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When Japanese Banks Become Pure Creditors: Effects of declining shareholding by banks on bank lending and firms' risk taking[1]

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Abstract

Utilizing the regulatory change relating to banks' shareholding in Japan as an instrument, this study examines the causal effects of declining shareholding by banks on bank lending and firms' risk taking. Banks may hold equity claims over client firms for either of the following two reasons: (i) gaining a competitive advantage by exploiting complementarity between shareholding and lending activities, and (ii) mitigating shareholder-creditor conflict. Exogenous reduction in a bank's shareholding would then impair the competitiveness of the bank's lending activities and aggravate the risk-shifting behavior of client firms. Using a firm-bank matched dataset of Japan's listed firms during the period 2001-2006, we empirically tested several hypotheses and obtain the following findings. First, a bank's removal from the list of major shareholders of a client firm (extensive margin) and the reduction in the ratio of the bank's shareholding to the firm's total shares on issue (intensive margin) decreases the bank's share of the firm's loans. Second, a reduction in the extensive margin of a bank's shareholding increases the volatility of the client firm's return on assets and reduces its Sharpe ratio. However, we do not find the same effect when a bank reduces the intensive margin of its shareholding.

Keywords: Bank shareholding, Conflict of interest, Corporate governance
JEL classification: G21, G32, G34

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1. Introduction

Shareholding in non-financial firms by banks has been the subject of considerable debate among economists and policy-makers around the world. In the United States, laws prohibit banks from having direct equity claims, while bank-affiliated firms (e.g., private equity funds and venture capitalists) can invest in non-financial firms to some extent, especially since the passage of the Gramm-Leach-Bliley Financial Services Modernization Act of 1999. In Japan and many European countries, banks are able to have equity claims over non-financial firms on their own account up to a specified limit, and many empirical studies have investigated Japanese and German banks' involvement in equity investment. In particular, those studies have examined whether banks' shareholding reduces credit friction between lenders and borrowers and improves firm performance (see, for instance, Flath 1993, Hiraki et al. 2003, Lichtenberg and Pushner 1994, Miyajima and Kuroki 2007, Morck et al. 2000, Prowse 1992, and Weinstein and Yafeh 1998 for Japanese banks, and Chirinko and Elson 2006 and Gorton and Schmid 2000 for German banks). This study revisits this issue by examining the causal effect of the *unwinding* of Japanese banks' shareholding caused by the regulatory change that was introduced in the early 2000s.

Shareholding in listed firms by banks declined substantially in the late 1990s and the early 2000s in Japan. One of the reasons for this was the introduction of regulatory limits on banks' shareholding in 2001, specifically the "Act on Limitation on Shareholding by Banks and Other Financial Institutions" (Bank Shareholding Limitation Act hereafter). For each bank, the Act set an upper limit on the aggregate amount of listed firms' shares that a bank could hold that was equal to the

amount of Tier 1 regulatory capital of the bank, and banks had to ensure that their shareholding was below this upper limit by the end of September 2006. Hence, a bank that held shares valued at more than its Tier 1 regulatory capital before the introduction of the Bank Shareholding Limitation Act was forced to sell client firms' shares. This study uses the ratio of banks' shareholding relative to their Tier 1 regulatory capital as an instrument for the banks' unwinding of their shareholding to extract the causal effect of declining shareholding by banks on bank lending and firms' risk-taking.

Theoretically, banks may hold equity claims over client firms for one of two reasons. First, banks may gain competitive advantages by exploiting complementarity between shareholding and lending activities and opportunities for cross-selling (the "competitive advantage hypothesis"). Second, shareholding by banks may mitigate conflicts of interest between shareholders and creditors, thus mitigating risk-taking behavior by firms and financial friction between lenders and borrowers (the "incentive alignment hypothesis"). According to these two hypotheses, exogenous reduction of a bank's shareholding would impair the competitiveness of its lending activities (competitive advantage hypothesis) and aggravate the risk-taking behavior of its client firms (incentive alignment hypothesis). Using a firm–bank matched dataset of Japan's listed firms during the period 2001–2006, we test these hypotheses by examining the reduction in banks' shareholding caused by the introduction of the Bank Shareholding Limitation Act in 2001.

To be more precise, we employ treatment regression and two-stage least squares (2SLS) regression approaches where the change in a bank's shareholding in its client firms is determined

endogenously. To measure the reduction in shareholding by a bank, we use two proxies. One is a dummy variable that takes a value of 1 if the shareholder bank withdraws from the top 30 shareholders in the firm, which we call the extensive margin. The other is the change in the ratio of the bank's shareholding to the firm's total shares on issue. We can only calculate the latter if the bank remains the major shareholder of the firm (i.e. the extensive margin is 0), and we call this the intensive margin. In the first stage of the treatment and 2SLS regressions, we treat the extensive and intensive margins as dependent variables, and we use the banks' ratio of shareholding relative to their Tier 1 regulatory capital before the introduction of the Bank Shareholding Limitation Act as an instrumental variable. In the second stage of the regressions, we examine whether the exogenous change in a bank's shareholding, which we extract from the first-stage regressions, reduces the bank's competitiveness in terms of lending activities and increases the risk-taking behavior of client firms.

By way of a preview, we obtain the following empirical results. First, when a shareholder bank reduces its equity claims on a client firm in terms of both the extensive margin and the intensive margin, the bank's share of loans to the firm decreases. This result is consistent with the competitive advantage hypothesis. Second, when a bank reduces its extensive margin, the volatility of the client firm's return on assets (ROA) increases, while its Sharpe ratio decreases. These results are consistent with the incentive alignment hypothesis. However, we do not find these effects when a bank reduces its intensive margin. To further investigate whether increased risk-taking by firms would increase the financial friction between creditors and borrowing firms, we also examine the change in "other" debts

provided by bond investors and banks other than the shareholder bank, as well as the change in the interest payment cost ratio of the firm. The results are somewhat consistent with the incentive alignment hypothesis: we find that both the extensive and intensive margins of a bank's shareholding have significant negative effects on other debts that firms incur, while only the intensive margin has a significant effect on the interest payment cost ratio. Third, when we divide our overall sample into a main-bank subsample and a non-main-bank subsample, the competitive disadvantage of a bank that reduces its equity claims mainly accrues in the non-main-bank subsample. That is, while a reduction in equity claims by a non-main bank has a significant negative effect on its share of a client firm's loans, we do not find a similar adverse effect when a main bank reduces its equity claims. With respect to the incentive alignment hypothesis, we obtain significant results for some variables for the non-main-bank subsample, but the results are mixed and sometimes inconsistent. Overall, we obtain robust evidence supporting the competitive advantage hypothesis and less evidence supporting the incentive alignment hypothesis.

The contributions of this study are twofold. First, this study contributes to the literature on the Japanese main-bank system by examining the effects of unwinding of shareholding by banks. Previous studies on Japanese main banks (Flath 1993, Hiraki et al. 2003, Lichtenberg and Pushner 1994, Morck et al. 2000, Prowse 1992, Weinstein and Yafeh 1998) have mainly focused on the determinants and effects of shareholding by banks, and few studies have investigated the unwinding of shareholding by Japanese banks that took place in the late 1990s and early 2000s. One notable exception is Miyajima

and Kuroki (2007), who examine the determinants of the unwinding of bank–firm cross-shareholding in Japan. They also examine the effect of cross-shareholding on firm performance. The second and more important contribution of this study is that we extract the causal effects of declining shareholding by a bank on its competitiveness in the loan market and the performance of firms in which the bank reduces its equity. Previous studies have produced mixed results in relation to how shareholding by banks affects firm performance (see, for instance, Litchenberg and Pushner (1994) for the positive view, Weinstein and Yafeh (1998) for the negative view, and Morck et al. (2000) for the more nuanced view). We revisit this unresolved issue by making use of a proper instrument, i.e., the reduction in shareholding induced by the Bank Shareholding Limitation Act.

The remainder of the paper is organized as follows. Section 2 briefly explains the Bank Shareholding Limitation Act of 2001 and the change in banks' shareholding in the early 2000s. Section 3 presents our empirical hypotheses and reviews the related literature. Section 4 explains our data and sample selection, the empirical strategy, and the variables, while Section 5 presents the empirical results. Section 6 concludes.

2. Institutional background

To provide some background for our analysis, this section briefly discusses changes in the shareholding structure of Japan's listed firms before and after the introduction of the Bank Shareholding Limitation Act.

Figure 1 shows changes in the shareholding distribution for listed companies in Japan by investor category. Business corporations and banks used to hold substantial proportions of shares in Japan's listed firms and, as has been documented in many studies, cross-shareholding between firms (e.g., between suppliers and customers) and between firms and banks was prevalent until the early 1990s. However, cross-shareholdings between firms and banks started to unwind from the late 1990s onwards for the following reasons. First, declining share prices after the burst of the asset price bubble prompted banks to sell off their shares to reduce the market risk associated with shareholding. Second, the introduction of market value accounting for financial instruments, which became effective in April 2000, might have reinforced banks' incentives to reduce the market risk associated with shareholding because a decline in the price of shares that a bank holds directly reduces its accounting profits under the market value accounting approach. Third, banks might also have anticipated that the risk weight of shares would increase under the Basel II Capital Accord, which was under discussion in the late 1990s, compared with that under the Basel I Capital Accord. As a result, the proportion of shareholding by commercial banks in listed Japanese companies declined from 14.8% in 1997 to 10.1% in 2000 (see Figure 1).

Although the banks voluntarily unwound their shareholding in listed firms in the late 1990s, they were forced to do so in response to the policy set by the Japanese government in the early 2000s. In April 2001, the Japanese government proposed an upper limit on the aggregate amount of shares that a bank could hold in its "Emergency Economic Measures (*Kinkyu-keizai-taisaku*)." Based on the

proposal, the Financial System Council discussed whether it was beneficial to set an upper limit on banks' shareholding. While there was initially a divergence of views among members as to whether such a limit on banks' shareholding was desirable,[1] they eventually reached agreement. The Financial System Council formulated the details of the regulation in June, and the National Diet established the Bank Shareholding Limitation Act in November 2001. Because the Act forced banks to sell considerable amounts of listed firms' shares , which was expected to prompt the unwinding of cross-shareholdings by non-financial firms as well, the Japanese government established the Banks' Shareholdings Purchase Corporation (*Ginkou-tou Hoyuu Kabushiki Shutoku Kikou*) to mitigate the downward pressure on share prices. The Banks' Shareholdings Purchase Corporation purchases eligible shares outside the stock exchanges, where eligible shares are defined as shares in listed companies that banks hold and bank shares that non-financial corporations hold.

As noted in the Introduction, the upper limit stipulated by the Act is equal to the amount of Tier 1 regulatory capital of each bank, and banks were required to reduce their shareholding to below this upper limit by the end of September 2006.[2] In principle, the amount of shares held is evaluated based on their current market price, but if a bank's aggregate shareholding based on market prices exceeds that based on book value, the latter valuation is used for the purposes of the regulation. Shares in bank subsidiaries and bank-affiliated companies, trust properties, and unlisted firms, and shares

[1] For instance, the Nikkei Financial News (April 16, 2001) summarized the opinions expressed by seven members of the Financial System Council at the first meeting. Two members were positive, while five members were negative.

[2] Initially, the deadline was the end of September 2004. In 2003, the National Diet extended the deadline to the end of September 2006.

obtained through debt–equity swaps are exempt from the regulation.

In response to the Act, banks continued to decrease their shareholding in listed firms. As a result, the proportion of shareholding in listed Japanese companies by commercial banks decreased from 10.1% in 2000 to 4.6% in 2006 (see Figure 1). Note, however, that the effect of the Bank Shareholding Limitation Act was heterogeneous among banks because it was predetermined by each bank's shareholding relative to their Tier 1 regulatory capital before the Act was implemented.

3. Empirical hypotheses

This section sets out our empirical hypotheses and reviews the related literature examining the effect of bank shareholding on banks' lending activities and firm performance.

3.1. The effect of decreasing shareholding by banks on bank lending: competitive advantage hypothesis

Banks may gain competitive advantages in their lending activities when they hold both equity and debt claims over the same firm. Such advantages naturally arise if there is an economy of scope and/or information synergies between equity investment and loan origination. Several studies have highlighted the existence of an economy of scope and/or information synergies between lending activities and securities underwriting (see, for instance, Bharath et al. 2007, Drucker and Puri 2005, and Yasuda 2005). Likewise, banks may use private information on client firms generated through their lending activities to make an equity investment or information obtained through their equity investments to originate

loans. Alternatively, banks may make equity investments in firms to cross-sell their core banking services, including business loans. For instance, Hellmann (2002) constructs a theory of strategic venture capital (VC) whereby strategic VC investments increase the value of the investors' other core businesses. Because of the complementarity between the VC investments and other businesses, a strategic VC investment generates lower returns than an independent VC investment that seeks purely financial gains. Bank-affiliated VC investments are likely to be strategic if there is complementarity between the bank's equity investment and its lending activities. We propose the following hypothesis regarding the effect of decreasing shareholding by banks on bank lending.

Hypothesis 1 (competitive advantage hypothesis): reduction in a bank's shareholding in a firm impairs the competitiveness of its lending activities and reduces the bank's share of the firm's loans.

A number of empirical studies on Japanese main banks have found that close firm–bank ties increase the availability of credit for borrowing firms (e.g., Weinstein and Yafeh 1998). However, many studies do not state whether this effect is the result of the simultaneous holding of both equity and debt or of other characteristics of the close relationship with the bank (e.g., the presence of representatives of the bank on the firm's board). Using data from German banks, Chirinko and Elson (2006) report that shareholding by banks does not have a significant effect on the amount of long-term loans provided. Using data on bank-affiliated private equity (PE) or VC firms in the United States, Hellmann et al.

(2008) and Fang et al. (2013) find that banks are more likely to cross-sell their financial products, including loans to firms, if bank-affiliated PE/VC firms have previously invested in those firms. Jiang et al. (2010) analyze data on syndicated loans by non-commercial banking institutions in the United States and find that these institutions tend to participate in syndicated loans more often if they simultaneously hold both equity and debt positions.

3.2. The effect of decreasing shareholding by banks on firms' risk-taking and borrowing terms: incentive alignment hypothesis

Shareholding by banks may mitigate conflicts of interest between shareholders and creditors, thus reducing both risk-taking behavior by firms and financial friction between lenders and borrowers. The seminal work of Jensen and Meckling (1976) and Myers (1977) shows that the divergence of objectives between shareholders and creditors may result in a conflict of interest whereby managers, whose objective it is to maximize shareholder value, may undertake actions exploiting the wealth of creditors (the asset substitution problem). A typical example of the asset substitution problem occurs when a manager pursues a risky, albeit profitable project because if the project fails, the limited liability status of shareholders sets a limit on their potential losses. The asset substitution problem may be resolved, at least partially, if creditors internalize the conflict of interest between shareholders and creditors by simultaneously holding equity and debt (Dewatripont and Tirole 1994, John et al. 1994). Alternatively, Mahrt-Smith (2006) theoretically shows that the hold-up problem in a lending relationship may be

mitigated if the lender holds equity in the borrowing firm, because the lender's incentive to extract rents from the borrower is reduced by its equity stake. We put forward the following hypothesis regarding the effect of decreasing shareholding by banks on firms' risk-taking and borrowing terms.

Hypothesis 2 (incentive alignment hypothesis): reduction in a bank's shareholding in a firm aggravates conflicts of interest between shareholders and creditors, thereby increasing risk-taking by firms and worsening their borrowing terms.

Most previous studies using Japanese data have examined how shareholding by banks affects firm value, and have produced mixed findings. Litchenberg and Pushner (1994) report that bank shareholding has a positive impact on firm productivity, while Miyajima and Kuroki (2007) report a negative impact on firm profitability (as measured by ROA) and Tobin's *q*, and argue that bank shareholding may be detrimental to firm value by encouraging the entrenchment of firms' managers. Morck et al. (2000) report that the effect of bank shareholding on firm performance is nonlinear, i.e., it is negative for low levels of shareholding, but positive for higher levels. Hiraki et al. (2003) argue that the effect on firm performance may depend on whether the shareholding between a bank and a firm is one-way or two-way (cross-shareholding) and on whether the shareholder bank is the firm's main bank. They find that cross-shareholding between a main bank and its client firms has a negative effect on firm value, while one-way shareholding by non-main banks has a positive effect. Using German data, Gorton

and Schmid (2000) find evidence that bank shareholding is positively related to firm performance (as measured by the market-to-book ratio), while Chrinko and Elson (2006) find that bank shareholding is negatively related to firm performance (as measured by ROA).

Turning to borrowing terms, Morck et al. (2000) find that the interest costs of Japanese firms increase with the level of bank ownership, which is inconsistent with the incentive alignment hypothesis, and they raise the possibility of rent extraction by bank shareholders. In contrast, Jiang et al. (2010) find that the credit spreads of syndicated loans are lower if U.S. non-commercial banking institutions hold equity claims over borrowing firms, which is consistent with the incentive alignment hypothesis. Using cross-country data on syndicated loans, Ferreira and Matos (2012) find that the availability of credit is higher if financial institutions invest in borrowing firms.

4. Data, empirical strategy, and variables

4.1. Data and sample selection

To construct our firm–bank matched dataset for shareholding relationships between listed firms and banks in Japan, we use the Nikkei Financial Quest database. This contains detailed information on Japan's listed firms including their financial statements, equity ownership, and the amount of loans outstanding with each bank with which they undertake transactions. Regarding equity ownership, the Nikkei Financial Quest database identifies the 30 major shareholders based on the number of shares held. In addition to the Nikkei Financial Quest database, we use the banks' financial statements

compiled by the Japanese Bankers Association to obtain bank-level data.

We restrict our sample to listed firms and banks for which accounting information for 2001 is available, where the closing month for 2001 is between January 2001 and December 2001 for firms and March 2001 for banks. Regarding banks, we restrict our sample to commercial banks; i.e., city banks, regional banks, and second-tier regional banks. We exclude trust banks because their shareholding is mainly in relation to fiduciary services for which the trust banks act as trustees. All city banks and some regional banks in our sample experienced mergers and acquisitions during the period 2001–2006. Thus, we constructed hypothetical merged banks, i.e., if bank A and bank B existed in 2001 but merged in 2003 to become bank C, we assumed that bank C existed in 2001.[3] Thus, if bank A was a major shareholder in a particular firm in 2001, we treat bank C as a major shareholder in the firm.

We restrict our sample to firm–bank pairs where a bank was one of the major shareholders of a firm in 2001 and examine the evolution of their shareholding relationship, as well as changes in loans outstanding and firm performance in 2006. After deleting some banks from the sample (see Section 4.3 for an explanation), we ended up with 3,941 firm–bank pairs (1,506 firms and 94 banks) for our analysis.

4.2. Empirical strategy

To examine the impact of decreasing shareholding in firm *i* by bank *j* on changes in their loans

[3] To be more precise, we constructed hypothetical banks in 2001 for the following banks: Mizuho (formerly Daiichi-Kangyo, Fuji, and Industrial Bank of Japan; merged in April 2002), BTMU (formerly Bank of Tokyo-Mitsubishi and UFJ; merged in January 2006. UFJ was formerly Sanwa and Tokai; merged in January 2002), SMBC (formerly Sakura, Sumitomo, and Wakashio; merged in March 2003), Nishinihon-City (formerly Nishinihon and Fukuoka-City; merged in October 2004), Shinwa (formerly Shinwa and Kyusyu; merged in April 2003), and Momiji (formerly Hiroshima-Sogo and Setouchi; merged in May 2004).

outstanding and firm performance, we need to separate a treatment effect from a possible selection effect. Regarding the extensive margin of the bank's shareholding, we apply a treatment regression approach in the following manner:

$$\Delta LOAN_{ij,2006-2001} = \alpha_0 \widehat{\text{Stock decrease\_ex}}_{ij,2006-2001} + \mathbf{X_{2001}}\boldsymbol{\alpha} + \varepsilon_{ij}, \quad (1a)$$

$$\Delta RISK_{i,2006-2001} = \beta_0 \widehat{\text{Stock decrease\_ex}}_{ij,2006-2001} + \mathbf{X_{2001}}\boldsymbol{\beta} + \eta_i, \quad (1b)$$

$$\Delta BORROWING_{i,2006-2001} = \gamma_0 \widehat{\text{Stock decrease\_ex}}_{ij,2006-2001} + \mathbf{X_{2001}}\boldsymbol{\gamma} + \omega_i, \quad (1c)$$

$$\left.\begin{aligned} \text{Stock decrease\_ex}^*_{ij,2006-2001} &= \lambda_0 \text{IV}_{j,2001} + \mathbf{X_{2001}}\boldsymbol{\lambda} + \upsilon_{ij}, \\ \text{Stock decrease\_ex}_{ij,2006-2001} &= 1 \text{ if Stock decrease\_ex}^*_{ij,2006-2001} > 0; \\ &= 0 \text{ if otherwise.} \end{aligned}\right\} \quad (2)$$

In equation (1a), $\Delta LOAN_{ij,2006-2001}$ is the variable that represents changes in the loan amount between firm *i* and bank *j* during the period 2001–2006.[4] Likewise, in equations (1b) and (1c), $\Delta RISK_{i,2006-2001}$ and $\Delta BORROWING_{i,2006-2001}$ represent changes in the risk-taking behavior and borrowing terms, respectively, of firm *i* during the period 2001–2006. We are interested in the coefficients of the dummy variable $\text{Stock decrease\_ex}_{ij,2006-2001}$, which indicates how bank *j* being deleted from the list of major shareholders in firm *i* between 2001 and 2006 affected $\Delta LOAN_{ij,2006-2001}$, $\Delta RISK_{i,2006-2001}$, and $\Delta BORROWING_{i,2006-2001}$.[5] To allow for the possibility that $\text{Stock decrease\_ex}_{ij,2006-2001}$ is determined endogenously, as shown by equation (2) and the

[4] To be more precise, we take the average of 2005 and 2006 for 2006 and the average of 2000 and 2001 for 2001 to take into account the possibility that the figures at the end of the fiscal year may be quite different from the average balance throughout the year. We apply the same procedure to all of the dependent variables that measure the difference (Δ).

[5] When we use variables for $\Delta RISK_{i,2006-2001}$ and $\Delta BORROWING_{i,2006-2001}$ as dependent variables, the same observation for firm i is used multiple times if the firm had more than two banks among its major shareholders in 2001, which may yield bias in the estimation. This potential problem is mitigated by using the subsample of firm–main-bank pairs described in Section 5.2.

fact that the correlations between the disturbance terms in equations (1a)–(1c) and (2) are not zero, we resort to the treatment regression using the maximum likelihood estimator. Finally, $\mathbf{X_{2001}}$ is a vector of covariates that include firm and bank characteristics in 2001.

Regarding the intensive margin of the bank's shareholding, we estimate the following equations using a 2SLS regression approach:

$$\Delta LOAN_{ij,2006-2001} = \alpha_0 \widehat{\text{Stock decrease\_in}}_{ij,2006-2001} + \mathbf{X_{2001}}\boldsymbol{\alpha} + \varepsilon_{ij}, \quad (3a)$$

$$\Delta RISK_{i,2006-2001} = \beta_0 \widehat{\text{Stock decrease\_in}}_{ij,2006-2001} + \mathbf{X_{2001}}\boldsymbol{\beta} + \eta_i, \quad (3b)$$

$$\Delta BORROWING_{i,2006-2001} = \gamma_0 \widehat{\text{Stock decrease\_in}}_{ij,2006-2001} + \mathbf{X_{2001}}\boldsymbol{\gamma} + \omega_i, \quad (3c)$$

$$\text{Stock decrease\_in}_{ij,2006-2001} = \lambda_0 \text{IV}_{j,2001} + \mathbf{X_{2001}}\boldsymbol{\lambda} + \upsilon_{ij}. \quad (4)$$

We employ 2SLS regressions because the key variable of interest, $\text{Stock decrease\_in}_{ij,2006-2001}$, which represents negative changes in the ratio of bank *j*'s shareholding relative to firm *i*'s total shares on issue during the period 2001–2006, is a continuous variable. $\text{Stock decrease\_in}_{ij,2006-2001}$ is only constructed if $\text{Stock decrease\_ex}_{ij,2006-2001}$ is zero, and thus represents the intensive margin of the bank's shareholding.

As noted above, both treatment regression and 2SLS regression assume that $\text{Stock decrease\_ex}_{ij}$ or $\text{Stock decrease\_in}_{ij}$ is endogenous and that the correlation between the disturbance terms in equations (1a)–(1c) and (2) and those in equations (3a)–(3c) and (4) are not zero. To check for the endogeneity of these two variables, we implement the Wald test in the case of treatment regressions and the Durbin test for 2SLS regressions to test the null hypothesis that the correlation

between disturbance terms is zero (Stock decrease_ex$_{ij}$ and Stock decrease_in$_{ij}$ are exogenous). If we fail to reject the null hypothesis, we use the estimation results obtained by ordinary least squares (OLS) regressions for equations (1a)–(1c) and (3a)–(3c).

4.3. Variables

The definitions of the dependent variables and independent variables used to estimate equations (1)–(4) are presented in Table 1, while Tables 2 and 3 show summary statistics and correlation coefficients, respectively. To deal with outliers, most variables are winsorized at the upper and lower 1 percentiles.[6]

Regarding the instrumental variable in equations (2) and (4), $\mathrm{IV}_{j,2001}$, we use BK_mainstock − cap ratio$_j$, which is defined as each bank's shareholding in listed firms relative to the amount of the bank's core capital as at March 2001. The mean of BK_mainstock − cap ratio$_j$ is 1.127, so banks in our sample had to reduce the amount of shares they held by about 13% on average to comply with the regulatory limit, although there are considerable cross-bank variations, as indicated by the first and third quartiles of BK_mainstock − cap ratio$_j$, which are 0.486 and 1.423, respectively (see Table 2).

To calculate the BK_mainstock − cap ratio$_j$ from the Nikkei Financial Quest database, we took the following steps. First, for each firm–bank pair *ij*, we calculated the amount of shares that bank *j* held as one of the top 30 shareholders in firm *i* by multiplying the number of firm *i*'s shares that bank

[6] The following variables are not winsorized: Stock decrease_ex, Stock decrease_in, ln(Sales), Industry dummy, and Mainbank dummy.

j held by the average stock price of firm *i* as at the closing month of accounting year 2001 (Mainstock_{ij}). Second, for each bank *j*, we totaled the amount of each firm's stock that the bank held: $\text{BK\_mainstock}_j = \sum_i \text{Mainstock}_{ij}$. Finally, we divided BK_mainstock_j by bank *j*'s core capital, which was a proxy for the bank's Tier 1 regulatory capital and was taken from the bank's balance sheet, to calculate the $\text{BK\_mainstock} - \text{cap ratio}_j$.

We could have calculated the ratio by simply using the amount of shares shown in the bank's balance sheet, but we decided not to do so for the following reasons. First, by definition, shares listed in a bank's balance sheet include not only shares in listed firms but also shares in unlisted firms and affiliated companies that are exempt from the Bank Shareholding Limitation Act. Second, shares listed in a bank's balance sheet may also include shares in listed firms that a bank holds despite not being among the top 30 shareholders, and our key variables, $\text{Stock decrease\_ex}_{ij}$ and $\text{Stock decrease\_in}_{ij}$, do not capture changes in shares that a bank holds if it is not one of the major shareholders. To comply with the definitions of the two main variables, we used the Nikkei Financial Quest database to calculate the $\text{BK\_mainstock} - \text{cap ratio}_j$. There is, however, a caveat in relation to the $\text{BK\_mainstock} - \text{cap ratio}_j$ in that it may underestimate the amount of listed firms' shares that a bank holds if the bank holds a large amount of shares as a non-major shareholder. To deal with this problem, we deleted banks for which the difference between the $\text{BK\_mainstock} - \text{cap ratio}_j$ constructed from the Nikkei Financial Quest database and the Stock-Tier 1 ratio constructed from the

bank's balance sheet was significant.[7] In addition, we deleted Ashikaga Bank and banks belonging to the Resona Group, which received capital injections from the Japanese government between 2001 and 2006. These banks significantly reduced the amount of their shareholding during this period because this was one of the conditions they were required to meet to receive capital injections from the government. As a result, the total number of banks in our sample was 94.

Key variables of interest in this study are the changes in the extensive and intensive margins of bank *j*'s shareholding in firm *i*, Stock decrease_ex$_{ij}$, and Stock decrease_in$_{ij}$. The mean of Stock decrease_ex$_{ij}$ is 0.234, thus about one-quarter of firm–bank shareholding relationships diminished between 2001 and 2006 (see Table 2). The mean of Stock decrease_in$_{ij}$ is –0.664, so even if a bank was still one of the major shareholders in a firm in 2006, the ratio of the bank's shareholding to the firm's total shares on issue declined by about 0.7 percentage points.

Turning to dependent variables, to examine whether a reduction in a bank's shareholding impaired the competitiveness of its lending activities ($\Delta LOAN_{ij}$ in equations (1a) and (3a)), we used ΔLoan share$_{ij}$, which represents the ratio between loans provided by bank *j* and the total of all loans taken out by firm *i* in 2006 less the same ratio in 2001. From Hypothesis 1 in Section 3, we expect the coefficient of Stock decrease_ex$_{ij}$ in equation (1a) to be negative, while that of Stock decrease_in$_{ij}$ in equation (3a) should be positive. In examining the change in risk-taking

[7] To be more precise, we calculated the ratio between the amount of shares listed in a bank's balance sheet and the amount of listed firms' shares that the bank held as one of the major shareholders, BK_mainstock, and deleted the bank from the sample if the ratio was greater than 22, which is the upper 1 percentile of the entire sample.

behavior by firms between 2001 and 2006 ($\Delta RISK_i$ in equations (1b) and (3b)), we use the following three variables: ΔROA volatility, which represents the change in the standard deviation of ROA; ΔR&D expense ratio, which represents the change in expenditure on research and development activities; and ΔSharpe ratio, which represents the change in the Sharpe ratio (=ROA/ROA volatility). If reduced shareholding by banks increases the risk-taking behavior of client firms as predicted by Hypothesis 2 in Section 3, we expect the coefficient of Stock decrease_ex$_{ij}$ in equation (1b) to be positive for ΔROA volatility and ΔR&D expense ratio, and negative for ΔSharpe ratio. Finally, to examine whether the firms' borrowing terms ($\Delta BORROWING_i$ in equations (1c) and (3c)) worsen because of conflicts of interest between borrowing firms and creditors, we use ΔOther debt ratio and ΔInterest expense ratio. ΔOther debt ratio represents the change in a firm's outstanding debts other than loans from the shareholding bank relative to the firm's total assets, and we expect the coefficient of Stock decrease_ex$_{ij}$ in equation (1c) and that of Stock decrease_in$_{ij}$ in equation (3c) to take a negative value. ΔInterest expense ratio represents the change in a firm's interest expenses relative to its assets, and we expect the coefficients of Stock decrease_ex$_{ij}$ to take a positive value.

Regarding the control variables, $\mathbf{X_{2001}}$, we use the following firm characteristic variables for 2001: the logarithm of total sales as a proxy for firm size (ln(Sales)), ROA as a proxy for profitability (ROA), standard deviation of ROA (ROA volatility) and the leverage ratio (Leverage ratio) as proxies for riskiness, ratio of cash relative to total assets as a proxy for liquidity (Cash ratio), sales growth as

a proxy for firm growth and loan demand (Sales growth), ratio of tangible assets to total assets as a proxy for tangibility (Tangible asset ratio), and 32 industry dummy variables. We also include a dummy variable representing whether the shareholding bank is the main bank of a firm (Main bank dummy), where the main bank is defined as the bank with the largest amount of loans outstanding as at 2001.

5. Results

In this section, we present the estimation results. Section 5.1 presents the main results, while Section 5.2 presents the estimation results after we divide the overall sample into main-bank and non-main-bank subsamples.

5.1. Main results

We first examine the determinants of the extensive and intensive margins of banks' shareholding to confirm whether the instrumental variable we use has the expected effects. In Table 4, columns (1) and (2) correspond to the empirical specifications in equations (2) and (4), respectively, in Section 4.2, with the rows showing the estimated coefficients and heteroskedasticity-robust *t*-statistics in parentheses.[8] In column (1), we find that the coefficient of the BK Mainstock − cap ratio is positive and

[8] Because we employ the maximum likelihood estimator that simultaneously estimates the coefficients of equations (1) and (2) and equations (3) and (4), we obtain different estimated coefficients in equations (2) and (4) for each dependent variable. However, all of the estimation results that are obtained are essentially the same, so we only report the results where the dependent variable is ΔLoan share in Tables 4 and 6. Results for the other dependent variables are reported in Tables A1 and A3 in the Appendix.

significant, implying that a bank that held a larger amount of shares compared with its Tier 1 capital in 2001 (i.e., before the Bank Shareholding Limitation Act was established) was more likely to be deleted from the lists of major shareholders of client firms by 2006. Similarly, in column (2), we find that the coefficient of the $\text{BK Mainstock} - \text{cap ratio}$ is positive and significant. That is, even if a bank continued to be one of the major shareholders of a firm in 2006, the proportion of the bank's shareholding decreased by a greater amount between 2001 and 2006 if the $\text{BK Mainstock} - \text{cap ratio}$ was greater in 2001. Based on the estimated coefficients in Table 4, an average bank that had to reduce its shareholding by 12.7%, which corresponds to the mean of $\text{BK Mainstock} - \text{cap ratio}$ in our sample, has a 2.9-percentage-point (0.127*0.225*100) higher probability of being deleted from the lists of major shareholders, and the ratio of its shareholding to the firm's total shares on issue decreases by 0.07 percentage points (0.127*0.541) if it remains as the firm's major shareholder.[9] In terms of firm characteristics, we find that banks decrease their extensive margin of shareholding for larger firms (ln(Sales)), riskier firms (ROA volatility), and firms with more tangible assets (Tangible asset ratio), while they decrease their intensive margin of shareholding for larger firms (ln(Sales)) and firms with greater cash holdings (Cash ratio). In terms of firm–bank relationships, we find that a bank is less likely to be deleted from the list of major shareholders in a firm if it is the firm's main bank, but we find the opposite result regarding the intensive margin of the bank's shareholding.

Next, we examine the effects of a change in a bank's shareholding on the competitiveness of

[9] As shown in Table 2, the unit of Stock decrease_in is percent and ranges from 0–100, while the other variables representing share or ratio (e.g., ΔLoan share, ΔSharpe ratio) range from 0–1.

its lending activity, the client firm's risk-taking, and the firm's borrowing terms. Table 5 shows the estimation results for the extensive margin of the bank's shareholding (equations (1a)–(1c) using Stock decrease_ex). For each dependent variable, we report the estimation results obtained from treatment regressions if we reject the null hypothesis that Stock decrease_ex is exogenous, while we report the results of OLS regressions if we fail to reject the null hypothesis.[10] We find, first, that the exogenous reduction in bank shareholding has a significant negative impact on ΔLoan share (column (1) in Table 5). Based on the estimation result, when a bank is deleted from the list of major shareholders of a firm, its share of loans to that firm decreases by 7 percentage points. Compared with the mean of ΔLoan share shown in Table 2, i.e., 1.2%, the effect is economically significant. Taking into account the estimation result in Table 4, for an average bank that had to reduce the amount of shares by 12.7% by the Bank Shareholding Limitation Act, the expected value of the decrease in the bank's share of loans to that firm is 0.2 percentage points (0.127*0.225*0.070*100). Thus the effect of the Act on an average bank is of modest but not negligible economic significance. In sum, the results suggest that a decrease in banks' shareholding impairs the competitiveness of their lending activities. Second, turning to the firms' risk-taking variables shown in columns (2)–(4) in Table 5, we find that a reduction in the extensive margin of the banks' shareholding (Stock decrease_ex) significantly increases firms' ΔROA volatility and reduces their ΔSharpe ratio. These results suggest that firms increase the riskiness of their business activities and reduce their Sharpe ratios when banks are deleted from their

[10] In Table 5, we only report the relevant results for each dependent variable (i.e., either treatment regression or OLS regression). Full results for both treatment regressions and OLS regressions are presented in Tables A1 and A2 in the Appendix.

list of major shareholders. Note, however, that because we use an OLS regression for ΔROA volatility, we do not specify the causal relationship between the decrease in the extensive margin of a bank's shareholding caused by an exogenous change in the BK Mainstock − cap ratio and the increase in the firm's ΔROA volatility. Third, we examine whether the reduction in bank shareholding worsens firms' borrowing terms (columns (5) and (6) in Table 5). The results are mixed: while we find a significant negative impact on ΔOther debt ratio, indicating that creditors other than the bank that are deleted from the list of major shareholders of the firm also reduce their credit claims, we do not find a significant effect on ΔInterest expense ratio.

Table 6 shows the effects of changes in banks' shareholding using the intensive margin of the banks' shareholding (equations (3a)–(3c) using Stock decrease_in).[11] First, similar to the result in Table 5, the reduction in the intensive margin of banks' shareholding has a statistically significant negative impact on ΔLoan share (column (1) in Table 6). Based on the estimation result, when a bank reduces its intensive margin of shareholding in a firm by 0.664 percentage points, which is equal to the mean of Stock decrease_in (Table 2), its share of loans to that firm decreases by 0.4 percentage points (0.664* (−0.006)*100). Compared with the mean of ΔLoan share, 1.2%, the effect is of modest but not negligible economic significance. Regarding the effect of the Bank Shareholding Limitation Act, because an average bank decreases its intensive margin of shareholding in a firm by only 0.07 percentage points by the Act as explained above, its share of loans to that firm decreases by merely 0.04

[11] The full estimation results of 2SLS regressions and OLS regressions are presented in Tables A3 and A4 in the Appendix.

percentage points (0.127*0.541*(−0.006)*100) and the effect is of little economic significance. Second, we do not find a significant effect on firms' risk-taking from a change in the intensive margin of banks' shareholding: none of the coefficients of ΔROA volatility, ΔR&D expense ratio, and ΔSharpe ratio are statistically significant (columns (2)–(4) in Table 6). These results are in contrast with those relating to the extensive margin of banks' shareholding shown in Table 5. One possible interpretation is that a reduction in the intensive margin of a bank's shareholding has less impact on firm behavior than a reduction in the extensive margin because the bank continues to be the firm's major shareholder. However, this interpretation is somewhat inconsistent with our third finding: a reduction in the intensive margin of banks' shareholding significantly reduces ΔOther debt ratio and increases ΔInterest expense ratio (columns (5) and (6) in Table 6). These results suggest that the conflicts of interest between shareholders and creditors intensify when the major shareholder bank reduces its shareholding. In summary, while Table 6 (intensive margin) shows qualitatively the same estimation results for ΔLoan share as Table 5 (extensive margin), we do not find any significant changes in firms' risk-taking behavior in response to a change in the intensive margin in banks' shareholding. Conversely, a reduction in the intensive margin of banks' shareholding significantly worsens firms' borrowing terms.

Overall, we find evidence that a decrease in a bank's extensive and intensive margins of shareholding in a firm decreased its share of loans to the firm, which is consistent with the competitive advantage hypothesis. We also find some evidence of an increase in a firm's risk-taking behavior and a deterioration in its borrowing terms, especially when a bank reduces its extensive margin of

shareholding in a firm, which is consistent with the incentive alignment hypothesis.

5.2. Results for main-bank and non-main-bank subsamples

In this subsection, we report the estimation results when we divide our overall sample into main-bank and non-main-bank subsamples to investigate whether the results obtained in the previous subsection are driven by changes in the shareholding of main banks or non-main banks.

Table 7 shows the estimation results for the extensive margin of banks' shareholding. For each dependent variable, we use the same estimation method (treatment or OLS regression) as that used in Table 5.[12] From Table 7, it can be seen that the effects of a bank's deletion from the list of major shareholders of client firms on its competitive advantage in lending activities and firms' risk-taking behavior are more significant in the non-main-bank subsample. First, we find that the coefficients of ΔLoan share are only significant in the non-main-bank subsample (columns (1) and (2) in Table 7). The results indicate that the share of loans provided by the main bank does not decrease even if the main bank is no longer one of the major shareholders in the client firm, while the share of loans provided by a non-main bank decreases when it becomes a pure creditor. Second, while we find a significant positive effect on ΔROA volatility for both the main-bank and non-main-bank subsamples, as shown in columns (3) and (4) in Table 7, the negative effect on ΔSharpe ratio is only significant in the non-main-bank subsample (columns (7) and (8) in Table 7). These results are in line with the findings of

[12] The full estimation results of both treatment regressions and OLS regressions are presented in Tables A5 and A6 in the Appendix.

Hiraki et al. (2003), who report that an increased level of shareholding by non-main banks has a positive impact on firm value. Third, regarding borrowing terms, we do not find significant effects on ΔOther debt ratio and ΔInterest expense ratio in either the main-bank or the non-main-bank subsamples (columns (9)–(12) in Table 7).

Table 8 shows the estimation results for the intensive margin of banks' shareholding. For each dependent variable, we use the same estimation method (2SLS or OLS regression) as that used in Table 6.[13] We find, first, that decreasing banks' shareholding in terms of the intensive margin significantly reduces the share of loans to firms in both the main-bank and non-main-bank subsamples (columns (1) and (2) in Table 8). This result differs from that for the extensive margin (see Table 7), in which we only find a significant effect in the non-main-bank subsample, but it should be noted that this may stem from the difference in the estimation method that we use (treatment regression for the extensive margin and OLS for the intensive margin). Second, turning to variables that represent changes in the risk-taking behavior of firms (columns (3)–(8) in Table 8), we do not find any significant effects except for ΔSharpe ratio in the main-bank subsample. The significantly negative coefficient of ΔSharpe ratio in the main-bank subsample (see column (7)) indicates that the Sharpe ratio improves for firms whose main bank reduces its shareholding, which is contrary to the incentive alignment hypothesis. Rather, this result is in line with previous studies indicating that bank shareholding is detrimental to firm value (e.g., Miyajima and Kuroki 2007). Finally, we find that the reduction in the intensive margin of banks'

[13] The full estimation results of 2SLS regressions and OLS regressions are presented in Tables A7 and A8 in the Appendix.

shareholding significantly reduces ΔOther debt ratio and increases ΔInterest expense ratio only in the non-main-bank subsample, which suggests that the estimation results for ΔOther debt ratio and ΔInterest expense ratio using the entire sample in Table 6 are mostly due to the non-main-bank subsample.

Overall, we find that the effects of a reduction in bank shareholding on the competitiveness of banks' lending, firms' risk-taking, and firms' borrowing terms are stronger for non-main banks than for main banks.

6. Conclusion

Employing the regulatory changes relating to banks' shareholding in Japan as an instrument, this study investigated the effects of declining shareholding by banks on bank lending and firms' risk-taking. Our empirical analysis yielded the following results. First, a reduction in bank shareholding in terms of both the extensive margin and the intensive margin reduces the bank's share of loans to the client firm. This finding is consistent with the view that banks hold equity in client firms to gain a competitive advantage in relation to lending activities. Second, a reduction in the extensive margin of a bank's shareholding increases the volatility of a client firm's ROA and reduces its Sharpe ratio, which is consistent with the view that bank shareholding is useful in mitigating shareholder–creditor conflict. However, we do not find this effect when a bank reduces the intensive margin of its shareholding. Third, the decrease in the bank's share of loans to the firm and the increase in the firm's risk-taking are stronger in relation to

non-main banks.

References

Bharath, S., S. Dahiya, A. Saunders, and A. Srinivasan (2007), "So what do I get? The bank's view of lending relationships," *Journal of Financial Economics*, 85(2), 368–419

Chirinko, R. S., and J. A. Elston (2006), "Finance, control and profitability: the influence of German banks," *Journal of Economic Behavior & Organization*, 59(1), 69–88

Dewatripont, M., and J. Tirole (1994), "A theory of debt and equity: Diversity of securities and manager-shareholder congruence," *Quarterly Journal of Economics*, 109(4), 1027–1054

Drucker, S. and M. Puri (2005), "On the benefits of concurrent lending and underwriting," *Journal of Finance*, 60(6), 2763–2799

Fang L., V. Ivashina, and J. Lerner (2013), "Combining banking with private equity investing," *Review of Financial Studies*, 26(9), 2139–2173

Ferreira, M.A., and P. Matos (2012), "Universal banks and corporate control: Evidence from the global syndicated loan market," *Review of Financial Studies*, 25(9), 2703–2744

Flath, D. (1993), "Shareholding in the Keiretsu, Japan's financial groups," *Review of Economics and Statistics*, 75(2), 249–257

Gorton, G., and F. A. Schmid (2000), "Unversal banking and the performance of German firms," *Journal of Financial Economics*, 58(1–2), 29–80

Hellmann, T. (2002), "A theory of strategic venture investing," *Journal of Financial Economics*, 64(2), 285–314

Hellmann T., L. Lindsey, and M. Puri (2008), "Building relationships early: Banks in venture capital," *Review of Financial Studies*, 21(2), 513–541

Hiraki, T., H. Inoue, A. Ito, F. Kuroki, and H. Masuda (2003), "Corporate governance and firm value in Japan: Evidence from 1985 to 1998," *Pacific-Basin Finance Journal*, 11(3), 239–265

Jiang, W., K. Li, and P. Shao (2010), "When shareholders are creditors: Effects of the simultaneous holding of equity and debt by non-commercial banking institutions," *Review of Finance*, 23(10), 3595–3637

John, K., T. A. John, and A. Saunders (1994), "Universal banking and firm risk-taking," *Journal of Banking & Finance*, 18(2), 307–323

Lichtenberg, F. R., and G. M. Pushner (1994), "Ownership structure and corporate performance in Japan," *Japan and the World Economy*, 6(3), 239–261

Mahrt-Smith, Jan (2006), "Should banks own equity stakes in their borrowers? A contractual solution

to hold-up problems," *Journal of Banking & Finance*, 30(10), 2911–2929

Miyajima, H., and F. Kuroki (2007), "The unwinding of cross-shareholding in Japan: Causes, Effects, and Implications," in M. Aoki, G. Jackson, and H. Miyajima eds., *Corporate Governance in Japan: Institutional Change and Organizational Diversity*, Oxford University Press, pp. 79–124

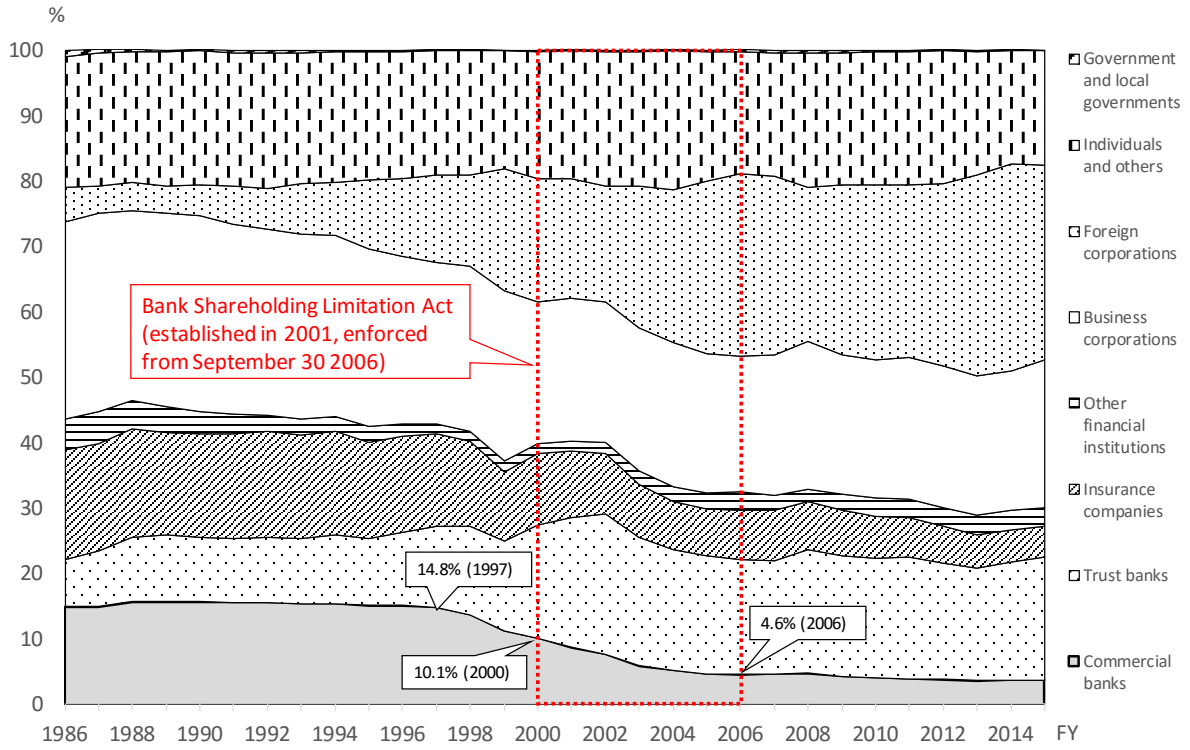
Morck, R., M. Nakamura, and A. Shivdasani (2000), "Banks, ownership structure, and firm value in Japan," *Journal of Business*, 73(4), 539–567

Prowse, S. D. (1992), "The structure of corporate ownership in Japan," *Journal of Finance*, 47(3), 1121–1140

Weinstein, D. E., and Y. Yafeh (1998), "On the costs of a bank-centered financial system: Evidence from the changing main bank relations in Japan," *Journal of Finance*, 53(2), 635–672

Yasuda, A. (2005), "Do bank relationships affect the firm's underwriter choice in the corporate-bond underwriting market?" *Journal of Finance*, 60(3), 1259–1292

Figure 1: Changes in the shareholding distribution (in terms of market value) for domestic listed companies by investor category



Note: The term 'Commercial banks' refers to city banks, regional banks, and long-term credit banks. From FY2004, companies listed on the JASDAQ are included. The term 'Other financial institutions' includes securities companies, credit cooperatives, investment trusts, and annuity trusts. The term 'Foreign corporations' includes non-Japanese individuals.

Sources: Tokyo Stock Exchange

Table 1: Definitions of variables used in the main estimations (Tables 3–5).

Variables	Definition	Winsorization at upper and lower 1 percentile
Dependent variables (1st stage)		
Stock decrease_ex	Dummy for a bank's termination of the relationship with a firm as a main shareholder (extensive margin). 1 if the bank which is listed as one of the top 30 shareholders in 2001 disappears from the top 30 list in 2006 and 0 if the bank remains in the list.	No
Stock decrease_in	Negative of a change in the ratio of a bank's shareholding to the total number of shares issued by a firm. This variable is constructed only if the bank remains to be listed as one of the top 30 shareholders during the period, in which case Stock drop is zero and we measure the intensive margin. The change is measured between 2001 and 2006 and the unit is percent (0-100).	No
Dependent variables (2nd stage)		
ΔLoan share	A change in the average share of loans extended by a bank between years 2000-2001 and years 2005-2006. The share of loans is the ratio of loans extended by the bank to the total amount of loans for the firm.	Yes
ΔROA volatility	A change in the average volatility of a firm's ROA between years 2000-2001 and years 2005-2006. For example, volatility of ROA in year 2000 and 2001 is the standard deviation of ROA in years 1995-1999 and years 1996-2000, respectively, and we take the average of the two for the ROA volatility of a firm's ROA for years 2000-2001.	Yes
ΔR&D expense ratio	A change in the average ratio of a firm's R&D expenditure to its total asset amount between years 2000-2001 and years 2005-2006.	Yes
ΔSharpe ratio	A change in the average Sharpe ratio for a firm between years 2000-2001 and years 2005-2006. The Sharpe ratio is defined as the ratio of ROA in year t to its standard deviation for years t-4 and t.	Yes
ΔOther debt ratio	A change in the average debt ratio provided by other institutions than the main shareholder bank between years 200-2001 and years 2005-2006. The debt ratio is defined as the ratio of interest-bearing liabilities (=loans and bonds) issued by other institutions than the main shareholder bank to the amount of total assets for a firm.	Yes
ΔInterest expense ratio	A change in the average interest expense ratio for a firm between years 2000-2001 and years 2005-2006. The interest expense ratio is the amount of interest payment plus discount expense divided by a firm's interest bearing liabilities amount.	Yes
Independent variables		
BK Mainstock-cap ratio	Sum of a bank's shareholding of listed firms (as one of the top 30 shareholders for each firm) divided by the bank's own core capital amount in 2001. Core capital is the sum of common stock, new stock subscription, and capital surplus reserve.	Yes
ln(Sales)	Log of a firm's sales in 2001	No
ROA	The ratio of a firm's current profit to its total asset in 2001	Yes
ROA volatility	Standard deviation of a firm's ROA for the preceding five years in 2001	Yes
Cash ratio	The ratio of a firm's cash and short-term security holdings to its total asset in 2001	Yes
Sales growth	A firm's sales growth between year 2000 and 2001	Yes
Tangible asset ratio	The ratio of a firm's tangible asset to its total asset in 2001	Yes
Leverage ratio	The ratio of a firm's interest bearing liabilities to its total asset in 2001	Yes
Main bank dummy	Dummy for the main bank of a firm. 1 if the bank is the largest lender for the firm in 2001 and 0 otherwise.	No
Industry dummy	Dummies for 33 industries (excluding financial industry) based on the Nikkei Industry Classification Code in 2001	No

Table 2: Summary statistics for the variables used in the main estimations (Tables 3–5). Definitions of variables are provided in Table 1.

Variables	N	Mean	sd	Min	p25	p50	p75	Max
Dependent variables (1st stage)								
Stock decrease_ex	3,941	0.234	0.423	0.000	0.000	0.000	0.000	1.000
Stock decrease_in	3,020	0.664	1.293	-20.750	0.000	0.100	1.075	8.080
Dependent variables (2nd stage)								
ΔLoan share	3,941	-0.012	0.052	-0.137	-0.027	0.000	0.006	0.137
ΔROA volatility	3,884	0.002	0.017	-0.142	-0.005	0.001	0.009	0.228
ΔR&D expense ratio	3,941	0.001	0.007	-0.086	-0.001	0.000	0.002	0.063
ΔSharpe ratio	3,884	0.298	3.368	-15.840	-1.230	0.454	2.102	13.979
ΔOther debt ratio	3,941	-0.064	0.124	-0.535	-0.133	-0.059	0.004	0.569
ΔInterest expense ratio	3,941	-0.002	0.031	-0.293	-0.009	-0.003	0.001	0.333
Independent variables								
BK Mainstock-cap ratio	3,941	1.127	0.616	0.003	0.486	1.165	1.423	1.923
ln(Sales)	3,941	10.675	1.394	5.572	9.691	10.510	11.526	16.455
ROA	3,941	0.042	0.044	-0.466	0.017	0.036	0.059	0.285
ROA volatility	3,941	0.019	0.016	0.002	0.009	0.015	0.024	0.237
Cash ratio	3,941	0.131	0.085	0.011	0.070	0.113	0.170	0.745
Sales growth	3,941	0.070	0.191	-0.390	-0.015	0.042	0.111	3.955
Tangible asset ratio	3,941	0.321	0.166	0.002	0.198	0.307	0.417	0.824
Leverage ratio	3,941	0.323	0.203	0.000	0.158	0.307	0.462	0.932
Main bank dummy	3,941	0.278	0.448	0.000	0.000	0.000	1.000	1.000

Table 3: Correlation coefficients for the variables used in the main estimations (Tables 3–5). Definitions of variables are provided in Table 1.

	Stock decrease_ex	Stock decrease_in	ΔLoan share	ΔROA volatility	ΔR&D expense ratio	ΔSharpe ratio	ΔOther debt ratio	ΔInterest expense ratio	BK Mainstock-cap	ln(Sales)	ROA	ROA volatility	Cash ratio	Sales growth	Tangible asset ratio	Leverage ratio	Main bank dummy
Stock decrease_ex	1.000																
Stock decrease_in	.	1.000															
ΔLoan share	-0.112	-0.195	1.000														
ΔROA volatility	0.045	0.109	-0.020	1.000													
ΔR&D expense ratio	0.015	0.065	-0.034	-0.016	1.000												
ΔSharpe ratio	0.026	-0.005	-0.046	-0.369	-0.021	1.000											
ΔOther debt ratio	-0.056	-0.114	-0.093	-0.073	-0.109	-0.203	1.000										
ΔInterest expense ratio	0.014	0.070	-0.083	0.079	0.037	0.010	-0.154	1.000									
BK Mainstock-cap	0.067	0.351	-0.089	0.042	0.056	0.013	-0.050	0.033	1.000								
ln(Sales)	0.033	0.249	-0.016	0.073	0.058	0.024	-0.195	0.033	0.118	1.000							
ROA	-0.008	0.004	0.039	-0.008	0.175	-0.121	0.079	-0.050	0.056	-0.036	1.000						
ROA volatility	0.064	-0.049	-0.019	-0.304	0.021	0.170	0.098	-0.070	0.010	-0.313	0.119	1.000					
Cash ratio	0.000	-0.005	-0.007	0.004	0.032	-0.088	0.064	0.046	0.055	-0.251	0.252	0.259	1.000				
Sales growth	0.004	-0.002	-0.008	-0.022	0.107	0.011	0.030	-0.014	0.039	-0.028	0.285	0.183	0.036	1.000			
Tangible asset ratio	0.018	-0.029	-0.008	-0.024	-0.036	0.091	-0.069	-0.076	-0.093	-0.048	-0.049	-0.088	-0.368	-0.066	1.000		
Leverage ratio	0.041	0.020	0.015	0.049	-0.015	0.136	-0.404	0.035	-0.041	0.151	-0.350	-0.085	-0.311	-0.052	0.342	1.000	
Main bank dummy	-0.191	0.164	-0.140	-0.012	0.005	0.001	0.007	0.002	0.114	-0.033	-0.027	0.014	-0.015	0.006	0.013	0.023	1.000

Table 4: Estimation results for (1) the first stage of treatment regression (Stock decrease_ex) and (2) two-stage least squares regression (Stock decrease_in) where the dependent variable in the second stage is ΔLoan share. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are shown in parentheses.

	(1)	(2)
Dependent variables	Stock decrease_ex	Stock decrease_in
	Treatment Regression	2SLS
Estimation method	(First stage)	(First stage)
BK Mainstock-cap ratio	0.225***	0.541***
	(6.54)	(16.82)
ln(Sales)	0.044**	0.217***
	(2.33)	(11.09)
ROA	-0.164	-0.361
	(-0.29)	(-0.69)
ROA volatility	7.677***	-0.716
	(5.09)	(-0.51)
Cash ratio	0.138	0.711**
	(0.43)	(2.44)
Sales growth	-0.083	-0.038
	(-0.62)	(-0.45)
Tangible asset ratio	0.488***	0.149
	(2.60)	(0.80)
Leverage ratio	0.185	-0.001
	(1.39)	(-0.01)
Main bank dummy	-0.728***	0.370***
	(-12.57)	(7.39)
Constant	-1.891***	-2.440***
	(-6.81)	(-9.22)
Industry dummies	yes	yes
Observations	3,941	3,020

Table 5: Estimation results for the effect of Stock decrease_ex on lending (column (1)), firm's risk-taking (columns (2)–(4)), and firm's borrowing terms (columns (5)–(6)). For each dependent variable, we chose the estimation method based on the Wald test statistics. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	ΔLoan share	ΔROA volatility	ΔR&D expense ratio	ΔSharpe ratio	ΔOther debt ratio	ΔInterest expense ratio
Estimation method	Treatment Regression	OLS	OLS	Treatment Regression	Treatment Regression	OLS
Stock decrease_ex	-0.070***	0.003***	0.000	-1.956**	-0.043**	0.001
	(-10.71)	(3.83)	(1.10)	(-2.31)	(-2.28)	(1.07)
ln(Sales)	0.000	-0.000	0.000**	0.231***	-0.011***	0.000
	(0.08)	(-1.26)	(2.06)	(4.83)	(-7.61)	(0.98)
ROA	0.069***	0.007	0.027***	-8.318***	-0.214***	-0.040***
	(2.94)	(0.55)	(3.59)	(-5.75)	(-4.73)	(-3.44)
ROA volatility	0.082	-0.442***	-0.014	56.662***	0.706***	-0.181***
	(1.26)	(-11.22)	(-0.68)	(13.08)	(5.47)	(-5.20)
Cash ratio	-0.015	0.012	0.000	-1.270*	-0.160***	0.023***
	(-1.15)	(1.36)	(0.20)	(-1.66)	(-6.45)	(3.29)
Sales growth	-0.007	0.000	0.002*	0.238	0.014	0.002
	(-1.33)	(0.05)	(1.86)	(0.80)	(1.41)	(0.58)
Tangible asset ratio	-0.009	-0.003	-0.000	1.202***	0.030**	-0.010***
	(-1.18)	(-1.09)	(-0.04)	(2.61)	(2.05)	(-2.75)
Leverage ratio	0.017***	0.006**	0.003***	1.188***	-0.302***	0.009***
	(3.20)	(2.31)	(3.44)	(3.69)	(-29.25)	(2.67)
Main bank dummy	-0.029***	0.000	0.000	-0.422**	-0.005	0.000
	(-12.55)	(0.34)	(0.80)	(-2.18)	(-1.00)	(0.35)
Constant	0.004	0.007**	-0.003**	-3.074***	0.165***	-0.009*
	(0.35)	(2.22)	(-2.23)	(-4.70)	(7.86)	(-1.66)
Industry dummies	yes	yes	yes	yes	yes	yes
Observations	3,941	3,884	3,941	3,884	3,941	3,941
R-squared		0.180	0.109			0.040
Log likelihood	4178.120			-11943.780	1267.440	
Wald chi2	239.84***			484.24***	1405.30***	
rho	0.569			0.349	0.167	
Wald test of indep. eqns.	42.96***			5.05**	2.73*	
lambda	0.031			1.139	0.018	

Table 6: Estimation results for the effect of Stock decrease_in on lending (column (1)), firm's risk-taking (columns (2)–(4)), and firm's borrowing terms (columns (5)–(6)). For each dependent variable, we chose the estimation method based on the Durbin test statistics. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	ΔLoan share	ΔROA volatility	ΔR&D expense ratio	ΔSharpe ratio	ΔOther debt ratio	ΔInterest expense ratio
Estimation method	OLS	2SLS	OLS	2SLS	OLS	OLS
Stock decrease_in	-0.006***	-0.001	0.000	0.307	-0.004**	0.001***
	(-5.76)	(-0.88)	(1.20)	(1.62)	(-2.07)	(2.82)
ln(Sales)	-0.001	0.000	0.000**	0.092	-0.012***	0.000
	(-1.37)	(0.85)	(2.18)	(1.26)	(-6.58)	(0.27)
ROA	0.072**	0.026*	0.029***	-10.589***	-0.278***	-0.042***
	(2.49)	(1.87)	(2.68)	(-4.18)	(-4.41)	(-3.03)
ROA volatility	0.017	-0.458***	-0.016	53.817***	0.668***	-0.181***
	(0.20)	(-10.17)	(-0.53)	(6.80)	(3.67)	(-4.55)
Cash ratio	-0.015	-0.007*	0.000	-1.363	-0.151***	0.023***
	(-1.02)	(-1.65)	(0.05)	(-1.39)	(-5.08)	(2.86)
Sales growth	-0.008	0.001	0.002	0.228	0.015	0.002
	(-1.64)	(0.81)	(1.50)	(1.01)	(0.82)	(0.56)
Tangible asset ratio	-0.025***	-0.006***	0.000	1.219**	0.027	-0.008*
	(-3.29)	(-2.78)	(0.19)	(2.32)	(1.42)	(-1.92)
Leverage ratio	0.016***	0.004**	0.002***	0.983***	-0.287***	0.006
	(2.83)	(2.23)	(2.61)	(2.59)	(-22.10)	(1.39)
Main bank dummy	-0.016***	0.000	0.000	-0.178	-0.002	-0.001
	(-8.06)	(0.64)	(0.60)	(-1.23)	(-0.58)	(-0.55)
Constant	0.018*	0.006*	-0.004**	-1.997**	0.169***	-0.005
	(1.69)	(1.65)	(-2.23)	(-2.18)	(6.74)	(-0.81)
Industry dummies	yes	yes	yes	yes	yes	yes
Observations	3,020	2,977	3,020	2,977	3,020	3,020
R-squared	0.070		0.113		0.247	0.036
Underidentification test		240.142***		240.142***		
Weak identification test		221.873***		221.873***		
Durbin test (Robust score chi2(1))		3.19712*		3.12233*		

Table 7: Estimation results of the main-bank subsample and the non-main-bank subsample regarding the effect of Stock decrease_ex on lending (column (1)), firm's risk-taking (columns (2)–(4)), and firm's borrowing terms (columns (5)–(6)). For each dependent variable, we chose the same estimation methods as those used in Table 5. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variables	ΔLoan share		ΔROA volatility		ΔR&D expense ratio		ΔSharpe ratio		ΔOther debt ratio		ΔInterest expense ratio	
Estimation method	Treatment Regression		OLS		OLS		Treatment Regression		Treatment Regression		OLS	
Subsample	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main
Stock decrease_ex	-0.005	-0.068***	0.003*	0.003***	0.001	0.000	0.050	-3.635***	-0.018	-0.030	0.004	0.001
	(-0.34)	(-8.88)	(1.69)	(3.43)	(0.63)	(0.59)	(0.06)	(-10.45)	(-0.54)	(-0.95)	(0.85)	(0.69)
ln(Sales)	-0.004***	0.001	0.000	-0.001*	0.000	0.000**	0.203***	0.279***	-0.012***	-0.011***	0.000	0.000
	(-3.20)	(1.36)	(0.51)	(-1.84)	(0.32)	(2.53)	(2.60)	(4.79)	(-4.32)	(-6.09)	(0.51)	(0.85)
ROA	0.037	0.084***	-0.017	0.023*	0.038**	0.021***	-6.340***	-9.984***	-0.281***	-0.162***	-0.035*	-0.042***
	(0.91)	(2.99)	(-0.65)	(1.78)	(2.33)	(4.46)	(-2.73)	(-5.06)	(-3.36)	(-3.01)	(-1.79)	(-3.05)
ROA volatility	-0.048	0.078	-0.379***	-0.480***	-0.050	0.005	41.766***	67.215***	0.935***	0.573***	-0.210***	-0.162***
	(-0.43)	(1.00)	(-6.39)	(-10.88)	(-1.09)	(0.41)	(6.54)	(12.75)	(4.04)	(3.38)	(-3.79)	(-3.85)
Cash ratio	-0.003	-0.027*	0.008	0.013	0.001	0.000	-1.466	-1.476	-0.178***	-0.154***	0.016	0.026***
	(-0.12)	(-1.82)	(0.44)	(1.40)	(0.17)	(0.09)	(-1.12)	(-1.47)	(-3.70)	(-5.34)	(1.30)	(3.07)
Sales growth	-0.002	-0.009	0.001	-0.001	0.001	0.002**	0.092	0.330	0.041***	-0.004	0.005	-0.001
	(-0.22)	(-1.37)	(0.28)	(-0.25)	(0.43)	(2.20)	(0.22)	(0.79)	(2.59)	(-0.35)	(0.78)	(-0.21)
Tangible asset ratio	-0.032**	-0.004	-0.004	-0.002	0.000	0.000	1.619**	1.178**	-0.001	0.038**	-0.013**	-0.008*
	(-2.46)	(-0.48)	(-0.75)	(-0.80)	(0.10)	(0.02)	(2.16)	(1.98)	(-0.02)	(2.18)	(-2.38)	(-1.81)
Leverage ratio	0.047***	0.010	0.000	0.008***	0.002	0.003***	1.194**	1.298***	-0.304***	-0.299***	0.008	0.010**
	(4.71)	(1.63)	(0.03)	(2.91)	(1.26)	(3.34)	(2.08)	(3.13)	(-14.54)	(-24.74)	(1.48)	(2.28)
Constant	0.024	-0.009	0.005	0.008**	-0.001	-0.004**	-3.035***	-3.476***	0.182***	0.158***	-0.004	-0.011
	(1.23)	(-0.72)	(0.76)	(2.30)	(-0.30)	(-2.54)	(-2.76)	(-4.10)	(4.54)	(6.26)	(-0.45)	(-1.64)
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	1,094	2,847	1,075	2,809	1,094	2,847	1,075	2,809	1,094	2,847	1,094	2,847
R-squared			0.159	0.200	0.146	0.103					0.071	0.037
Log likelihood	1364.2512	2872.5502					-2988.5466	-8886.9348	565.25589	754.05291		
Wald chi2	64.4***	121.94***					185.26***	397.03***	427.1***	1032.62***		
rho	-0.1492403	0.5693536					-0.076284	0.613558	0.162339	0.081789		
Wald test of indep. eqns. (rho = 0)	1.24	42.96***					0.24	111.32***	0.97	0.21		
lambda	-0.0077418	0.031265					-0.2218778	2.2282	0.0174897	0.0085836		

Table 8: Estimation results for the main-bank subsample and the non-main-bank subsample regarding the effect of Stock decrease_in on lending (column (1)), firm's risk-taking (columns (2)–(4)), and firm's borrowing terms (columns (5)–(6)). For each dependent variable, we chose the same estimation methods as those used in Table 4. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variables	ΔLoan share		ΔROA volatility		ΔR&D expense ratio		ΔSharpe ratio		ΔOther debt ratio		ΔInterest expense ratio	
Estimation method	OLS		2SLS		OLS		2SLS		OLS		OLS	
Subsample	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main
Stock decrease_in	-0.009***	-0.004***	-0.001	-0.001	0.000	0.000	0.901**	0.117	-0.003	-0.004*	0.001	0.002**
	(-6.34)	(-3.17)	(-0.53)	(-0.62)	(0.27)	(1.53)	(2.42)	(0.53)	(-1.16)	(-1.65)	(1.62)	(2.22)
ln(Sales)	-0.002	-0.001	0.000	0.000	0.000	0.000***	-0.128	0.142*	-0.011***	-0.012***	-0.000	0.000
	(-1.62)	(-0.92)	(0.66)	(0.41)	(0.24)	(2.64)	(-0.84)	(1.69)	(-3.23)	(-5.55)	(-0.42)	(0.36)
ROA	0.039	0.097***	0.001	0.047***	0.039**	0.019***	-5.912	-13.966***	-0.357***	-0.209**	-0.028	-0.046**
	(0.88)	(2.87)	(0.03)	(3.73)	(2.19)	(2.80)	(-1.55)	(-5.94)	(-3.87)	(-2.48)	(-1.46)	(-2.49)
ROA volatility	0.054	-0.022	-0.406***	-0.499***	-0.059	0.015	45.436***	60.271***	0.722***	0.654***	-0.149***	-0.197***
	(0.43)	(-0.22)	(-5.96)	(-10.71)	(-1.10)	(0.77)	(3.91)	(6.61)	(2.69)	(2.75)	(-2.94)	(-3.54)
Cash ratio	-0.011	-0.022	-0.010	-0.005	-0.000	-0.000	-0.828	-1.387	-0.160***	-0.137***	0.010	0.029***
	(-0.41)	(-1.19)	(-1.34)	(-1.05)	(-0.04)	(-0.10)	(-0.54)	(-1.09)	(-3.05)	(-3.81)	(0.94)	(2.68)
Sales growth	-0.003	-0.011*	0.002	0.001	0.001	0.002	-0.094	0.544**	0.049*	-0.010	0.007	-0.002
	(-0.42)	(-1.89)	(0.55)	(0.42)	(0.64)	(1.64)	(-0.29)	(2.00)	(1.77)	(-0.50)	(1.01)	(-0.55)
Tangible asset ratio	-0.036***	-0.022**	-0.011**	-0.004	0.001	-0.000	1.665**	1.009	0.002	0.042*	-0.010*	-0.007
	(-2.77)	(-2.33)	(-2.45)	(-1.63)	(0.40)	(-0.04)	(1.97)	(1.50)	(0.07)	(1.82)	(-1.89)	(-1.28)
Leverage ratio	0.045***	0.004	0.004	0.004**	0.002	0.002**	1.349**	0.780*	-0.310***	-0.275***	0.009*	0.005
	(4.34)	(0.66)	(1.49)	(2.16)	(1.26)	(2.32)	(2.08)	(1.68)	(-13.77)	(-16.91)	(1.72)	(0.86)
Constant	0.017	0.015	0.007	0.006	-0.001	-0.005**	-0.686	-2.281**	0.177***	0.156***	-0.001	-0.006
	(0.93)	(1.15)	(1.05)	(1.36)	(-0.27)	(-2.44)	(-0.44)	(-2.03)	(3.93)	(5.17)	(-0.08)	(-0.79)
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	981	2,039	964	2,013	981	2,039	964	2,013	981	2,039	981	2,039
R-squared	0.104	0.032			0.161	0.106			0.286	0.238	0.053	0.042
Underidentification test (Kleibergen-Paap rk LM statistic)			43.058***	230.38***			43.058***	230.381***				
Weak identification test (Kleibergen-Paap rk Wald F statistic)			48.046***	275.305***			48.046***	275.305***				
Durbin test (Robust score chi2(1))			0.888354	2.60869			5.90007**	1.17053				

Appendix

Table A1: Estimation results for the treatment regressions when we use Stock decrease_ex. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

Dependent variables	ΔLoan share		ΔROA volatility		ΔR&D expense ratio		ΔSharpe ratio		ΔOther debt ratio		ΔInterest expense ratio	
	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage
Stock decrease_ex		-0.070***		0.004**		0.001		-1.956**		-0.043**		0.001
		(-10.71)		(2.07)		(1.03)		(-2.31)		(-2.28)		(0.29)
BK Mainstock-cap ratio	0.225***		0.209***		0.220***		0.195***		0.219***		0.218***	
	(6.54)		(5.38)		(5.75)		(4.98)		(5.75)		(5.68)	
ln(Sales)	0.044**	0.000	0.064***	-0.000	0.061***	0.000**	0.067***	0.231***	0.062***	-0.011***	0.062***	0.000
	(2.33)	(0.08)	(3.34)	(-1.54)	(3.24)	(2.04)	(3.50)	(4.83)	(3.30)	(-7.61)	(3.27)	(0.98)
ROA	-0.164	0.069***	0.046	0.007	-0.140	0.027***	-0.129	-8.318***	-0.229	-0.214***	-0.183	-0.040***
	(-0.29)	(2.94)	(0.07)	(1.07)	(-0.24)	(9.28)	(-0.20)	(-5.75)	(-0.39)	(-4.73)	(-0.31)	(-3.18)
ROA volatility	7.677***	0.082	8.024***	-0.443***	7.802***	-0.016*	8.887***	56.662***	8.043***	0.706***	7.984***	-0.180***
	(5.09)	(1.26)	(5.01)	(-23.83)	(4.98)	(-1.92)	(5.27)	(13.08)	(5.22)	(5.47)	(5.17)	(-5.13)
Cash ratio	0.138	-0.015	0.176	0.012***	0.184	0.000	0.138	-1.270*	0.186	-0.160***	0.174	0.023***
	(0.43)	(-1.15)	(0.53)	(3.31)	(0.56)	(0.14)	(0.42)	(-1.66)	(0.57)	(-6.45)	(0.53)	(3.35)
Sales growth	-0.083	-0.007	-0.105	0.000	-0.081	0.002***	-0.112	0.238	-0.100	0.014	-0.085	0.002
	(-0.62)	(-1.33)	(-0.75)	(0.07)	(-0.60)	(2.75)	(-0.79)	(0.80)	(-0.71)	(1.41)	(-0.61)	(0.65)
Tangible asset ratio	0.488***	-0.009	0.513***	-0.003	0.528***	-0.000	0.499***	1.202***	0.529***	0.030**	0.523***	-0.010**
	(2.60)	(-1.18)	(2.64)	(-1.45)	(2.75)	(-0.18)	(2.59)	(2.61)	(2.76)	(2.05)	(2.73)	(-2.36)
Leverage ratio	0.185	0.017***	0.158	0.006***	0.143	0.003***	0.170	1.188***	0.142	-0.302***	0.139	0.009***
	(1.39)	(3.20)	(1.14)	(3.76)	(1.05)	(3.75)	(1.23)	(3.69)	(1.04)	(-29.25)	(1.02)	(3.15)
Main bank dummy	-0.728***	-0.029***	-0.757***	0.000	-0.756***	0.000	-0.733***	-0.422**	-0.760***	-0.005	-0.755***	0.000
	(-12.57)	(-12.55)	(-12.70)	(0.51)	(-12.80)	(1.16)	(-11.74)	(-2.18)	(-12.85)	(-1.00)	(-12.79)	(0.25)
Constant	-1.891***	0.004	-2.175***	0.007**	-2.158***	-0.003**	-2.208***	-3.074***	-2.162***	0.165***	-2.156***	-0.009
	(-6.81)	(0.35)	(-7.66)	(2.44)	(-7.66)	(-2.19)	(-7.83)	(-4.70)	(-7.69)	(7.86)	(-7.66)	(-1.46)
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	3,941	3,941	3,884	3,884	3,941	3,941	3,884	3,884	3,941	3,941	3,941	3,941
Log likelihood		4178.120		8720.289		12013.052		-11943.780		1267.440		6242.873
Wald chi2		239.84***		836.78***		480.28***		484.24***		1405.30***		162.00***
rho		0.569		-0.027		-0.089		0.349		0.167		0.006
Wald test of indep. eqns. (rho = 0)		42.96***		0.21		0.66		5.05**		2.73*		0.01
lambda		0.031		0.000		0.001		1.139		0.018		0.000

Table A2: Estimation results for the OLS regressions when we use Stock decrease_ex. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

Dependent variables	ΔLoan share	ΔROA volatility	ΔR&D expense ratio	ΔSharpe ratio	ΔOther debt ratio	ΔInterest expense ratio
Stock decrease_ex	-0.017***	0.003***	0.000	-0.025	-0.012***	0.001
	(-8.35)	(3.83)	(1.10)	(-0.20)	(-2.93)	(1.07)
ln(Sales)	-0.001*	-0.000	0.000**	0.189***	-0.012***	0.000
	(-1.75)	(-1.26)	(2.06)	(4.33)	(-7.88)	(0.98)
ROA	0.071***	0.007	0.027***	-8.399***	-0.213***	-0.040***
	(2.82)	(0.55)	(3.59)	(-4.44)	(-3.94)	(-3.44)
ROA volatility	-0.049	-0.442***	-0.014	52.020***	0.632***	-0.181***
	(-0.70)	(-11.22)	(-0.68)	(8.74)	(4.05)	(-5.20)
Cash ratio	-0.018	0.012	0.000	-1.392*	-0.162***	0.023***
	(-1.46)	(1.36)	(0.20)	(-1.69)	(-6.45)	(3.29)
Sales growth	-0.006	0.000	0.002*	0.289	0.014	0.002
	(-1.28)	(0.05)	(1.86)	(1.41)	(0.89)	(0.58)
Tangible asset ratio	-0.016**	-0.003	-0.000	0.945**	0.026	-0.010***
	(-2.35)	(-1.09)	(-0.04)	(2.09)	(1.54)	(-2.75)
Leverage ratio	0.015***	0.006**	0.003***	1.096***	-0.303***	0.009***
	(3.01)	(2.31)	(3.44)	(3.54)	(-27.23)	(2.67)
Main bank dummy	-0.019***	0.000	0.000	-0.072	0.000	0.000
	(-10.11)	(0.34)	(0.80)	(-0.64)	(0.10)	(0.35)
Constant	0.011	0.007**	-0.003**	-2.795***	0.169***	-0.009*
	(1.24)	(2.22)	(-2.23)	(-4.21)	(7.86)	(-1.66)
Industry dummies	yes	yes	yes	yes	yes	yes
Observations	3,941	3,884	3,941	3,884	3,941	3,941
R-squared	0.053	0.180	0.109	0.116	0.266	0.040

Table A3: Estimation results for the 2SLS regressions when we use Stock decrease_in. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

Dependent variables	ΔLoan share		ΔROA volatility		ΔR&D expense ratio		ΔSharpe ratio		ΔOther debt ratio		ΔInterest expense ratio	
	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage
Stock decrease_in		-0.009***		-0.001		0.000		0.307		-0.010*		0.002
		(-3.78)		(-0.88)		(1.30)		(1.62)		(-1.76)		(1.36)
BK Mainstock-cap ratio	0.541***		0.539***		0.541***		0.539***		0.541***		0.541***	
	(16.82)		(16.69)		(16.82)		(16.69)		(16.82)		(16.82)	
ln(Sales)	0.217***	-0.000	0.220***	0.000	0.217***	0.000	0.220***	0.092	0.217***	-0.010***	0.217***	-0.000
	(11.09)	(-0.19)	(11.11)	(0.85)	(11.09)	(1.17)	(11.11)	(1.26)	(11.09)	(-4.36)	(11.09)	(-0.10)
ROA	-0.361	0.072**	-0.493	0.026*	-0.361	0.029***	-0.493	-10.589***	-0.361	-0.278***	-0.361	-0.042***
	(-0.69)	(2.49)	(-0.92)	(1.87)	(-0.69)	(2.69)	(-0.92)	(-4.18)	(-0.69)	(-4.44)	(-0.69)	(-3.05)
ROA volatility	-0.716	0.013	-0.936	-0.458***	-0.716	-0.015	-0.936	53.817***	-0.716	0.660***	-0.716	-0.181***
	(-0.51)	(0.16)	(-0.67)	(-10.17)	(-0.51)	(-0.52)	(-0.67)	(6.80)	(-0.51)	(3.65)	(-0.51)	(-4.59)
Cash ratio	0.711**	-0.012	0.701**	-0.007*	0.711**	-0.000	0.701**	-1.363	0.711**	-0.144***	0.711**	0.022***
	(2.44)	(-0.81)	(2.38)	(-1.65)	(2.44)	(-0.14)	(2.38)	(-1.39)	(2.44)	(-4.82)	(2.44)	(2.78)
Sales growth	-0.038	-0.008*	-0.037	0.001	-0.038	0.002	-0.037	0.228	-0.038	0.015	-0.038	0.002
	(-0.45)	(-1.65)	(-0.44)	(0.81)	(-0.45)	(1.51)	(-0.44)	(1.01)	(-0.45)	(0.83)	(-0.45)	(0.56)
Tangible asset ratio	0.149	-0.025***	0.168	-0.006***	0.149	0.000	0.168	1.219**	0.149	0.027	0.149	-0.008*
	(0.80)	(-3.31)	(0.89)	(-2.78)	(0.80)	(0.20)	(0.89)	(2.32)	(0.80)	(1.42)	(0.80)	(-1.92)
Leverage ratio	-0.001	0.016***	-0.014	0.004**	-0.001	0.002***	-0.014	0.983***	-0.001	-0.287***	-0.001	0.006
	(-0.01)	(2.84)	(-0.11)	(2.23)	(-0.01)	(2.63)	(-0.11)	(2.59)	(-0.01)	(-22.29)	(-0.01)	(1.41)
Main bank dummy	0.370***	-0.015***	0.380***	0.000	0.370***	-0.000	0.380***	-0.178	0.370***	0.001	0.370***	-0.001
	(7.39)	(-6.27)	(7.52)	(0.64)	(7.39)	(-0.01)	(7.52)	(-1.23)	(7.39)	(0.15)	(7.39)	(-0.68)
Constant	-2.440***	0.010	-2.472***	0.006*	-2.440***	-0.003	-2.472***	-1.997**	-2.440***	0.153***	-2.440***	-0.003
	(-9.22)	(0.85)	(-9.25)	(1.65)	(-9.22)	(-1.54)	(-9.25)	(-2.18)	(-9.22)	(5.33)	(-9.22)	(-0.45)
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	3,020	3,020	2,977	2,977	3,020	3,020	2,977	2,977	3,020	3,020	3,020	3,020
Underidentification test (Kleibergen-Paap rk LM statistic)		243.776***		240.142***		243.776***		240.142***		243.776***		243.776***
Weak identification test (Cragg-Donald Wald F statistic)		228.014***		221.873***		228.014***		221.873***		228.014***		228.014***
Durbin test (Robust score chi2(1))	1.76076	(p = 0.1845)	3.19712	(p = 0.0738)	.989567	(p = 0.3198)	3.12233	(p = 0.0772)	1.41088	(p = 0.2349)	.23686	(p = 0.6265)

Table A4: Estimation results for the OLS regressions when we use Stock decrease_in. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

Dependent variables	ΔLoan share	ΔROA volatility	ΔR&D expense ratio	ΔSharpe ratio	ΔOther debt ratio	ΔInterest expense ratio
Stock decrease_in	-0.006***	0.001***	0.000	-0.012	-0.004**	0.001***
	(-5.76)	(3.26)	(1.20)	(-0.27)	(-2.07)	(2.82)
ln(Sales)	-0.001	-0.000	0.000**	0.177***	-0.012***	0.000
	(-1.37)	(-0.33)	(2.18)	(3.27)	(-6.58)	(0.27)
ROA	0.072**	0.026*	0.029***	-10.605***	-0.278***	-0.042***
	(2.49)	(1.88)	(2.68)	(-4.20)	(-4.41)	(-3.03)
ROA volatility	0.017	-0.456***	-0.016	53.415***	0.668***	-0.181***
	(0.20)	(-10.14)	(-0.53)	(6.75)	(3.67)	(-4.55)
Cash ratio	-0.015	-0.008**	0.000	-1.072	-0.151***	0.023***
	(-1.02)	(-2.00)	(0.05)	(-1.11)	(-5.08)	(2.86)
Sales growth	-0.008	0.001	0.002	0.226	0.015	0.002
	(-1.64)	(0.81)	(1.50)	(1.00)	(0.82)	(0.56)
Tangible asset ratio	-0.025***	-0.006***	0.000	1.212**	0.027	-0.008*
	(-3.29)	(-2.76)	(0.19)	(2.28)	(1.42)	(-1.92)
Leverage ratio	0.016***	0.004**	0.002***	0.979***	-0.287***	0.006
	(2.83)	(2.24)	(2.61)	(2.58)	(-22.10)	(1.39)
Main bank dummy	-0.016***	-0.000	0.000	-0.027	-0.002	-0.001
	(-8.06)	(-0.38)	(0.60)	(-0.22)	(-0.58)	(-0.55)
Constant	0.018*	0.009***	-0.004**	-2.755***	0.169***	-0.005
	(1.69)	(2.87)	(-2.23)	(-3.44)	(6.74)	(-0.81)
Industry dummies	yes	yes	yes	yes	yes	yes
Observations	3,020	2,977	3,020	2,977	3,020	3,020
R-squared	0.070	0.228	0.113	0.127	0.247	0.036

Table A5: Comparison of the second-stage estimation results of the treatment regressions when we use Stock decrease_ex for the main-bank subsample and the non-main-bank subsample. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

Dependent variables	ΔLoan share		ΔROA volatility		ΔR&D expense ratio		ΔSharpe ratio		ΔOther debt ratio		ΔInterest expense ratio	
Subsample	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main
Stock decrease_ex	-0.005	-0.068***	0.008**	0.003	0.000	0.006***	0.050	-3.635***	-0.018	-0.030	0.004	0.042***
	(-0.34)	(-8.88)	(2.11)	(1.62)	(0.21)	(5.47)	(0.06)	(-10.45)	(-0.54)	(-0.95)	(0.89)	(22.01)
ln(Sales)	-0.004***	0.001	0.000	-0.001**	0.000	0.000	0.203***	0.279***	-0.012***	-0.011***	0.000	-0.001
	(-3.20)	(1.36)	(0.34)	(-2.20)	(0.37)	(1.52)	(2.60)	(4.79)	(-4.32)	(-6.09)	(0.54)	(-1.15)
ROA	0.037	0.084***	-0.017	0.023***	0.038***	0.021***	-6.340***	-9.984***	-0.281***	-0.162***	-0.035*	-0.039**
	(0.91)	(2.99)	(-1.40)	(2.71)	(6.64)	(5.83)	(-2.73)	(-5.06)	(-3.36)	(-3.01)	(-1.82)	(-2.06)
ROA volatility	-0.048	0.078	-0.387***	-0.482***	-0.050***	-0.011	41.766***	67.215***	0.935***	0.573***	-0.210***	-0.280***
	(-0.43)	(1.00)	(-11.51)	(-21.25)	(-3.15)	(-1.05)	(6.54)	(12.75)	(4.04)	(3.38)	(-4.08)	(-5.58)
Cash ratio	-0.003	-0.027*	0.006	0.013***	0.001	0.000	-1.466	-1.476	-0.178***	-0.154***	0.016	0.027***
	(-0.12)	(-1.82)	(0.92)	(3.15)	(0.17)	(0.23)	(-1.12)	(-1.47)	(-3.70)	(-5.34)	(1.46)	(2.71)
Sales growth	-0.002	-0.009	0.001	-0.000	0.001	0.002***	0.092	0.330	0.041***	-0.004	0.005	0.000
	(-0.22)	(-1.37)	(0.36)	(-0.27)	(0.62)	(2.99)	(0.22)	(0.79)	(2.59)	(-0.35)	(1.44)	(0.06)
Tangible asset ratio	-0.032**	-0.004	-0.005	-0.003	0.000	-0.001	1.619**	1.178**	-0.001	0.038**	-0.013**	-0.014**
	(-2.46)	(-0.48)	(-1.22)	(-0.99)	(0.11)	(-0.64)	(2.16)	(1.98)	(-0.02)	(2.18)	(-2.09)	(-2.42)
Leverage ratio	0.047***	0.010	0.001	0.008***	0.002	0.002**	1.194**	1.298***	-0.304***	-0.299***	0.008	0.006
	(4.71)	(1.63)	(0.19)	(4.63)	(1.29)	(2.53)	(2.08)	(3.13)	(-14.54)	(-24.74)	(1.62)	(1.48)
Constant	0.024	-0.009	0.006	0.008**	-0.001	-0.003*	-3.035***	-3.476***	0.182***	0.158***	-0.004	-0.001
	(1.23)	(-0.72)	(1.05)	(2.33)	(-0.33)	(-1.92)	(-2.76)	(-4.10)	(4.54)	(6.26)	(-0.41)	(-0.15)
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	1,094	2,847	1,075	2,809	1,094	2,847	1,075	2,809	1,094	2,847	1,094	2,847
Log likelihood	1364.2512	2872.5502	2643.7181	6131.2308	3496.4433	8574.9646	-2988.5466	-8886.9348	565.25589	754.05291	2184.9363	4219.4278
Wald chi2	64.4***	121.94***	202.23***	687.43***	185.86***	317.00***	185.26***	397.03***	427.1***	1032.62***	82.14***	566.9***
rho	-0.1492403	0.5693536	-0.1658235	-0.025928	0.0113024	-0.487751	-0.076284	0.613558	0.162339	0.081789	-0.0001182	-0.7038222
Wald test of indep. eqns. (rho = 0)	1.24	42.96***	1.83	0.12	0.01	27.24***	0.24	111.32***	0.97	0.21	0	581.34***
lambda	-0.0077418	0.031265	-0.0025681	-0.0003993	0.0000832	-0.003508	-0.2218778	2.2282	0.0174897	0.0085836	-2.88E-06	-0.0257305

Table A6: Comparison of the estimation results of the OLS regressions when we use Stock decrease_ex for the main-bank subsample and the non-main-bank subsample. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

Dependent variables	ΔLoan share		ΔROA volatility		ΔR&D expense ratio		ΔSharpe ratio		ΔOther debt ratio		ΔInterest expense ratio	
Subsample	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main
Stock decrease_ex	-0.019***	-0.016***	0.003*	0.003***	0.001	0.000	-0.357	0.058	0.014	-0.016***	0.004	0.001
	(-3.18)	(-7.65)	(1.69)	(3.43)	(0.63)	(0.59)	(-1.10)	(0.42)	(1.17)	(-3.54)	(0.85)	(0.69)
ln(Sales)	-0.004***	-0.000	0.000	-0.001*	0.000	0.000**	0.209***	0.183***	-0.013***	-0.012***	0.000	0.000
	(-3.16)	(-0.25)	(0.51)	(-1.84)	(0.32)	(2.53)	(2.61)	(3.50)	(-4.26)	(-6.61)	(0.51)	(0.85)
ROA	0.036	0.088***	-0.017	0.023*	0.038**	0.021***	-6.344**	-10.156***	-0.280***	-0.161**	-0.035*	-0.042***
	(0.80)	(3.20)	(-0.65)	(1.78)	(2.33)	(4.46)	(-1.99)	(-5.38)	(-3.11)	(-2.40)	(-1.79)	(-3.05)
ROA volatility	-0.026	-0.072	-0.379***	-0.480***	-0.050	0.005	42.487***	57.256***	0.886***	0.532***	-0.210***	-0.162***
	(-0.22)	(-0.88)	(-6.39)	(-10.88)	(-1.09)	(0.41)	(4.70)	(8.01)	(3.37)	(2.81)	(-3.79)	(-3.85)
Cash ratio	0.002	-0.026*	0.008	0.013	0.001	0.000	-1.337	-1.366	-0.188***	-0.153***	0.016	0.026***
	(0.07)	(-1.75)	(0.44)	(1.40)	(0.17)	(0.09)	(-1.04)	(-1.32)	(-3.95)	(-5.25)	(1.30)	(3.07)
Sales growth	-0.002	-0.008	0.001	-0.001	0.001	0.002**	0.090	0.432*	0.041	-0.004	0.005	-0.001
	(-0.25)	(-1.44)	(0.28)	(-0.25)	(0.43)	(2.20)	(0.28)	(1.83)	(1.63)	(-0.22)	(0.78)	(-0.21)
Tangible asset ratio	-0.030**	-0.012	-0.004	-0.002	0.000	0.000	1.676**	0.659	-0.005	0.036*	-0.013**	-0.008*
	(-2.32)	(-1.48)	(-0.75)	(-0.80)	(0.10)	(0.02)	(2.15)	(1.21)	(-0.16)	(1.83)	(-2.38)	(-1.81)
Leverage ratio	0.046***	0.006	0.000	0.008***	0.002	0.003***	1.154**	0.946***	-0.301***	-0.300***	0.008	0.010**
	(4.56)	(1.02)	(0.03)	(2.91)	(1.26)	(3.34)	(1.99)	(2.61)	(-13.76)	(-22.87)	(1.48)	(2.28)
Constant	0.021	0.002	0.005	0.008**	-0.001	-0.004**	-3.119***	-2.667***	0.187***	0.161***	-0.004	-0.011
	(1.19)	(0.23)	(0.76)	(2.30)	(-0.30)	(-2.54)	(-2.86)	(-3.25)	(4.44)	(6.44)	(-0.45)	(-1.64)
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	1,094	2,847	1,075	2,809	1,094	2,847	1,075	2,809	1,094	2,847	1,094	2,847
R-squared	0.066	0.038	0.159	0.200	0.146	0.103	0.148	0.114	0.283	0.269	0.071	0.037

Table A7: Comparison of the second-stage estimation results of the 2SLS regressions when we use Stock decrease_in for the main-bank subsample and the non-main-bank subsample. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

Dependent variables	ΔLoan share		ΔROA volatility		ΔR&D expense ratio		ΔSharpe ratio		ΔOther debt ratio		ΔInterest expense ratio	
Subsample	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main
Stock decrease_in	0.008	-0.015***	-0.001	-0.001	0.000	0.000	0.901**	0.117	-0.024*	-0.007	-0.001	0.003
	(1.41)	(-5.04)	(-0.53)	(-0.62)	(0.58)	(1.10)	(2.42)	(0.53)	(-1.83)	(-1.10)	(-0.61)	(1.57)
ln(Sales)	-0.008***	0.002	0.000	0.000	-0.000	0.000**	-0.128	0.142*	-0.004	-0.012***	0.001	-0.000
	(-3.17)	(1.49)	(0.66)	(0.41)	(-0.18)	(1.98)	(-0.84)	(1.69)	(-0.65)	(-4.50)	(0.55)	(-0.15)
ROA	0.051	0.104***	0.001	0.047***	0.039**	0.019***	-5.912	-13.966***	-0.373***	-0.207**	-0.030	-0.046**
	(1.12)	(3.06)	(0.03)	(3.73)	(2.23)	(2.80)	(-1.55)	(-5.94)	(-4.04)	(-2.48)	(-1.60)	(-2.56)
ROA volatility	0.069	-0.039	-0.406***	-0.499***	-0.059	0.016	45.436***	60.271***	0.702***	0.648***	-0.151***	-0.194***
	(0.55)	(-0.38)	(-5.96)	(-10.71)	(-1.12)	(0.80)	(3.91)	(6.61)	(2.71)	(2.75)	(-3.06)	(-3.58)
Cash ratio	-0.008	-0.006	-0.010	-0.005	-0.000	-0.001	-0.828	-1.387	-0.163***	-0.132***	0.009	0.027**
	(-0.29)	(-0.34)	(-1.34)	(-1.05)	(-0.02)	(-0.27)	(-0.54)	(-1.09)	(-3.08)	(-3.61)	(0.91)	(2.48)
Sales growth	-0.002	-0.011*	0.002	0.001	0.001	0.002*	-0.094	0.544**	0.047*	-0.010	0.007	-0.002
	(-0.29)	(-1.88)	(0.55)	(0.42)	(0.66)	(1.65)	(-0.29)	(2.00)	(1.77)	(-0.51)	(1.01)	(-0.56)
Tangible asset ratio	-0.032**	-0.021**	-0.011**	-0.004	0.001	-0.000	1.665**	1.009	-0.003	0.043*	-0.010*	-0.007
	(-2.30)	(-2.18)	(-2.45)	(-1.63)	(0.44)	(-0.06)	(1.97)	(1.50)	(-0.08)	(1.85)	(-1.90)	(-1.30)
Leverage ratio	0.047***	0.005	0.004	0.004**	0.002	0.002**	1.349**	0.780*	-0.313***	-0.275***	0.009*	0.004
	(4.42)	(0.73)	(1.49)	(2.16)	(1.32)	(2.32)	(2.08)	(1.68)	(-14.15)	(-17.07)	(1.72)	(0.85)
Constant	0.055**	-0.007	0.007	0.006	-0.000	-0.004**	-0.686	-2.281**	0.128**	0.148***	-0.006	-0.003
	(2.35)	(-0.50)	(1.05)	(1.36)	(-0.00)	(-2.03)	(-0.44)	(-2.03)	(2.22)	(4.56)	(-0.66)	(-0.38)
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	981	2,039	964	2,013	981	2,039	964	2,013	981	2,039	981	2,039
Underidentification test (Kleibergen-Paap rk LM statistic)	44.666***	231.809***	43.058***	230.38***	44.666***	231.809***	43.058***	230.381***	44.666***	231.809***	44.666***	231.809***
Weak identification test (Kleibergen-Paap rk Wald F statistic)	49.924***	276.883***	48.046***	275.305***	49.924***	276.883***	48.046***	275.305***	49.924***	276.883***	49.924***	276.883***
Durbin test (Robust score chi2(1))	10.9374***	11.799***	0.888354	2.60869	0.240014	0.316128	5.90007**	1.17053	2.60476	0.073384	1.13009	0.373375

Table A8: Comparison of the estimation results of the OLS regressions when we use Stock decrease_in for the main-bank subsample and the non-main-bank subsample. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively. Robust t-statistics are in parentheses.

Dependent variables	ΔLoan share		ΔROA volatility		ΔR&D expense ratio		ΔSharpe ratio		ΔOther debt ratio		ΔInterest expense ratio	
Subsample	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main	Main	Non-main
Stock decrease_in	-0.009***	-0.004***	0.001*	0.001***	0.000	0.000	0.088	-0.083	-0.003	-0.004*	0.001	0.002**
	(-6.34)	(-3.17)	(1.72)	(2.70)	(0.27)	(1.53)	(1.18)	(-1.43)	(-1.16)	(-1.65)	(1.62)	(2.22)
ln(Sales)	-0.002	-0.001	-0.000	-0.000	0.000	0.000***	0.140	0.187***	-0.011***	-0.012***	-0.000	0.000
	(-1.62)	(-0.92)	(-0.09)	(-0.45)	(0.24)	(2.64)	(1.53)	(2.78)	(-3.23)	(-5.55)	(-0.42)	(0.36)
ROA	0.039	0.097***	0.002	0.047***	0.039**	0.019***	-6.502*	-13.870***	-0.357***	-0.209**	-0.028	-0.046**
	(0.88)	(2.87)	(0.08)	(3.69)	(2.19)	(2.80)	(-1.74)	(-5.86)	(-3.87)	(-2.48)	(-1.46)	(-2.49)
ROA volatility	0.054	-0.022	-0.405***	-0.497***	-0.059	0.015	44.901***	59.853***	0.722***	0.654***	-0.149***	-0.197***
	(0.43)	(-0.22)	(-5.90)	(-10.60)	(-1.10)	(0.77)	(3.91)	(6.52)	(2.69)	(2.75)	(-2.94)	(-3.54)
Cash ratio	-0.011	-0.022	-0.010	-0.007	-0.000	-0.000	-0.989	-1.102	-0.160***	-0.137***	0.010	0.029***
	(-0.41)	(-1.19)	(-1.27)	(-1.45)	(-0.04)	(-0.10)	(-0.66)	(-0.89)	(-3.05)	(-3.81)	(0.94)	(2.68)
Sales growth	-0.003	-0.011*	0.002	0.001	0.001	0.002	-0.152	0.546**	0.049*	-0.010	0.007	-0.002
	(-0.42)	(-1.89)	(0.57)	(0.41)	(0.64)	(1.64)	(-0.48)	(1.98)	(1.77)	(-0.50)	(1.01)	(-0.55)
Tangible asset ratio	-0.036***	-0.022**	-0.010**	-0.005*	0.001	-0.000	1.506*	1.023	0.002	0.042*	-0.010*	-0.007
	(-2.77)	(-2.33)	(-2.36)	(-1.65)	(0.40)	(-0.04)	(1.80)	(1.51)	(0.07)	(1.82)	(-1.89)	(-1.28)
Leverage ratio	0.045***	0.004	0.004	0.004**	0.002	0.002**	1.212**	0.790*	-0.310***	-0.275***	0.009*	0.005
	(4.34)	(0.66)	(1.55)	(2.12)	(1.26)	(2.32)	(1.98)	(1.69)	(-13.77)	(-16.91)	(1.72)	(0.86)
Constant	0.017	0.015	0.011*	0.008**	-0.001	-0.005**	-2.602**	-2.698***	0.177***	0.156***	-0.001	-0.006
	(0.93)	(1.15)	(1.84)	(2.19)	(-0.27)	(-2.44)	(-2.10)	(-2.62)	(3.93)	(5.17)	(-0.08)	(-0.79)
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	981	2,039	964	2,013	981	2,039	964	2,013	981	2,039	981	2,039
R-squared	0.104	0.032	0.204	0.252	0.161	0.106	0.148	0.131	0.286	0.238	0.053	0.042