0.6299 7.77
<i>NOSHINC</i>	0.0555 5.29	0.0248 2.29	0.028 2.58	0.0284 2.62	0.0279 2.57
<i>NOSHDEC</i>	0.1551 13.85	0.1533 13.46	0.1788 15.42	0.1805 15.58	0.1788 15.42
<i>FIVE</i>	0.1497 13.57	0.1564 13.95	0.1715 15.12	0.1723 15.17	0.1716 15.10
<i>TOP</i>	-0.0516 -7.16	-0.0559 -7.61	-0.0592 -8.06	-0.0618 -8.00	-0.0587 -7.52
<i>Lag TLNSHARE</i>	-0.0656 -3.63	-0.029 -1.49	-0.0521 -2.65		-0.0521 -2.64
<i>Lag TLNLT</i>				-0.0019 -0.19	-0.0017 -0.18
<i>Lag TA</i>	0.0004 7.60	0.0003 5.12	0.0003 5.54	0.0003 5.67	0.0003 5.54
<i>Lag Ave Q</i>	0.0084 4.08	0.0019 0.86	0.0029 1.30	0.0034 1.56	0.0029 1.31
<i>Lag lnCOVRAT</i>	-0.0018 -0.18	-0.0001 -0.01	0.0034 0.33	-0.0041 -0.41	0.0034 0.33
<i>EXRET</i>		0.0771 9.96	0.0576 8.27	0.0573 8.16	0.0576 8.27
<i>Lag EXRET</i>		0.0811 6.15	0.0759 5.77	0.076 5.8	0.0759 5.77
<i>Lag BETA</i>		0.0929 8.86	0.1034 9.81	0.1001 9.53	0.1033 9.79
<i>Lag IRISK</i>		-0.0141 -10.15	-0.0113 -8.28	-0.0123 -9.33	-0.0113 -8.26

(continued on next page)

Table 5 (continued)

<i>Lag BTA</i>			-0.088	-0.0873	-0.0879
			-19.51	-19.42	-19.50
<i>BNETINCTA</i>			-2.3486	-2.3246	-2.3502
			-5.79	-5.73	-5.79
<i>Lag BNETINCTA</i>			-0.4399	-0.4135	-0.4421
			-0.98	-0.92	-0.99
Pseudo R ²	0.032	0.054	0.071	0.071	0.071
Number of obs.	19,464	19,081	19,081	19,081	19,081

Note: The table contains the results of probit regressions of the dummy variable *SDUM* on a set of firm-, bank-, and firm-bank-specific variables. *SDUM* is set to one if the bank decreased its shareholding in a particular firm between $t - 1$ and t , and zero otherwise. The RHS firm-specific variables include current (period t) and lagged (period $t - 1$) values of the annual return on the firm's stock in excess of return on the Nikkei 225 index (*EXRET* and *Lag EXRET*), the firm's market beta (*Lag BETA*), and idiosyncratic risk (*Lag IRISK*) in period $t - 1$, an estimate of the firm's average Q in $t - 1$ (*Lag Ave Q*), the share of total bank loans in total liabilities in $t - 1$ (*Lag TLNTL*), a lag of total assets (*Lag TA*), the log of the interest coverage ratio (*Lag lnCOVRAT*), and the dummy variables *NOSHDEC* and *NOSHINC*, which are set to one if the firm's number of outstanding shares decreased or increased, respectively, in period t . Bank-specific variables are the bank's total assets at $t - 1$ (*Lag BTA*) and current and lagged values of the bank's return on assets (*BNETINCTA*). Firm-bank-specific variables include the share of the firm's total loans extended by the shareholding bank at $t - 1$ (*Lag TLNSHARE*), a dummy set to one if the bank is identified as the firm's main bank in $t - 1$ (*TOP*), and a dummy set to one if the bank's shareholding rate in the previous year was greater than 5 percent (*FIVE*). Regressions also include a full set of firm-level industry dummies, and a dummy for each mega-bank. Robust z statistics are reported under each coefficient.

that deteriorating bank health contributed to the rising incidence of share sales. Finally, across all specifications, the variable *TOP* enters negatively and significantly, indicating that banks were, overall, reluctant to sell shares in those firms for which they served as the main bank. Being the firms' main bank in period $t - 1$ reduced the probability of a sale of shares in a client firm by roughly 5–6 percentage points.

Repeating this exercise on a year-by-year basis provides some evidence that fiscal 2002 was a watershed year (Table 6).³⁴ As equity markets fell and the NPL problem worsened through fiscal 2002, banks faced a growing need for cash to support their capital ratios. A reading of the coefficients on the variables tracking the firms' stock price performance (i.e., *EXRET*, *BETA*, and *IRISK*) suggests that banks sold shares of

34. The regressions in Table 6 are based on Model 5 in Table 5. However, the bank-specific variables have been dropped. Regression includes sets of mega-bank and industry dummies. To save space, only the coefficient estimates for six regressors are presented in Table 6. The number of observations in these regressions is limited to those firms in which one of the particular mega-banks held a positive number of shares in the previous period, and thus tends to decline in each successive year as banks' equity portfolios shrank.

Table 6 The Decision of Mega-Banks to Sell Shares, Model 5 by Fiscal Year

Fiscal year	1998	1999	2000	2001	2002	2003	2004
<i>TOP</i>	-0.0478 -3.12	-0.0749 -3.66	-0.0179 -0.81	-0.0582 -2.91	0.0232 0.87	-0.0642 -2.67	-0.0542 -1.98
<i>Lag TLNSHARE</i>	-0.0517 -1.19	-0.0858 -1.33	-0.1939 -3.56	0.0117 1.53	-0.1007 -1.79	-0.0192 -0.89	-0.0501 -0.95
<i>Lag TLNTL</i>	-0.0046 -0.13	-0.0053 -0.13	0.009 0.19	-0.0672 -1.24	-0.2683 -4.5	-0.1959 -3.09	-0.0665 -1.03
<i>EXRET</i>	0.0134 0.8	0.0124 1.42	0.0453 1.77	0.1029 2.8	0.0793 2.32	0.0422 2.90	0.0065 0.29
<i>Lag EXRET</i>	-0.026 -0.79	0.0533 2.36	0.0146 1.15	0.0804 2.98	0.0499 1.23	-0.0046 -0.12	0.029 1.94
<i>Lag BETA</i>	0.0211 1.43	0.0389 1.95	0.1432 5.04	0.1627 4.60	0.2928 6.98	0.2388 6.39	0.0979 2.55
<i>Lag IRISK</i>	-0.0018 -0.87	-0.0033 -1.43	-0.0052 -1.56	0.0039 1.14	-0.0071 -1.76	-0.0035 -0.87	-0.0049 -0.93
Pseudo R ²	0.102	0.13	0.123	0.095	0.087	0.076	0.065
Number of obs.	3,067	2,988	3,012	2,807	2,632	2,445	2,099

Note: The table contains the results of probit regressions of the dummy variable *SDUM* on a set of firm-, bank-, and firm-bank specific variables. *SDUM* is set to one if the bank decreased its shareholding in a particular firm between $t - 1$ and t , and zero otherwise. The RHS firm-specific variables include current (period t) and lagged (period $t - 1$) values of the annual return on the firm's stock in excess of return on the Nikkei 225 index (*EXRET* and *Lag EXRET*), the firm's market beta (*Lag BETA*) and idiosyncratic risk (*Lag IRISK*) in period $t - 1$, an estimate of the firm's average Q in $t - 1$ (*Lag Ave Q*), the share of total bank loans in total liabilities in $t - 1$ (*Lag TLNTL*), a lag of total assets (*Lag TA*), the log of the interest coverage ratio (*Lag lnCOVRAT*), and the dummy variables *NOSHDEC* and *NOSHINC*, which are set to one if the firm's number of outstanding shares decreased or increased, respectively, in period t . Bank-specific variables are the bank's total assets at $t - 1$ (*Lag BTA*) and current and lagged values of the bank's return on assets (*BNETINCTA*). Firm-bank-specific variables include the share of the firm's total loans extended by the shareholding bank at $t - 1$ (*Lag TLNSHARE*), a dummy set to one if the bank is identified as the firm's main bank in $t - 1$ (*TOP*), and a dummy set to one if the bank's shareholding rate in the previous year was greater than 5 percent (*FIVE*). Regressions also include a full set of firm-level industry dummies, and a dummy for each mega-bank. Robust z statistics are reported under each coefficient.

firms that outperformed the market, particularly in fiscal 2001 and fiscal 2002. The size and the significance of the coefficient on *EXRET* rises in these years (and then declines through fiscal 2004), indicating that banks may have "cashed in," driven by their need to boost capital adequacy. However, with falling equity prices overall in these years, it may also reflect banks' reluctance to sell those shares requiring the recognition of a large capital loss. Banks also tended to sell off high beta stocks in these years, which may have helped them better absorb the fall in the mark-to-market value of their equity portfolios. The coefficient on the firm's (lagged) market beta almost doubles in fiscal 2002.

Perhaps most significantly, the coefficient on the *TOP* variable suggests that something changed in fiscal 2002. In all years except fiscal 2002, *TOP* enters the regressions with a negative sign, and is generally statistically significant. In fiscal 2001, for example, the estimated coefficient implies that being a firm's main bank tended to reduce the probability of a sale of shares by 6 percentage points. In fiscal 2002, however, the coefficient flips signs (but is statistically insignificant), signaling that banks disposed of shares in *all* types of firms in this year, regardless of whether it was the firm's main bank.

On balance, the evidence suggests that firm-bank ties are, in a purely mechanical sense, loosening. However, it is not clear from the results above that the culture of main bank relationships has completely disappeared. Banks' capital adequacy and profitability improved in fiscal 2003–05 as equity prices recovered and the credit costs associated with NPL disposal declined significantly, reducing their incentive to dispose of shares. Some banks even reported growing requests from firms for banks to increase their shareholding (Bank of Japan [2007]). Indeed, after fiscal 2002, the coefficient on *TOP* again turns negative and is statistically significant (Table 6).

VI. Bank Ties and Firm Performance

What are the implications of banks' share disposal for firm performance? Using data for the 1980s, Weinstein and Yafeh (1998), Morck, Nakamura, and Shivdasani (2000) and Beason (1999) found that bank affiliation was negatively correlated with firm profitability, positively correlated with a firm's interest payments, and uncorrelated with firm volatility.³⁵ MK2007 showed that the negative relationship between bank affiliation and firm profitability remained evident in the data throughout the 1990s, when banks' equity disposal began in earnest.

This section builds on this work by examining how the empirical relationship between bank ties and firm performance has changed as banks' disposal of corporate shares accelerated. The analysis relies on the empirical framework described in Section II.B, that is, regressions of firm performance metrics on measures of firm-bank affiliation and control variables. Year-by-year estimates using different subsamples of firms and banks help to track how the coefficients on the firm-bank relationship variables have changed over time, in particular since fiscal 2002. The results suggest that the effect of bank shareholding ties has weakened less than might have been expected given the degree to which banks' equity portfolios have shrunk in recent years.

The dependent variables examined here are firm profitability, interest payments, and measures of firms' stock price volatility. Firm profitability is measured by operating profits normalized by gross sales revenue (*PROF_SL*), although the results are similar if earnings per share (*EPS*) is used. Interest payments are measured as the interest on non-bond debt divided by total non-bond debt. Finally, year-specific measures of the

35. Weinstein and Yafeh (1998) measure bank affiliation using a *keiretsu* dummy, while Morck, Nakamura, and Shivdasani (2000) use firm-bank lending and shareholding data for 1986.

firm's stock price beta and total stock price volatility (i.e., the standard deviation of raw returns) are taken as measures of firm volatility.³⁶

The independent variables paired with these three dependent variables consist of sets of firm- and firm-bank-specific controls.³⁷ The log of gross sales (*lnRSL*) is used to control for firm size in all regressions. Lags of sales growth (*RSLGR*) and average Q (*Ave Q*) are thought to be positively correlated with operating profits, and negatively correlated with interest payments. Differences in firms' debt structure are controlled for by the inclusion of *TDEBT_MC*, or total debt over the sum of total debt and market capitalization, and by *NBDEBT_TL*, or total non-bond debt over total liabilities. The first of these tracks the overall degree of leverage in the firm, whereas the second captures the degree of bank financing. Regressors that capture variation in ownership structure include *OWN_TOPTEN*, the cumulative ownership by the top 10 shareholders, and *OWN_INDIV*, *OWN_FORGN*, and *OWN_OTHER*, the cumulative ownership by individuals, by foreigners, and by other shareholders, respectively.

The regressors of interest are those that capture the strength of the firm-bank lending and shareholding relationship. The main bank for each firm is chosen using the four-step mechanical selection procedure described in Section V. Once each firm's main bank is identified, the strength of the lending tie with this bank is captured by *TOP_LNTL*, or total loans from the top bank normalized by total liabilities. Similarly, *TOP_OWN* is the percent of outstanding shares held by the top bank. Finally, the regressions also include a dummy, *KEIRETSU*, which is set equal to one if the firm was a member of one of the financial *keiretsu* groups.

The analysis consists of a series of instrumental variable (IV) regressions, where lags of all RHS variables are used as instruments for current period values. The exceptions to this are the firm-bank relationship-specific variables (*TOP_OWN* and *TOP_LNTL*) and the sales-growth regressor; for these variables, only lags are used.³⁸ The regressions are run on firms that have been in existence since at least fiscal 1991, and the full sample is balanced from fiscal 1991 to fiscal 2004 (although regression results from the 1980s are presented as well).³⁹ Firms for which stock price data and data on the year- and bank-specific lending relationships are not available are also dropped, leaving a total of 1,228 firms. Using this sample as the base, firms with extreme values of the dependent variable (less than the first percentile value, or greater than the 99th percentile value) are dropped prior to running each regression.

Table 7 provides a breakdown of main bank affiliation for the sample of firms used in the regressions. In the early 1980s, the banks that ultimately merged into the four mega-banks served as the top bank for close to 80 percent of the firms in the sample. This share consistently fell since then, and by fiscal 2003–04 had reached 65 percent.

36. Only the results using total stock price volatility are presented here.

37. Each regression also includes a dummy that equals one if the observation was based on a non-12-month accounting period, and a full set of industry and year dummies.

38. Using lags of *TOP_OWN* and *TOP_LNTL* generally yield *less statistically significant* coefficients than current-period values, but are arguably more appropriate since correlation between current period values and the error term can bias the coefficients.

39. Balancing between 1991 and 2004, rather than from, say, 1982 to 2004 means that some firms enter the sample during the 1980s. This yields a somewhat larger sample of firm for the later period, which is the focus of this study.

Table 7 Identifying Main Banks (Regression Sample of Firms)

Fiscal year	Four mega-banks as main banks ¹					Other main banks	No main bank	Total firms
	Criterion 1 ²	Criterion 2 ³	Criterion 3 ⁴	Criterion 4 ⁵	Total			
1982	490	113	46	29	678	61	325	1,064
83	653	126	56	35	870	83	129	1,082
84	656	117	51	45	869	82	147	1,098
85	645	134	47	41	867	74	172	1,113
86	612	176	34	40	862	70	167	1,099
87	609	196	36	45	886	78	204	1,168
88	606	219	33	47	905	84	220	1,209
89	560	251	42	43	896	94	233	1,223
90	589	241	31	41	902	99	220	1,221
91	599	239	34	41	913	90	221	1,224
92	595	261	34	35	925	96	207	1,228
93	612	245	27	43	927	90	208	1,225
94	617	239	28	40	924	89	215	1,228
95	653	214	25	34	926	85	214	1,225
96	655	216	18	36	925	89	214	1,228
97	619	161	39	103	922	86	219	1,227
98	637	143	42	108	930	87	210	1,227
99	616	98	50	85	849	85	294	1,228
2000	585	100	75	93	853	88	287	1,228
01	572	128	65	95	860	82	286	1,228
02	568	95	72	110	845	90	293	1,228
03	517	69	75	146	807	97	324	1,228
04	494	58	63	175	790	103	335	1,228

- Notes: 1. The four mega-banks are the groups of banks that ultimately merged into the Tokyo Mitsubishi UFJ, Sumitomo Mitsui, Mizuho, and Resona banking groups. Main banks are identified using loan and shareholding data that are nonconsolidated, that is, based on the individual banks that existed in each year. The figures for trust and regional banks are included in other main banks.
2. The number of firms for which the bank is the largest lender among banks *and* the largest shareholder among banks.
3. The number of firms for which the bank is the largest lender among banks and is one of the top five shareholders (but not the largest bank shareholder).
4. The number of firms for which the bank is the largest shareholder among banks and is one of the top five bank lenders (but not the largest bank lender).
5. The number of firms for which the bank is the largest bank lender, but not among the top five bank shareholders.

The major banks still tended to be both the largest shareholder *and* the largest lender among banks (criterion 1), although this has become somewhat less prevalent since fiscal 2000.⁴⁰

40. Of firms with a “major” main bank, the share of firms for which the bank was both the largest shareholder and the largest lender among banks (criterion 1 divided by total with major main bank) has fluctuated between 60 percent and 75 percent since the early 1980s. It has been on a downward trend since 1999, and reached 63 percent in fiscal 2004.

A. Results for the Full Sample

The regression results, using firms' profit rate as the dependent variable, are presented in Table 8 for each of four time periods. The results presented in the first column for each time period (labeled "All") are based on regressions using the entire sample of firms. These regressions have been "built up" by including only *TOP_OWN*, and then adding other control regressors, although only the final set of results is presented. In each of the four periods (full sample), larger firms (as captured by *lnRSL*) have lower profit rates, as do those that are more highly leveraged (*TDEBT_MC*) and those that rely more heavily on bank debt (*NBDEBT_TL*). Foreign ownership is positively associated with firms' profit rate, as is lagged sales growth.

A striking result across these regressions is that ownership by the main bank is negatively associated with firm profitability even in the fiscal 2001–04 period, when the unwinding of cross-shareholding accelerated. Ownership by the main bank (*TOP_OWN*) enters negatively and significantly in each of the four time periods, even after controlling for the main bank's loan share (*TOP_LNLT*) and firms' *keiretsu* affiliation. The size of the coefficient is largest in the most recent period (fiscal 2001–04). Taken at face value, the estimates suggest that a one-standard-deviation increase in ownership by the top bank is associated with a 0.4 percentage point reduction in the firms' profit rate in each of the periods except fiscal 1991–96.

A similar exercise is repeated in Table 9 using interest expenses (*INT_NBDEBT*) as the dependent variable. Across the full-sample regressions (columns marked "All"), *TOP_OWN* enters positively and significantly only twice, in the fiscal 1991–96 and fiscal 1997–2000 periods. Thus, the evidence that ownership by the top bank is associated with higher interest payments is quite weak. However, the coefficients on the *TOP_LNLT* variable, which tracks the firm's total outstanding loans from the main bank scaled by total liabilities, are far more consistent across time periods. In all periods, *TOP_LNLT* enters positively and significantly, implying that greater concentration of debt from the main bank is associated with higher interest payments.

Finally, Table 10 presents results from regressions using the firms' stock price volatility as the dependent variable. As hypothesized by Beason (1999), main bank-affiliated firms may enjoy lower volatility, possibly in exchange for reduced profits and higher interest expenses. Yet the results indicate, if anything, just the opposite. For the full-sample regressions, the coefficients on *TOP_OWN* and *TOP_LNLT* are rarely significant. When these regressors do enter significantly, they tend to imply that ownership by the top bank is positively associated with volatility.

On balance, these results for the pooled sample of firms suggest that affiliation with a main bank is associated with worse firm performance. The variables tracking main-bank affiliation tend to enter with a negative sign in firm profitability regressions, and with a positive sign in regressions with firm interest expenses as the dependent variable. However, from these results alone, it is impossible to determine whether main bank affiliation is the cause of this poor performance, or whether main banks simply tended to hold shares in firms that happened to have lower than average profitability. This issue is taken up in the next section.

Table 8 Firm Profitability and Main Bank Affiliation

	1982-90			1991-96			1997-2000			2001-04		
	All	Inelig	Elig	All	Inelig	Elig	All	Inelig	Elig	All	Inelig	Elig
<i>lnRSL</i>	-0.0045	-0.0035	-0.0089	-0.0043	-0.0013	-0.0077	-0.0057	-0.0014	-0.0116	-0.0054	-0.0017	-0.0103
	-9.99	-4.38	-16.08	-8.94	-1.79	-12.14	-7.10	-1.33	-9.24	-6.85	-1.45	-9.64
<i>TDEBT_MC</i>	-0.04	0.003	-0.0771	-0.053	-0.0514	-0.072	-0.051	-0.0567	-0.0595	-0.0232	-0.0342	-0.0332
	-7.41	0.37	-10.22	-10.3	-7.30	-8.61	-10.65	-9.04	-7.03	-4.58	-4.90	-3.79
<i>NBDEBT_TL</i>	-0.0233	-0.0226	-0.0138	-0.0216	-0.0334	-0.0207	-0.032	-0.0647	-0.0208	-0.0185	-0.0969	0.0003
	-4.60	-2.14	-2.24	-5.02	-5.43	-3.21	-5.87	-6.42	-2.89	-2.18	-5.14	0.03
<i>OWN_TOPTEN</i>	-0.0081	-0.0279	0.0167	0.0119	0.009	0.0222	0.0053	-0.004	0.0283	-0.0094	-0.0164	-0.001
	-1.20	-2.69	2.02	1.72	0.95	2.28	0.53	-0.30	1.76	-0.90	-1.19	-0.07
<i>OWN_INDIV</i>	-0.0042	0.0213	-0.0173	-0.0003	0.0134	-0.0086	-0.0291	-0.0035	-0.0628	-0.0406	-0.0178	-0.0896
	-0.71	2.27	-2.50	-0.04	1.47	-0.93	-2.32	-0.29	-2.61	-4.32	-1.40	-7.06
<i>OWN_FOREIGN</i>	0.1608	0.0888	0.1514	0.1273	0.0937	0.1509	0.1148	0.087	0.1313	0.0743	0.0641	0.0631
	12.19	4.58	10.84	10.42	5.00	10.54	6.43	3.37	5.08	5.30	2.55	3.66
<i>OWN_OTHER</i>	-0.0288	-0.0003	-0.0355	-0.0262	-0.0171	-0.0274	-0.033	-0.0168	-0.0467	-0.0363	-0.0245	-0.0543
	-5.54	-0.04	-5.32	-4.81	-2.24	-3.69	-3.90	-1.53	-3.81	-4.33	-2.22	-4.67
<i>RSL_GR</i>	0.0396	0.0378	0.0528	0.0687	0.0571	0.0867	0.0593	0.0424	0.0823	0.0062	0.0109	0.0023
	4.74	3.66	7.86	11.49	7.87	8.46	8.15	5.30	6.11	1.45	1.41	0.65
<i>KEIRETSU</i>	-0.0036	-0.0019	-0.0056	-0.0052	-0.0041	-0.0059	-0.0055	-0.0044	-0.0064	-0.0037	-0.0011	-0.0064
	-4.22	-1.48	-5.19	-5.77	-3.04	-4.73	-4.55	-2.58	-3.64	-2.94	-0.61	-3.75
<i>TOP_LNTL</i>	0.0125	0.0027	0.0424	-0.009	-0.0135	0.0297	0.025	0.0132	0.0646	0.0089	0.022	0.0161
	1.35	0.25	2.48	-0.76	-0.93	1.46	2.32	0.95	3.63	0.91	1.66	1.07
<i>TOP_OWN</i>	-0.1342	-0.0515	-0.1214	-0.0587	-0.0505	-0.0502	-0.1451	-0.0926	-0.1741	-0.1553	-0.0954	-0.2253
	-6.24	-1.66	-4.08	-2.12	-1.15	-1.41	-4.67	-2.11	-4.12	-5.12	-2.04	-4.71
R ²	0.303	0.329	0.384	0.273	0.281	0.333	0.289	0.300	0.361	0.236	0.267	0.324
Number of obs.	7,842	3,831	4,011	6,506	3,380	3,126	4,342	2,256	2,086	4,344	2,256	2,088

Note: The table contains the results of IV regressions of operating profits normalized by gross sales on a set of firm and firm-bank relationship-specific variables. *lnRSL* is the log of gross sales, *TDEBT_MC* is total debt over the sum of total debt and market capitalization, *NBDEBT_TL* is non-bond debt over total liabilities, and *OWN_INDIV*, *OWN_FOREIGN*, and *OWN_OTHER* are cumulative ownership by individuals, by foreigners, and by other nonfinancial businesses in Japan, respectively. *RSL_GR* is a lag of real sales growth, *KEIRETSU* is a dummy for firm membership in one of the financial keiretsu, *TOP_LNTL* is the total loans extended by the top bank scaled by total liabilities, and *TOP_OWN* is ownership by the top bank. Each regression includes a full set of industry dummies. The current value of each variable is instrumented with a one-period lag. The exceptions to this are *RSL_GR*, *TOP_LNTL*, and *TOP_OWN*, where only one-period lagged values of these variables are used. Robust *t*-statistics are reported under each coefficient. Eligible firms are those that passed the bond issuing criteria at least five times between 1982 and 1989, and Ineligible firms are those that did not.

Table 9 Firm Interest Expenses and Main Bank Affiliation

	1982-90			1991-96			1997-2000			2001-04		
	All	Elig	Inelig	All	Elig	Inelig	All	Elig	Inelig	All	Elig	Inelig
<i>lnRSL</i>	-0.0011	-0.0017	-0.0013	-0.0008	-0.0003	-0.0001	-0.0001	-0.0002	-0.0002	-0.0004	-0.0007	-0.0003
	-7.98	-8.01	-7.53	-6.84	-2.19	-1.16	-1.16	-2.02	-1.67	-5.04	-5.67	-2.7
<i>PROF_SL</i>	-0.0098	-0.0129	-0.0063	-0.0085	-0.0079	0.0055	0.0055	0.0083	-0.0012	0.0013	0.0031	0.00
	-2.98	-1.73	-2.35	-2.39	-2.39	3.82	3.82	2.85	-0.81	0.80	1.19	0.02
<i>TDEBT_MC</i>	0.0755	0.0712	0.0546	0.053	0.0553	0.0261	0.0261	0.0264	0.0243	0.0263	0.0284	0.0243
	51.98	33.91	44.54	31.35	25.41	26.95	26.95	26.95	25.61	32.91	27.41	15.42
<i>NBDEBT_TL</i>	0.0161	0.0147	0.0203	0.0185	0.0204	0.0103	0.0103	0.0108	0.0095	0.0086	0.0099	0.0077
	10.38	3.47	21.63	12.09	15.57	17.42	17.42	10.08	12.94	11.15	7.22	6.83
<i>OWN_TOPTEN</i>	0.0033	0.0006	0.0041	-0.0004	0.0029	-0.0018	-0.0018	-0.0036	-0.0009	-0.0015	-0.0008	-0.0022
	1.77	0.21	1.73	-0.30	1.25	-2.03	-2.03	-3.21	-0.73	-1.66	-0.84	-1.55
<i>OWN_INDIV</i>	-0.0077	-0.0147	-0.0055	-0.0046	-0.009	0.0027	0.0027	0.0002	-0.0034	0.0008	0.0001	0.0014
	-4.88	-6.50	-2.56	-3.77	-5.17	0.28	0.28	0.66	-2.96	1.21	0.10	1.27
<i>OWN_FOREIGN</i>	-0.0056	-0.0048	-0.0022	-0.0104	0.0009	0.0027	0.0027	0.0047	0.0007	0.0041	0.0055	0.0041
	-1.95	-0.89	-0.92	-2.62	0.28	2.11	2.11	2.31	0.40	4.46	3.31	3.27
<i>OWN_OTHER</i>	-0.01	-0.0138	-0.0085	-0.0055	-0.0091	-0.0037	-0.0008	0.00	-0.0013	-0.0007	-0.0018	0.001
	-7.43	-7.40	-4.44	-4.56	-5.57	-1.09	-1.09	-0.03	-1.27	-1.01	-1.91	0.94
<i>RSL_GR</i>	0.00	0.00	0.0012	-0.0017	-0.0028	-0.0005	0.0002	-0.0003	0.0011	-0.0003	-0.0002	-0.0003
	-7.25	-3.73	0.68	-1.60	-1.91	0.31	0.31	-0.33	1.38	-2.03	-0.83	-1.78
<i>KEIRETSU</i>	0.0003	0.0002	0.0004	-0.0002	0.0004	-0.0007	-0.0001	-0.0001	-0.0002	-0.0002	-0.0002	-0.0002
	1.17	0.61	1.01	-0.75	1.25	-2.20	-2.20	-0.55	-1.32	-1.82	-0.85	-1.75
<i>TOP_LNTL</i>	0.0319	0.023	0.0598	0.0208	0.0244	0.0195	0.0065	0.0057	0.0088	0.0105	0.0073	0.0134
	9.83	6.21	10.06	7.48	7.40	3.76	4.21	2.68	3.62	4.22	2.01	3.72
<i>TOP_OWNA</i>	-0.0062	-0.031	-0.0011	0.0239	-0.0063	0.0396	0.0112	0.0067	0.0133	-0.0086	-0.0036	-0.0092
	-0.96	-3.57	-0.11	3.92	-0.69	4.83	3.32	1.20	3.13	-1.79	-0.45	-1.53
R ²	0.586	0.591	0.55	0.63	0.671	0.573	0.596	0.616	0.572	0.605	0.625	0.559
Number of obs.	7,847	3,642	4,205	6,529	3,242	4,358	4,358	2,164	2,194	4,360	2,164	2,196

Note: The table contains the results of IV regressions of interest expenses on non-bond debt over total non-bond debt (*INT_NBDEBT*) on a set of firm and firm-bank relationship-specific variables. *lnRSL* is the log of gross sales, *TDEBT_MC* is total debt over the sum of total debt and market capitalization, *NBDEBT_TL* is non-bond debt over total liabilities, and *OWN_INDIV*, *OWN_FOREIGN*, and *OWN_OTHER* are cumulative ownership by individuals, by foreigners, and by other nonfinancial businesses in Japan, respectively. *RSL_GR* is a lag of real sales growth, *KEIRETSU* is a dummy for firm membership in one of the financial *keiretsu*, *TOP_LNTL* is the total loans extended by the top bank scaled by total liabilities, and *TOP_OWNA* is ownership by the top bank. Each regression includes a full set of industry dummies. The current value of each variable is instrumented with a one-period lag. The exceptions to this are *RSL_GR*, *TOP_LNTL*, and *TOP_OWNA*, where only one-period lagged values of these variables are used. Robust *t*-statistics are reported under each coefficient. Eligible firms are those that passed the bond issuing criteria at least five times between 1982 and 1989, and Ineligible firms are those that did not.

Table 10 Firm Stock Price Volatility and Affiliation with the Top Bank

	1982-90			1991-96			1997-2000			2001-04		
	All	Inelig	Elig	All	Inelig	Elig	All	Inelig	Elig	All	Inelig	Elig
<i>lnRSL</i>	-0.7041	-0.4255	-0.5933	-0.4874	-0.5372	-0.3725	-0.8858	-1.1642	-0.3011	-0.6997	-0.9766	-0.1482
	-10.62	-1.70	-10.34	-14.92	-11.12	-16.87	-17.56	-15.84	-5.84	-13.9	-12.21	-2.89
<i>PROF_SL</i>	-5.9671	-5.8485	-5.7071	-9.5904	-8.3982	-8.5057	-21.6736	-26.3936	-11.4079	-17.4729	-24.3564	-5.6713
	-2.37	-1.05	-4.04	-5.40	-2.29	-10.66	-12.11	-8.41	-7.14	-13.7	-12.08	-4.01
<i>TDEBT_MC</i>	6.8747	8.7712	2.1107	2.7494	3.0888	2.2309	7.1479	8.7382	4.3745	10.1457	11.5415	6.9185
	3.04	2.64	1.99	7.38	6.51	5.79	14.07	12.25	8.16	16.71	13.34	11.64
<i>NBDEBT_TL</i>	2.3799	3.2515	1.62	1.5902	1.4059	1.4855	4.9741	6.4413	3.5203	3.4003	3.4822	2.1968
	4.40	2.11	4.23	5.91	2.42	6.96	12.71	7.76	8.96	7.30	3.06	4.24
<i>OWN_TOPTEN</i>	3.9855	10.0949	0.2784	1.8433	2.3266	0.1439	1.5379	2.034	0.1701	2.318	3.0386	0.8721
	1.96	1.88	0.51	2.23	1.92	0.42	2.37	2.20	0.25	3.53	3.08	1.32
<i>OWN_INDIV</i>	2.6414	8.1282	-0.5289	2.9196	4.3042	-0.1974	0.6184	0.71	-0.0988	1.7538	2.0597	1.6473
	1.60	1.88	-0.95	1.75	1.63	-0.71	0.96	0.85	-0.16	3.34	2.42	2.85
<i>OWN_FOREIGN</i>	1.4544	-8.9939	2.5728	1.7555	2.6059	-0.447	7.7012	6.0831	5.0336	7.0069	8.2456	3.7916
	1.17	-1.62	1.93	1.60	1.31	-0.90	8.57	4.17	6.12	8.68	5.27	5.70
<i>OWN_OTHER</i>	-0.4052	-1.4692	0.3721	0.9562	1.6772	-0.0651	1.1451	0.6494	0.7688	0.425	0.1618	0.1644
	-0.50	-0.87	0.53	1.94	1.84	-0.24	2.11	0.78	1.45	0.78	0.18	0.33
<i>KEIRETSU</i>	-0.3976	-0.8437	-0.1116	-0.1135	-0.2614	-0.0003	-0.0293	-0.2722	0.1211	0.0115	-0.0858	0.0285
	-3.28	-3.41	-0.92	-2.25	-2.58	-0.01	-0.37	-2.13	-2.13	1.58	-0.66	0.37
<i>RSL_GR</i>	0.3604	0.4641	-0.0091	-1.4352	-2.4964	-0.3676	-0.8735	-1.4402	-0.4691	-0.1309	0.0184	-0.2762
	0.74	0.68	-0.02	-1.09	-1.12	-1.26	-2.03	-2.35	-1.03	-1.35	0.12	-2.42
<i>TOP_LNTL</i>	-1.8058	-1.2293	-1.3164	-0.6566	-1.2576	-0.1442	-1.7816	-3.2023	0.937	1.6507	-0.2671	5.32
	-0.61	-0.3	-0.64	-0.55	-0.74	-0.22	-1.93	-2.58	0.86	1.31	-0.21	2.06
<i>TOP_OWN</i>	0.6456	-4.5901	9.4463	13.511	19.5708	3.8284	4.7414	4.366	6.3735	-1.5684	-1.7606	0.8521
	0.11	-0.48	1.65	1.75	1.62	2.09	1.81	1.16	2.07	-0.64	-0.45	0.33
R ²	0.041	0.041	0.178	0.116	0.081	0.436	0.407	0.43	0.294	0.406	0.401	0.389
Number of obs.	6,857	3,148	3,709	6,506	3,380	3,126	4,342	2,256	2,086	4,344	2,256	2,088

Note: The table contains the results of IV regressions of the annual standard deviation of a firm's stock price (calculated with daily data) on a set of firm and firm-bank relationship-specific variables. *lnRSL* is the log of gross sales, *TDEBT_MC* is total debt over the sum of total debt and market capitalization, *NBDEBT_TL* is non-bond debt over total liabilities, and *OWN_INDIV*, *OWN_FOREIGN*, and *OWN_OTHER* are cumulative ownership by individuals, by foreigners, and by other nonfinancial businesses in Japan, respectively. *RSL_GR* is a lag of real sales growth, *KEIRETSU* is a dummy for firm membership in one of the financial *keiretsu*, *TOP_LNTL* is the total loans extended by the top bank scaled by total liabilities, and *TOP_OWN* is ownership by the top bank. Each regression includes a full set of industry dummies. The current value of each variable is instrumented with a one-period lag. The exceptions to this are *RSL_GR*, *TOP_LNTL*, and *TOP_OWN*, where only one-period lagged values of these variables are used. Robust *t*-statistics are reported under each coefficient. Eligible firms are those that passed the bond issuing criteria at least five times between 1982 and 1989, and Ineligible firms are those that did not.

B. Firm Performance and Access to Outside Financing Options

The results presented above suggest that firms with strong main bank ties tend to perform worse, and face higher interest payments, than otherwise. The goal of this section is to shed some light on whether affiliation with a main bank is the *cause* of this poor firm performance, because banks extract rents from dependent firms, or whether banks happen to hold shares in firms that perform poorly.

The approach taken here follows Morck, Nakamura, and Shivdasani (2000). The sample of firms is split according to firms' history of access to the bond market. Such a division is meant to isolate those firms that have always had a full range of financing options from those that have historically been bank dependent. The argument behind this approach is the following. If main banks extracted rents from their client firms via higher interest payments, they should have been able to do so from *bank-dependent* firms (i.e., those *without* outside financing options) regardless of whether the bank held the firm's equity. However, for firms *with* outside financing options (bank-independent firms), banks had to rely more on their shareholding toehold to expropriate rents. As argued by Morck, Nakamura, and Shivdasani (2000, p. 555), the empirical relationship between bank ownership and firm performance metrics may be different for firms that are truly bank dependent since "a banks' power to extract surplus is greater when the firm is heavily dependent on the bank, as would be the case if the firm were prohibited from issuing public debt. Such firms would be subject to bank appropriation regardless of the level of bank ownership."

This hypothesis has several empirical implications. Bank-dependent firms should, all else equal, exhibit worse firm performance, higher interest payments, and a higher degree of bank financing than bank-independent firms. Of course, this by itself would not necessarily imply rent extraction behavior by banks, since bank-dependent firms may exhibit worse firm performance precisely *because* they do not have access to outside financing options. However, in a world where banks enjoy market power over their client firms, a regression of firm performance metrics on measures of main bank affiliation should yield a more robust *statistical relationship* between firm performance and bank ownership (e.g., the *TOP_OWN* variable) for *bank-independent firms*, since banks do not necessarily need the shareholding toehold to extract surplus from these firms.

Admittedly, it is difficult in practice to identify firms that are truly "bank dependent." Firms that can easily issue bonds in the capital markets may *choose* bank financing. Indeed, as shown by Arikawa and Miyajima (2007), firms that had relied on external sources of finance in the 1980s increasingly turned back to bank financing throughout the 1990s, particularly firms in the retail trade, construction, and real estate development industries.⁴¹ Thus, a simple sample split based on, say, firms' share of loan financing in total debt is not necessarily a good indicator of *financing constraints*.

The approach taken here is to use the bond issuing criteria in place in the 1980s (Table 11) to identify those firms that had a *consistent history* of access to bond financing. In the regression results that follow, a firm is termed "Eligible" if it passed the bond

41. Arikawa and Miyajima (2007) report that the share of listed firms "exclusively dependent upon bank borrowing" increased from 29.4 percent in 1991 to 46.9 percent in 2000. The share of firms "exclusively dependent on bond issuance" plus those relying on a "mixture of bond issuance and bank borrowing" fell from 63.6 percent in 1990 to 41.4 percent in 2000.

Table 11 Example Bond-Issuing Criteria

[1] October 1976–July 1987: Criteria for Domestic Secured Convertible Bonds

Performance standards	Issuer's book equity		
	¥3–6 billion	¥6–10 billion	> ¥10 billion
Book equity/paid-in capital	N.A.	1.5	1.2
Book equity/total assets	N.A.	0.2	0.15
Operational profit/total assets	N.A.	0.05	0.04
Earnings per share (yen)	N.A.	7.0	7.0
Dividends per share (yen)	N.A.	5.0	5.0
Approval criteria	N.A.	EPS, DPS, and at least two of the other three criteria	EPS, DPS, and at least two of the other three criteria

[2] July 1987–May 1989: Criteria for Domestic Secured Convertible Bonds

Performance standards	Issuer's book equity		
	¥3–6 billion	¥6–10 billion	> ¥10 billion
Book equity/paid-in capital	2.0	1.5	1.2
Book equity/total assets	0.15	0.12	0.1
Operational profit/total assets	0.07	0.06	0.05
Earnings per share (yen)	7.0	7.0	7.0
Dividends per share (yen)	5.0	5.0	5.0
Approval criteria	EPS, DPS, and at least two of the other three criteria	EPS, DPS, and at least two of the other three criteria	EPS, DPS, and at least two of the other three criteria
Approval criteria	If the firm has no bonds outstanding, then DPS and at least three of the other four criteria are satisfied. If the firm has outstanding bonds: (1) if DPS is met in the last three years then only one remaining criterion is satisfied; (2) if DPS is met in the previous year, then two of the remaining four criteria are satisfied.		

Note: The table presents minimum approval criteria for domestic issuance of secured convertible bonds and secured straight bonds for selected years. Criteria are taken from Kaneko and Battaglini (1990) and Karp and Koike (1990). A firm wishing to issue bonds in period t must have met the criteria in period $t - 1$.

issuing criteria at least five times between the fiscal 1982–89 period, and “Ineligible” otherwise.⁴² These restrictions on bond issues were lifted in the early 1990s, after which all firms were supposedly free to issue bonds.⁴³ Thus, we should not necessarily expect to observe the same pattern of regression coefficients across these groups for the 1980s and for later periods.

42. Five was chosen to split the total balanced sample of firms roughly in half. There are 522 Eligible firms and 564 Ineligible firms.

43. All criteria (except ratings) were removed from the guidelines restricting bond issues in November 1990. In April 1993, the lowest bound of the ratings criteria for issuing unsecured straight bonds was lowered to BBB. See details in Hoshi, Kashyap, and Sharfstein (1993) and Anderson and Makhija (1999).

Some relevant sample statistics for these two groups of firms, Eligible and Ineligible, are presented in Figures 7–8. Eligible firms were consistently larger and more profitable, with lower average interest expenses on non-bond debt and lower stock price volatility (Figure 7). They were also much more likely to issue bonds, and were less dependent on their main bank (Figure 8), although both groups of firms moved toward loan financing in the 1990s. By almost any measure, eligible firms, on average, continued to outperform the ineligible firms even after the bond issuing restrictions were lifted.

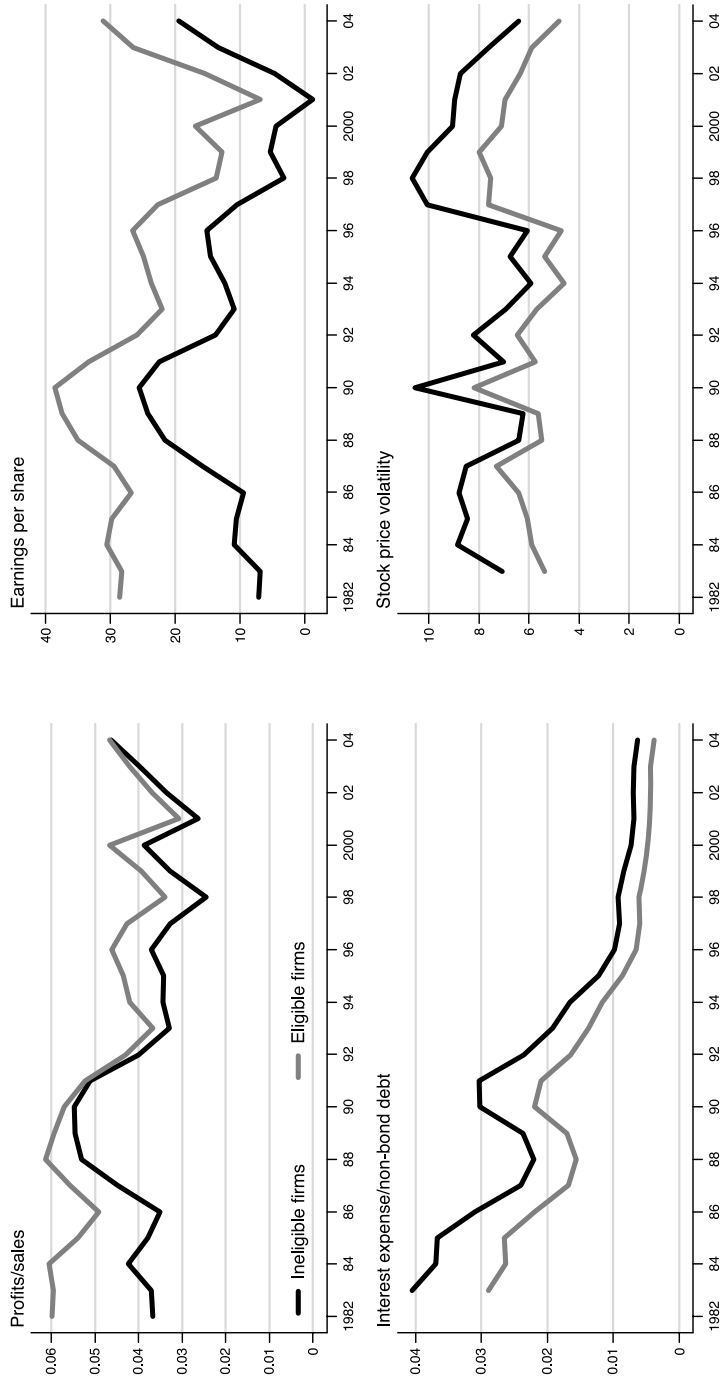
The results of regressions run separately for these groups of firms are presented under the headings of “Inelig” and “Elig” in Table 8. Overall, the negative association between ownership by the main bank and firm profitability tends to be strongest for the more profitable firms with a history of outside financing options. That is, the coefficient on the *TOP_OWN* variable is larger (i.e., more negative) at a greater level of significance for the Eligible group of firms in all but the fiscal 1991–96 period. A one-standard-deviation increase in ownership by the top bank is associated with a 0.5 percentage point reduction in Eligible firms’ profit rate in the fiscal 1997–2000 and fiscal 2001–04 periods, but only a 0.1 percentage point reduction in the fiscal 1991–96 period. These results do not seem to be driven by firms in those industries that increasingly relied on bank financing in the 1990s (i.e., real estate development, retail trade, and construction), and which are weighted more heavily in the Ineligible group of firms. Dropping all firms in these industries and re-estimating does not have an effect on the pattern of coefficients observed in Table 8.

These regressions were repeated for individual years using a pooled sample of firms, and after interacting dummies for the mega-banks with the *TOP_OWN* variable, a specification that allows for the time variation in the coefficient on this variable to be tracked separately for each of the four mega-banks. The results of this exercise (presented in Appendix Table 1 in the Appendix) indicate that the negative association between ownership by the top bank and profitability is driven (primarily) by firms associated with Resona and Mizuho. In contrast, this relationship does not appear as strong for Tokyo Mitsubishi UFJ, nor are the differences across the Eligible and Ineligible firm groups as stark.

Table 9 presents the results using interest expenses as the dependent variable. Equity ownership by the main bank tends to be associated with increased interest expenses for the Eligible groups of firms in the fiscal 1991–96 and fiscal 1997–2000 periods. In contrast, there is no association between equity ownership and interest expenses for the fiscal 2001–04 period for either group of firms. However, affiliation with a main bank does seem to matter; greater loan concentration from the main bank, as tracked by the *TOP_LNTL* variable, enters with a positive sign and is statistically significant in each period and for each group of firms. In all but the fiscal 1990–96 period, the coefficient on this variable is *larger* for the Eligible group of firms. For these firms, a one-standard-deviation increase in *TOP_LNTL* is associated with greater interest rate on non-bond debt of 0.07 percent in the fiscal 1997–2000 period, and a 0.1 percent increase in the 2000–04 period.

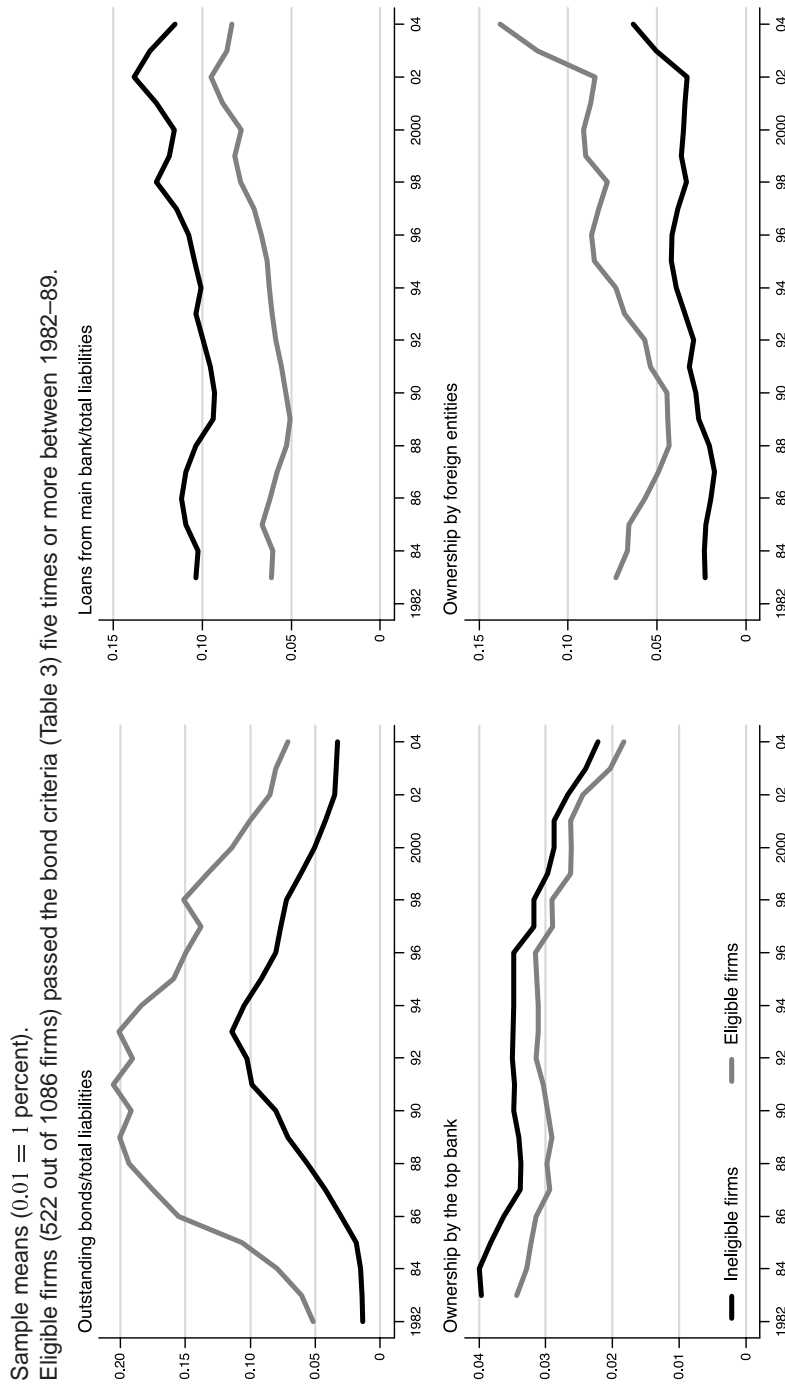
Figure 7 Firm Performance Metrics, by Bond Eligibility

Sample means (0.01 = 1 percent; EPS in yen). Eligible firms (522 out of 1,086 firms) passed the bond criteria (Table 3) five times or more between 1982–89.



Sources: Kaigin Financial Data, Nikkei NEEDS, Bloomberg.

Figure 8 Firm Debt and Ownership Structure, by Bond Eligibility



Source: Kaigin Financial Data.

Overall, the results presented above tend to be consistent with those found for earlier periods in Japan. Affiliation with a main bank, as proxied by equity ownership and lending variables, tends to be negatively associated with firm performance, and positively associated with interest expenses, even after banks' substantial disposal of corporate equities. Moreover, the results are broadly in line with the empirical relationships used to support the rent extraction argument examined by Weinstein and Yafeh (1998) and Morck, Nakamura, and Shivdasani (2000). The statistical relationship tends to be strongest for the least bank-dependent group of firms, even as late as the fiscal 2001–04 period. That said, there is much yet to explore on this question, since it could also be the case that banks simply have held onto poorly performing firms *within the group* of best performers (i.e., Eligible firms). Sorting out these issues is the focus of ongoing research.

VII. Concluding Remarks

The evidence presented here from the Kaigin database suggests that, mechanically at least, the ownership link between firms and their major banks has loosened considerably since fiscal 2001. Between fiscal 1997 and fiscal 2000, the lower-bound estimate of the number of corporate shares held by the group of banks that ultimately merged into the four mega-banks decreased by more than 20 percent; by fiscal 2004 it had decreased by over 60 percent (Figure 2). While these banks' portfolios are still large and well diversified, the process of share disposal presumably should have weakened the ability of banks to monitor firms (or extract rents, as the case may be), and thus led to less robust empirical relationships between firm performance and bank affiliation than those observed prior to the unwinding process.

A closer look at the data suggests that firm-bank ties may not have loosened as much as this share disposal might suggest. Banks' equity portfolios have become smaller, but they remained remarkably similar in structure in fiscal 2003 to those in fiscal 1996, indicating that banks adopted an approach of selling shares across all industries, rather than targeted disposal of firms in a particular economic sector (Table 3). The incidence of share sales picked up noticeably in fiscal 2001 and fiscal 2002 when regulatory scrutiny increased pressure on banks to reduce their equity holdings. In these years, banks disposed of shares in all types of firms, particularly shares that outperformed the market, or those with a high market beta.

However, the evidence suggests that banks remained reluctant to sell shares in their client firms through fiscal 2004. Indeed, even after the significant equity disposal, firms' top banks still tended to be both the largest lender *and* the largest shareholder among banks. Overall, the results from the second half of the paper indicate that the statistical regularities in the coefficients on firm-bank affiliation measures in the 1980s continue to be evident after the significant equity disposal had taken place. Even in the fiscal 2000–04 period, affiliation with a main bank is negatively associated with firm profits, positively associated with interest payments, and largely unassociated with stock price volatility. Thus, while shareholding has been reduced in absolute terms, it

is less clear whether the broader relationships between banks and firms in Japan have changed as well.

APPENDIX

Appendix Table 1 presents the results from year-by-year regressions of firms' profit rate on the full set of regressors used in Table 9. In these regressions, the *TOP_OWN* variable is interacted with dummies for each of the four mega-banks, allowing for a separate coefficient to be estimated for each year and each bank. As shown in the top panel, the negative relationship between the profit rate and ownership by the main bank is strongest and the most consistent across years for those firms whose main bank was one that ultimately was merged into the Mizuho mega-bank group (see Figures 3–4), although the coefficients for other banks also enter negatively and significantly as well. The center and bottom panels indicate that, with the exception of the Tokyo Mitsubishi UFJ banking group, this effect was again the most evident for the Eligible group of firms. Again, the results for fiscal 2002 stand out. The coefficient on the *TOP_OWN* variable for this year is generally the largest (i.e., most negative) across years, the exception being the coefficient on ownership by Resona, which peaks in fiscal 2004.

Appendix Table 1 Profitability RegressionsCoefficient on *TOP_OWN* variable, by mega-bank and fiscal year

	Fiscal year	Mizuho		Tokyo Mitsubishi UFJ		Sumitomo Mitsui		Resona		Number of obs.	R ²
		Coeff.	<i>t</i> -stat.	Coeff.	<i>t</i> -stat.	Coeff.	<i>t</i> -stat.	Coeff.	<i>t</i> -stat.		
All firms	1996	-0.1659	-2.45	-0.2006	-2.97	-0.1373	-1.9	-0.1819	-1.65	1,086	0.283
	97	-0.1365	-2.05	-0.1679	-2.59	-0.0958	-1.39	-0.2509	-2.27	1,085	0.312
	98	-0.1774	-2.58	-0.1	-1.37	-0.2045	-2.38	-0.1596	-1.37	1,085	0.319
	99	-0.1879	-2.93	-0.0929	-1.33	-0.0723	-0.92	-0.2135	-1.83	1,086	0.298
	2000	-0.192	-2.33	-0.0055	-0.07	0.0186	0.2	-0.1789	-1.41	1,086	0.27
	01	-0.1687	-2.09	-0.1052	-1.33	-0.1099	-1.19	-0.1492	-1.2	1,086	0.232
	02	-0.2151	-2.97	-0.2809	-3.91	-0.1943	-2.59	-0.164	-1.45	1,086	0.241
	03	-0.1462	-2.19	-0.1367	-1.87	-0.0333	-0.38	-0.0806	-0.77	1,086	0.233
	04	-0.1356	-1.8	-0.1795	-2.08	-0.1487	-1.35	-0.2517	-1.64	1,086	0.261
Ineligible firms	1996	-0.1882	-1.88	-0.3108	-3.31	-0.0743	-0.74	-0.2292	-1.58	564	0.275
	97	-0.0945	-0.93	-0.1569	-1.61	-0.0054	-0.06	-0.1958	-1.32	564	0.311
	98	-0.056	-0.57	-0.0812	-0.82	-0.1154	-0.91	-0.1411	-0.96	564	0.356
	99	-0.1424	-1.54	-0.1102	-1.19	-0.0021	-0.02	-0.1567	-0.99	564	0.316
	2000	-0.0834	-0.84	-0.1195	-1.12	0.1127	0.89	-0.0834	-0.55	564	0.266
	01	0.0132	0.12	-0.1053	-1.05	0.0719	0.55	0.0042	0.03	564	0.278
	02	-0.0923	-0.94	-0.2807	-2.64	-0.1394	-1.14	-0.0544	-0.32	564	0.264
	03	0.0434	0.46	-0.177	-1.63	0.1305	1.06	0.0746	0.47	564	0.27
	04	-0.0386	-0.36	-0.2365	-1.81	-0.1306	-0.89	-0.0662	-0.36	564	0.332
Eligible firms	1996	-0.1057	-1.13	-0.071	-0.71	-0.1656	-1.65	-0.0658	-0.36	522	0.369
	97	-0.1083	-1.22	-0.1594	-1.69	-0.119	-1.17	-0.298	-1.69	521	0.386
	98	-0.2628	-2.6	-0.152	-1.38	-0.2497	-2.12	-0.0879	-0.46	521	0.353
	99	-0.1645	-1.71	-0.1016	-0.98	-0.1	-0.91	-0.1721	-0.92	522	0.364
	2000	-0.2237	-2.02	0.1152	0.98	-0.0142	-0.11	-0.2466	-1.17	522	0.393
	01	-0.2732	-2.33	-0.0659	-0.52	-0.1962	-1.6	-0.2395	-1.1	522	0.321
	02	-0.3694	-3.76	-0.3149	-3.05	-0.2668	-2.97	-0.2613	-1.77	522	0.352
	03	-0.3663	-4.1	-0.1077	-1.04	-0.211	-1.82	-0.2968	-2.15	522	0.348
	04	-0.2407	-2.55	-0.0308	-0.27	-0.1679	-1.19	-0.4411	-1.74	522	0.375

Note: The table presents the results of year-specific regressions of firm profitability (measured as operating profits scaled by gross sales) on the full set of RHS variables (excluding *TOP_LNSHARE*) used in Table 8. The *TOP_OWN* variable is interacted with dummy variables for each of the four mega-banks, thus allowing separate coefficients for each mega-bank to be estimated. Only the coefficients and *t*-statistics for these ownership variables are presented. Eligible firms are those that passed the bond issuing criteria in Japan at least five times between 1982 and 1989, and Ineligible firms are those that did not.

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