Hitotsubashi ICS-FS Working Paper Series

FS-2007-E-001

Single versus Multiple Main Bank Relationships: Evidence from Japan

Takato Hiraki

School of Management, Tokyo University of Science

Akitoshi Ito

Graduate School of International Corporate Strategy,
Hitotsubashi University

Fumiaki Kuroki

Nissay Asset Management Corporation

First version: November 2003

Current version: September 2007

Single versus Multiple Main Bank Relationships: Evidence from Japan

Takato Hiraki[(a)]
Akitoshi Ito[(b)]
and
Fumiaki Kuroki[(c)]

[(a)] School of Management, Tokyo University of Science (hiraki@ms.kuki.tus.ac.jp)
[(b)] Graduate School of International Corporate Strategy, Hitostubashi University (aito@ics.hit-u.ac.jp)
[(c)] Nissay Asset Management Corporation

First Version: November, 2003
Current Version: September 2007

Abstract

In this study, we investigate whether multiple main bank relationships reduce the so-called "hold-up costs" of bank financing (Rajan, 1992) in the context of main-bank system uniquely developed in Japan. We examine the panel data of companies listed on the Tokyo Stock Exchange, the first and second sections, during the period from 1991 to 1998. Our empirical results show that main bank borrowing is negatively related to the profitability of the firm, suggesting the presence of significant hold-up costs. However, they also show that multiple main bank relationships reduce the hold-up costs and potentially lead firms to higher profitability. This hold-up cost reducing effect of multiple main bank relationships is larger for the firms with the higher value of growth opportunities than those with the lower value of growth opportunities.

Key words*:* hold-up costs, multiple bank relationships, main bank, and Japanese firms
JEL classification*:* G32; G34

Correspondence to: Akitoshi Ito

Single versus Multiple Main Bank Relationships: Evidence from Japan

Abstract

In this study, we investigate whether multiple main bank relationships reduce the so-called "hold-up costs" of bank financing (Rajan, 1992) in the context of main-bank system uniquely developed in Japan. We examine the panel data of companies listed on the Tokyo Stock Exchange, the first and second sections, during the period from 1991 to 1998. Our empirical results show that main bank borrowing is negatively related to the profitability of the firm, suggesting the presence of significant hold-up costs. However, they also show that multiple main bank relationships can reduce the hold-up costs and lead firms to higher profitability. This hold-up cost reducing effect of multiple main bank relationships is larger for the firms with the higher value of growth opportunities than those with the lower value of growth opportunities.

Key words*:* hold-up costs, multiple bank relationships, main bank, and Japanese firms
JEL classification*:* G32; G34

I. Introduction

The benefits and costs of bank financing for firms are the focus of recent studies. A number of authors argue that information production and monitoring by banks mitigate information asymmetries and reduce agency costs of debt (see, for example, Diamond 1984 and 1991, Fama 1985, and Berlin and Loeys 1988). Past empirical studies report evidence consistent with such benefits of bank financing (see, for example, James 1987, Lummer and McConnell 1989, and Peterson and Rajan 1994). Bank financing induces certain costs, however. Rajan (1992) and Sharpe (1990) point out that a bank to monitor, monopolizing information, is able to extract rents from its client firms, which in turn leads them to distorted investment decisions. This negative externality on the firm value is called "the hold-up problem" of bank financing (Rajan, 1992).[1] The hold-up problem becomes more serious, the higher (lower) the hold-up costs (profitability) of the firm financing through a bank. Thus, the economic intuition behind the bank hold-up costs is quite simple.

The hold-up problem of bank financing can be mitigated by the alternative financing through public debts. But this may not be a viable solution all the time because of the significant agency costs associated with public debt financing. Still taking advantage of bank financing, an alternative and more practical way of reducing the hold-up costs is the use of several banks as opposed to of a single bank. Rajan (1992) and von Thadden (1994) argue that multiple bank relationships can mitigate the hold-up problem providing some room for competition among lender banks. In the meantime,

[1] Houston and James (1996) provide evidence consistent with significant hold-up costs for U.S. firms that rely on borrowing from a single bank.

maintaining the multiple bank relationship can be costly in a few other respects. First, duplicated monitoring is usually less efficient than monitoring by a single bank. Second, a free rider problem of multiple bank monitoring may result in rather weakened monitoring over the activities of the corporate borrower. Third, restructuring of debt claims with multiple banks is more difficult when fallen into financial distress. Therefore, the overall effectiveness of the multiple bank relationship in mitigating the hold-up problem is largely an empirical matter.

The single vs. multiple bank relationships is not very relevant to Japanese firms which typically depend on several banks including the main bank. After finding significant hold-up costs associated with the main bank relationship, this study investigates whether the multiple main bank relationship reduces the hold-up costs of "main-bank" involvement in public firms in Japan. We use the panel data of the firms listed on the Tokyo Stock Exchange (TSE), both first and second sections included, for the sample period of 1991-1999. Historically, a typical Japanese company has maintained a special tie with its main bank (Aoki, Patrick and Sheard, 1994). Following past studies (Kang and Shivdasani, 1997, and Morck, Nakamura and Shivdasani, 2000 among others), the main bank in this study is defined as the largest creditor to the firm, usually, among the several banks. However, this does not necessarily preclude the possibility that the number of largest creditors, i.e., main banks, can be more than one. It is very odd to find that most past empirical studies (see, for example, Hoshi, Kashyap and Sharfstein, 1990, Kaplan and Minton, 1994, Kang and Shivdasani, 1995 and Morck and Nakamura, 1999) do not pay much attention to this (multiple main bank) possibility or

they even implicitly assume that the firm has (to have) a single main bank.[2,3] Our data set actually shows that about 9.4 % of the firms with bank loans have multiple main banks based on our definition. All firms in our sample are classified into either the group with the single main bank or that of the multiple main bank relationship without much concerned with the qualitative difference between the real main bank, if it exists, and the sub-main bank(s). We subsequently confirm that this sub-sampling of the entire firms is relevant by showing higher profitability for the firms with multiple main banks than for those with a single main bank. We interpret this result as attributable to the significantly mitigated hold-up problem among the firms in the former group.

The relationship between a Japanese firm and its main bank(s) provides us with a unique experimental setting. The "hold-up costs" of bank financing proposed by Rajan (1992) can be more rigorously tested in the context of the Japanese main-bank system where a monitoring function is explicitly given to the main bank (Aoki, 1994). In that system, management interference as a part of main-bank monitoring is extremely costly for the bank because it usually involves a financial rescue. Because of this, the main bank has to extract the rent from the client firm for the system to be sustainable in the long run. Thus, in this study our main concern is whether added competition in monitoring can affect the overall hold-up costs. In other words, our concern is not with the number of banking relationships but with the number of main bank relationships.

---

[2] For example, both of the popular quarterly investment guidebooks published by *Toyo-keizai* and *Nikkei* disallow each firm to have multiple main banks by discretionally choosing one out of multiple main bank candidates with the same largest amount of loans.

[3] See Horiuchi (1991) for institutional details about multiple main banks.

It is well know the standard main bank relationship of the firms is based on a long-time implicit contract, thus it is quite stable. This is also confirmed by the data for our sample.[4] This general characteristic applies to the multiple main banks relationship, too. Given the stability of the main bank relationship, especially, of the multiple main bank relationship, the potentially existing endogeneity problem might not be an important issue in this study. Profitability or some other unknown factors might have initially caused the firm to shift its single main bank relationship to the multiple main bank relationship, but once established, the multiple main bank relationship becomes a stable system of such a firm. Using the data with very stable banking relationship we find that the multiple main bank relationship is positively related the reduction of the hold-up costs associated with a main bank tie. We do not discuss the reason why a majority of the sample firms knowingly and continuously rely on the single main bank policy, which is beyond the scope of this paper.

Past empirical studies provide mixed evidence about the effectiveness of multiple banks in reducing the hold-up costs. Houston and James (1996) report evidence that multiple bank relationships reduce the hold-up costs for large U.S. firms. In contrast, Degryse and Ongena (2001) show that multiple bank relationships reduce the profitability of Norwegian firms as borrowers from bank(s). The results of Cole (1998) indicate that multiple sources of creditors are likely to reduce the probability of obtaining additional credit for small U.S. firms.

[4] Among the firms listed on the TSE in fiscal year 1991 which had a single main bank, only 8.9 percent of the firms changed their largest lender bank over the four-year course through fiscal year 1995, implying that a little more than two out of the one hundred firms change their main bank(s) per year. Out of this rare change of main banks, the occurrence of changes between the single and the multiple main bank relationship is further reduced to almost nil.

Turning to the case of Japanese bank-firm relationships, many authors show that the main bank plays an important monitoring function and the firm's special tie with the main bank reduces information asymmetries (see Aoki, Patrick and Sheard, 1991, Kaplan and Minton, 1994, Kang and Shivdasani, 1995 and Morck and Nakamura, 1999 among others). However, more recent studies (Weinstein and Yafeh, 1998, Pinkowitz and Williamson, 2001 and Hiraki et al., 2003) suggest that the hold-up costs are also significant for Japanese companies that maintain a tie with the main bank. Weinstein and Yafeh (1998) find that Japanese companies with a main bank tie tend to exhibit low profitability and low growth. Hiraki et al. (2003) also report that main bank borrowing is negatively related to firm value. Finally, Pinkowitz and Williamson (2001) show that Japanese firms with a main bank tie tend to hold the excessive amount of cash. Thus, whether the multiple main bank relationship reduces the hold-up costs of Japanese firms is of academic interest as well as of practical importance.

Our major findings are as follows: first, main bank borrowing is significantly and negatively related to the profitability of the firm, which suggests the presence of hold-up costs. Second, multiple main bank relationships reduce the hold-up costs and lead the firms with this feature to higher profitability. This mitigating effect of multiple main bank relationships on the hold-up problem is robust irrespective of the firm's access to the public debt market and the firm size. Third, the mitigating effect of multiple main bank relationships on the hold-up problem is larger for firms with the higher value of growth opportunities than those with the lower value of growth opportunities. Finally, the correction on possibly existing selection biases does not

qualitatively change our main results.

The rest of this paper is organized as follows. The next section describes our dataset and variables of interest. Section III reports our empirical results. Section IV concludes the study.

II. Data

The dataset used in this study is drawn from various sources: financial statement and stock price data of individual companies are from Nikkei Needs Database; data on bank loans are from Toyo Keizai and Nikkei Needs Database. Our initial sample of characteristic variables on a fiscal year basis of all firms listed on the first and second sections of the Tokyo Stock Exchange (TSE) for the sample period from 1991 to 1998 are extracted from this dataset.[5]

From the initial sample of all listed public firms on the TSE, we exclude firms in the financial services industry because the main bank relationship is irrelevant for this group of firms. We also exclude firms operating in the regulated industries (telecommunication, electricity and gas utilities) because important variables such as return on assets, leverage and main bank borrowing are likely to be influenced by regulatory factors rather than by market forces. For the most part of subsequent analysis, we focus only on firms that have bank loans. While excluding firms without

[5] In Japan, a fiscal year typically starts in April and ends in March next year. For example, the fiscal year 1991 corresponds to the year from April 1, 1991 to March 31, 1992. We use this expression throughout the paper.

bank loans from each year's sample can be subject to selection biases, correcting possible selection biases produces materially no difference in results.[6] Therefore, we only document the results based on the sample of firms with bank loans with one typical result of the robustness checks to these biases.

For each firm in the sample, we formally define the main bank as the largest, in terms of credit providing, of all creditor banks. If the largest creditor bank is singly identified, we classify the firm as having a single main bank. If the number of the largest creditor banks is more than one, the firm is classified as having multiple main banks. We capture the effect of multiple main bank relationships on the hold-up costs by regressing the profitability of the firm on the variable indicating the existence of multiple main bank relationships and several control variables of the same firm. The economic rational for this is simple: if the multiple main bank relationship reduces the hold-up costs, it then should increase the firm's profitability or at least partially offset the negative impact of the hold-up costs.

We use return on assets (denoted by ROA) as the dependent variable. The numerator of ROA corresponds to earnings before interest and tax (EBIT), and the denominator to the sum of the market value of equity and the book value of total liabilities. In order to capture the impact of multiple main bank relationships, we use a dummy variable (denoted by MULTIB) which is equal to one if the firm has multiple main banks and

[6] First, we run the Probit regression that determines whether the firm obtains bank loans. Second, in a subsequent regression based on the sample of firms with bank loans, we include estimates of the inverse Mill ratio obtained from the Probit regression among independent variables to take into account selection biases. This is Heckman's (1979) proposed procedure. See Greene (2000, p. 926) for the details of the procedure.

zero otherwise. We use the main bank borrowing ratio (MAIN_BORD) defined as the ratio of the total main bank loans to the total liabilities to measure the strength of firm's tie with the main bank(s**).** We also include an interaction term between the multiple main bank dummy and the main bank borrowing ratio in the regression together with other remaining independent variables. The interaction term might capture the changing response of firm's ROA to the main bank borrowing ratio depending on having or not having additional main bank(s).

We use the asset value, leverage, Tobin's q, and a *keiretsu* dummy as control variables. The total asset value of the firm, i.e., firm size, is defined as the market value of equity plus the book value of total liabilities (FVALUE). In the actual regression, however, we use the natural log transformed total asset value (denoted by LFVALUE) rather than the original total asset value measure (FVALUE). This variable may capture the economies of scale or market power of the firm, which might be positively related with the firm's ROA. The leverage ratio of the firm (LEVERAGE) is measured by the total liabilities divided by the total assets (FVALUE). If the firm has high leverage, the difficulties with raising additional funds should force it to give up some of the profitable projects. Tobin's q (TOBINQ) is conventionally measured in this study as the ratio of the sum of the market value of equity and the book value of total liabilities to the book value of the total assets. We include this variable to control the regression for a potential impact of the firm's growth opportunities on its profitability. Finally, we include a *keiretsu* dummy variable (BIG6) which is equal to one if the firm belongs to one of the six major *keiretsu* groups and zero otherwise. Hoshi, Kashyap and Sharfstein (1991) show that firms belonging to major *keiretsu* groups are financially less constrained,

which may lead to higher profitability. As already reviewed, other researchers more recently document the opposite result. Finally, we include yearly and industry dummy variables to control the regression for the effects of business cycles and sector demand fluctuations, respectively, on the firm's profitability.

Table 1 shows the descriptive statistics of the variables used in this study. Some of them are not used in the basic regressions but used only for the robustness check of the basic regression results. The overall number of firm years is 10,344 throughout the sample period from 1991 through 1998, all of which meet the condition of having bank loans. According to Table 1, about 90.6 % (9,374 firm years) of the sample firms on average have a single main bank (UNIB), and 9.4 % (970 firm years) of the sample firms have multiple main banks (MULTIB). Among the firms that have multiple main banks, the average number of main bank relationships maintained is 2.4 (not reported in Table 1) with more than 75 % having only two main banks. Table 1 also shows that firms with a single main bank tend to have lower ROA, lower (log of) firm value, higher leverage, lower main bank borrowing ratio, and higher probability of *keiretsu* membership than firms with multiple main banks.

III. Empirical results

We capture the effect of multiple main bank relationships on the hold-up costs by regressing the profitability of the firm on the variable(s) indicating multiple main bank relationships and several control variables. The most basic regression results are

shown in Table 2 with two alternative specifications. Equation (1) includes a multiple main bank dummy variable (MULTIB) which is equal to one if the firm has multiple main banks and zero otherwise. Equation (2), in addition to the multiple main bank dummy, includes the interaction term between the multiple main bank dummy and the main bank borrowing ratio (MULTIB*MAIN_BORD).[7] For subsequent regression analysis, White's (1980) *t* statistics are reported in referring to the statistical significance of the regression coefficients estimated.

Table 2 shows the OLS regression results with and without the interaction term under equation (1) and equation (2), respectively. The result of equation (1) shows that the main bank borrowing ratio (MAIN_BORD) is significantly and negatively related to ROA at the one percent level of statistical significance. This is consistent with the empirical hypothesis that the hold-up costs of main bank relationships decrease the profitability of the firm depending on the strength of its main bank tie.[8] On the other hand, the coefficient estimate of the multiple main bank dummy is significantly positive at the one percent significance level, which is also consistent with the hypothesis that having multiple main bank relationships reduces the hold-up costs. We then allow the sensitivity coefficient of the main bank borrowing ratio to differ between the two groups of firms with and without the multiple main bank relationship. This is done by including the interaction term (MULTIB*MAIN_BORD) in equation (2). The differing sensitivity to the main bank borrowing ratio between the single and the multiple main bank firm

[7] In the current and subsequent regression analysis, we do not report estimates of coefficients corresponding to yearly and industry dummies to save space. These omitted results are available upon request.

[8] A similarly significant result on the hold-up costs is obtained from the regression using the ratio of loans made by the two largest creditor banks to the total liabilities of the firm with a single main bank in stead of the strict main bank loan ratio.

group, captured by the coefficient on (MULTIB*MAIN_BORD), is significantly positive at the one percent level, although the total sensitivity for multiple main bank firms (coefficient on MAIN_BORD + coefficient on MULTIB*MAIN_BORD) is still negative and statistically significant. Notice that the multiple main bank dummy is not statistically significant any more in this regression. The results in Table 2 thus suggest that the multiple main bank relationship reduces the negative effect, in magnitude, of the hold-up costs on the firm's ROA.

We check the robustness of our main results in Table 2 by sub-dividing the entire sample in several ways. First, we divide the entire sample into the group of the firms that have public debts (including straight bonds, convertible bonds, bonds with warrants, and commercial papers) on their liabilities side of the balance sheet and the firms that do not have debt securities outstanding. We use the presence of debt securities outstanding as a proxy for the firm's ability to alternatively raise capital. The firm with this ability might have already reduced the hold-up costs because this alternative debt financing available could have been used by the firm as a bargaining tool in relation to its main bank. Thus, the multiple main bank relationship in reducing the hold-up costs is relatively unimportant in the former but important in the latter group of firms. However, it is said that the bond issuance in Japan is often captured by the firm's main bank or its investment banking subsidiary as a lead manager in bond underwriting. Thus, the effect of multiple main bank relationships may be still important, under this conjecture, for the firms with the access to public debt markets. Second, we construct two equally divided sub-samples based on the firm's size (FVALUE). Information asymmetries tend to be severer for smaller firms than for larger firms and therefore, the

benefit of more concentrated (i.e., single main bank) financing may outweigh the cost of such financing for the smaller firms. Thus, the effectiveness in hold-up cost reducing of multiple main banks may be limited to the larger firms in availability. Third, we also equally sub-divide the entire sample by the value of growth opportunities faced by each firm in terms of Tobin's q. Firms that have the higher value of growth opportunities can be subject to severer hold-up costs (Rajan, 1992). Then, the hold-up cost reducing effect of multiple main bank relationships may be more important for the firms with greater growth opportunities. Table 3 reports the results of these robustness checks.

The columns under equations (1) and (2) in Table 3 show the results for the group of firms with public debts on the liabilities side of their balance sheets. In this sub-sample, the coefficients of the multiple main bank dummy (MULTIB) in equation (1) and its interaction term with the main bank borrowing ratio (MULTIB*MAIN_BORD) in equation (2) remain positive and statistically significant at the five percent and the one percent level, respectively. The columns under equations (3) and (4) show the results for the group of firms that have no public debts outstanding. Among these firms, the coefficient of the multiple main bank dummy is positive and still significant at the five percent level in equation (3), although the positive interaction effect is only significant at the ten percent level in equation (4). The overall results in the first robustness test suggest that the hold-up cost reducing effect of multiple main bank relationships is available regardless of the public debt market access status of the firm even though the effect is slightly weaker for the group of the firms that have no access to the public debt market. The result is more consistent with our second alternative view presented earlier that the main bank extracts the rent even in client

firm's bond issuance by exploiting bond market imperfection and this cost is reduced by adding additional main bank(s).

The columns under equations (5) to (6) in Table 3 show the results for the sub-sample consisting of larger firms. While the coefficient estimate of the multiple main bank dummy is not statistically significant for both specifications, the interaction term included in equation (6) has a significant and positive coefficient at the five percent level. Next, the columns under equations (7) and (8) show the results for the sub-sample consisting of smaller firms. While the positive coefficient estimate of the interaction term in equation (8) is only significant at the ten percent level, that of the multiple main bank dummy is significant at the five percent level in equation (7). These results are somewhat inconsistent with our prediction as well as with the international evidence. The hold-up cost reducing effect of multiple main bank relationships for the group of smaller firms is at least as significant as that for the group of larger firms, and thus the result is robust regardless of firm-size ranges in our sample.

Our results on the Rajan's (1992) conjecture are shown under the columns of equations (9) through (12) in Table 3. In the sub-sample consisting of the firms with more growth opportunities, the coefficients of the multiple main bank dummy in equation (9) and the interaction term in equation (10) are significantly positive at the five percent and the one percent level, respectively. In the sub-sample consisting of the firms with fewer growth opportunities, on the other hand, neither the multiple main bank dummy in equations (11) and (12) nor the interaction term in equation (12) takes a statistically significant coefficient at any conventional level. Notice that the coefficients estimated

on the main bank borrowing ratio (MAIN_BORD) for the firms with lower q is about 50 percent, in size, of those for firms with higher q, which suggests that the hold-up costs for lower q firms are less important than for higher q firms.[9] Our interpretation is that the firms with more growth opportunities can more effectively use the multiple main bank relationship as a means of reducing their otherwise very high hold-up costs. On the other hand, the multiple main bank relationship is not very effective for those with less growth opportunities (i.e., those with lower hold-up costs associated with main bank involvement). Thus, the hold-up cost reducing effect of multiple main bank relationships is largely limited in availability to the group of firms with more growth opportunities.

So far, our regression analysis has been based solely on the sample of the firms that have bank loans actually outstanding. Given the fact that we excluded the firms with no bank loans from our sample, the coefficients estimated with this sample can be subject to sample selection biases. For example, some unknown factors that encourage the firm to borrow (or not to borrow at all) from the bank may also affect the profitability of the firm. In order to take into account this kind of possibly existing selection biases, we first estimate the Probit model that determines whether the firm borrows from the bank or not. Then, the implied inverse Mill ratio in the first-stage Probit regression is used as one of the independent variables in the second-stage OLS on ROA.[10]

[9] The difference in the coefficients between two sub-samples is statistically significant at the 1 % level.

[10] This procedure follows Heckman (1979).

For the Probit regression, as independent variables we include the log of firm value (LFVALUE), the leverage (LEVERAGE), Tobin's q (TOBINQ), dummy variable for the membership in the six major *keiretsu* groups (BIG6), the log of the number of months since the time of listing on the TSE (LAGE), and dummy variable (MBOND) which is equal to one if the firm has debt securities outstanding in their liabilities and zero otherwise. The rationale for each variable is as follows: the higher the firm value is, the larger the economies of scale in issuing debt securities, which implies the negative relationship between the firm value and the probability of having bank loans. The higher the leverage is, the higher the firm's need for bank loans in addition to public debts and/or trade credits. The more important the value of firm's growth opportunities is, the higher the agency cost of public debts is, which implies the positive relationship between Tobin's q and the probability of having bank loans. Firms belonging to traditional, major *keiretsu* groups are more likely to borrow from *keiretsu*-affiliated banks. The older the firm is in age, the stronger the firm's (transaction-based) tie with banks is, which leads to higher probability of having bank loans.[11] Alternatively, younger firms may rely more on bank financing because of the higher degree of information asymmetries applied to them. Finally, firms that are able to have an access to the public debt markets tend to use bank loans less frequently. The result of the Probit regression is shown in Panel A of Table 4. All coefficients estimates of the independent variables are statistically significant at the one percent level. In addition, the signage of all coefficients is consistent with the prediction made above.

[11] The number of months since listing on the TSE is used as a proxy for the age of the firm. This is because we do not have precise data on the date of incorporation for many sample firms.

In the second stage, we re-run the OLS regression on ROA by additionally including the inverse Mill ratio implied by the Probit regression in Panel A as an independent variable. The results of the second-stage regression on ROA with the implied inverse Mill ratio are shown in Panel B of Table 4. While the coefficient estimate of the inverse Mill ratio (IMILL) is statistically significant at the one percent level for both specifications, the overall results are qualitatively very similar to those documented in Table 2. Specifically, the coefficient of the multiple main bank dummy (MULTIB) is significantly positive in equation (1), and that of the interaction term between the multiple main bank dummy and the main bank borrowing ratio (MULTIB*MAIN_BORD) is also significantly positive at the one percent level. These suggest that the results in Table 2 were not driven by sample selection biases. We also examined all other regression results by including the estimated inverse Mill ratio in each equation and found that the results are very similar in all cases.[12]

IV. Conclusion

In this study, we investigate whether the multiple main bank relationship is related to the reduction of the "hold-up costs" of bank financing (Rajan, 1992) by using the panel data of Japanese companies listed on the Tokyo Stock Exchange, the first and second sections included, during the period from 1991 to 1998. The relationship between firms and their main banks provides us with a unique experimental setting with the Japanese data. For most Japanese firms, the relationship with their main bank(s) is

[12] The results are available upon request.

quite stable over time and, in the case of multiple main bank relationships, it is almost fixed throughout our sample. This implies that we are able to measure the effectiveness of multiple main bank relationships independently of the economic reason why they had designed and adopted this particular banking policy. Our test of the hold-up cost reduction is basically free from the endogeneity issue which potentially exists between the firm's profitability and its policy decision on the choice of the multiple main bank over the single main bank relationship.

We capture the effect of multiple main bank relationships on the hold-up costs by regressing the profitability of the firm (ROA) on the variables indicating multiple main bank relationships and those to control the regression. Our empirical results are as follows: first, main bank borrowing is negatively related to the profitability of the firm, which suggests the presence of significant hold-up costs. Second, the multiple main bank relationship reduces the hold-up costs and lead firms with this feature to higher profitability. This hold-up problem mitigating effect of multiple main banks is robust irrespective of the firm's access to the public debt markets and the firm's size. Third, this mitigating effect of multiple main bank relationships is larger for firms with the higher value of growth opportunities than those with the lower value of growth opportunities. Finally, the correction on sample selection biases does not change our main findings and conclusions qualitatively. Thus, the hold-up cost mitigating effect of multiple main bank relationships is robust except for the asymmetric effectiveness with respect to the value of firm's growth opportunities.

The main bank features as both major creditor and shareholder of the client firm do not

equally apply to the claims to the client firm: the main bank does not play the role as a main shareholder in general but do play the role as a major creditor. Rents extracted from their client firms are probably too high to justify as shown by the significant sensitivity coefficient magnitude between -0.06 and -0.07 to the main bank borrowing ratio variable (with an average of 0.098) when the sample average ROA is as low as 0.025. The average percentage hold-up cost over our sample is about 20 percent of the ROA, 0.006/(0.006 + 0.025) or 0.007/(0.007 + 0.025) which results in the sample average ROA at 0.025. Notice than the percent hold-up cost is the positive function of the main bank borrowing ratio. The corresponding percent hold-up cost with multiple main bank relationships is between 11 percent and 12 percent. Given this, it is likely that the multiple main bank relationship should be one of the viable solutions that management may consider to reduce the hold-up costs. However, from the results in this study the reason why many firms (about 90 percent of the sample) rather knowingly maintain the costly single main bank over the less costly multiple main bank policy is not known. Probably there are some factors which force these firms to remain unchanged with the single main bank policy. If it is forced by the existing (single) main bank, the practice is very consistent with what the words of the bank “hold-up costs” exactly mean.

References

Aoki, M., H. Patrick and P. Sheard, 1994, "The Japanese main bank system: An introductory overview," Chapter 1, in Aoki, M, and H. Patrick, eds., *The Japanese Main Bank System - Its Relevance for Developing and Transforming Economies*, Oxford University Press, New York , p3-50.

Aoki, M., "Monitoring Characteristics of the Main Bank System: An Analytical and Developmental View," Chapter 4, in Aoki, M. and H. Patrick, eds., *The Japanese Main Bank System - Its Relevance for Developing and Transforming Economies* Oxford University Press, New York, p109-141.

Berlin, M. and J. Loeys, 1988, "Bond covenants and delegated monitoring", *Journal of Finance* 43, p397-412.

Cole, R.A., 1998, "The importance of relationships to the availability of credit", *Journal of Banking and Finance* 22, p959-977.

Degryse, H., and S. Ongena, 2001, "Bank relationships and firm profitability", *Financial Management* Spring 2001, p9-34.

Diamond, D., 1984, "Financial intermediation and delegated monitoring," *Review of Economic Studies* 51 (1984), p393-414.

Diamond, D., 1991, "Monitoring and reputation: The choice between bank loans and directly placed debt, *Journal of Political Economy* 99, p689-721.

Fama, E.F., 1985, What's different about banks?", *Journal of Monetary Economics* 15, p29-39.

Greene, W., 2000, "*Econometric Analysis*", forth edition, Prentice Hall, New Jersey.

Heckman, J., 1979, "Sample selection bias as a specification error", *Econometrica* 47, p153-161.

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*, p239-265.

Horiuchi, T., 1994, "The effect of firm status on banking relationships and loan syndication", Chapter 8, in Aoki, M, and H. Patrick, eds., *The Japanese Main Bank System - Its Relevance for Developing and Transforming Economies*, Oxford University Press, New York , p258-294.

Hoshi, T., A. Kashyap, and D. Sharfstein, 1990, "The role of banks in reducing the costs of financial distree in Japan," *Journal of Financial Economics* 27, p67-88.

Hoshi, T., A. Kashyap, and D. Sharfstein, "Corporate structure, liquidity, and investment: evidence from Japanese industrial groups," *Quarterly Journal of Economics* 106 (1991), p33-60.

Houston, J., and C. James, 1996, "Bank information monopolies and the mix of private and public debt claims", *Journal of Finance* 51, p1863-1889.

James, C., 1987, "Some evidence on the uniqueness of bank loans, *Journal of Financial Economics* 19, p217-235.

Kang, JK., and A. Shivdasani, "Firm performance, corporate governance, and top executive turnover in Japan," *Journal of Financial Economics* 38 (1995), p29-58.

Kang, JK. and A. Shivdasani, "Corporate restructuring during performance declines in Japan," *Journal of Financial Economics* 46 (1997), p29-65.

Kaplan, S. and B.A. Minton, "Appointments of outsiders to Japanese boards: Determinants and implications for managers," *Journal of Financial Economics* 36 (1994), p225-58.

Lummer, S.L., and J.J. McConnell, 1989, "Further evidence on the bank lending process and the capital market response to bank loan agreements", *Journal of Financial Economics* 25, p99-122.

Morck, R., and M. Nakamura, "Banks and corporate control in Japan," *Journal of Finance* 54 (1999), p319-39.

Morck, R., M. Nakamura, and A. Shivdasani, "Banks, ownership structure, and firm value in Japan," *Journal of Busienss* 73 (2000), p539-567.

Peterson, M., and R. Rajan, 1994, "The benefits of lender relationships: Evidence from small business data", *Journal of Finance* 49, p3-37.

Pinkowitz, L., and R. Williamson, 2001, "Bank power and cash holdings: Evidence from Japan," *Review of Financial Studies* 14, p1059-1082.

Rajan, R., 1992, "Insiders and outsiders: The choice between relationship and arm's length debt," *Journal of Finance* 47, p1367-1400.

Sharpe, S.A., 1990, "Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships", *Journal of Finance* 45, p1069-1087.

von Thadden, EL, 1994, "The commitment of finance, duplicated monitoring and investment horizon", ESF-CEPR Working Paper in *Financial Markets* 27.

Weinstein, D.E., and Y. Yafeh, "On the costs of a bank centered financial system: Evidence from the changing main bank relations in Japan," *Journal of Finance* 53 (1998), p635-72.

White, H., 1980, "A heteroscedasticity-consistent covariance matrix estimator and a direct rest for heteroscedasticity", *Econometrica* 48, p817-838.

Table 1.
Basic statistics of firm characteristic variables for firms that have bank loans from 1991 to 1998

	Overall			Single Main Bank			Multiple Main Bank		
# of Obs	10344			9374			970		
	Mean	Std	Median	Mean		Std	Median	Mean	Std	Median
ROA	0.0290	0.0327	0.0272	0.0284	**	0.0328	0.0270	0.0345	0.0318	0.0295
FVALUE	277939	662420	79309	272873		641665	77758	326898	835716	99578
LFVALUE	11.4408	1.3673	11.2811	11.4183	**	1.3744	11.2614	11.6580	1.2780	11.5087
LEVERAGE	0.5231	0.1892	0.5204	0.5265	**	0.1891	0.5241	0.4902	0.1877	0.4740
AGE	385.92	161.64	413.00	388.44	**	160.84	414.00	361.59	167.34	393.00
LAGE	5.7481	0.8736	6.0235	5.7572	**	0.8704	6.0259	5.6602	0.9005	5.9738
TOBINQ	1.3069	0.4816	1.2169	1.3061		0.4760	1.2166	1.3144	0.5322	1.2198
UNIB	0.9062									
MULTIB	0.0938									
MAIN_BORD	0.0983	0.0871	0.0776	0.0958	**	0.0842	0.0762	0.1226	0.1087	0.0936
BIG6	0.1068			0.1089	*			0.0866		
MBOND	0.6204			0.6175				0.6485		

ROA = return on assets; FVALUE = book value of total liabilities + market value of equity ; LFVALUE = log of FVALUE; LEVERAGE = total liabilities divided by firm value (FVALUE); AGE = number of months since the firm's stock was listed on the TSE; LAGE = log of AGE; TOBINQ = Tobin's q measured by the ratio of the book value of total liabilities plus the market value of equity to the book value of total assets; UNIB = dummy variable equal to one if the firm has a single main bank and zero otherwise; MULTIB = dummy variable equal to one if the firm has multiple main banks and zero otherwise; MAIN_BORD = main bank loans divided by total liabilities; BIG6 = dummy variable equal to one if the firm belongs to one of the six major keiretsu groups and zero otherwise; MBOND = dummy variable equal to one if the firm has corporate bonds, convertible bonds or bonds with warrants in its liabilities and zero otherwise.

* (**) The difference in means between firms with a single main bank and with multiple main banks is significant at 5% (1%).

Table 2.
OLS regression of ROA on firm characteristic variables and main bank relation for the pooled sample from 1991 to 1998

Variable	(1)	(2)
C	0.0276	0.0286
	(6.654) **	(6.850) **
LFVALUE	0.0030	0.0029
	(10.007) **	(9.715) **
LEVERAGE	-0.0565	-0.0563
	(-21.756) **	(-21.663) **
TOBINQ	0.0079	0.0080
	(4.961) **	(5.018) **
MULTIB	0.0027	-0.0012
	(2.925) **	(-0.855)
MAIN_BORD	-0.0622	-0.0675
	(-11.740) **	(-11.383) **
MULITIB*MAIN_BORD		0.0327
		(3.244) **
BIG6	-0.0097	-0.0097
	(-11.029) **	(-10.991) **
# of Obs	10344	10344
F-value	105.81 **	103.74 **
Adjusted R-Square	0.2935	0.2944

The dependent variable is ROA. The definition of variables is as follows: ROA = return on assets; LFVALUE = log of the book value of total liabilities + market value of equity; LEVERAGE = total liabilities divided by firm value (FVALUE); TOBINQ = Tobin's q measured by the ratio of the book value of total liabilities plus the market value of equity to the book value of total assets; MULTIB = dummy variable equal to one if the firm has multiple main banks and zero otherwise; MAIN_BORD = main bank loans divided by total liabilities; BIG6 = dummy variable equal to one if the firm belongs to one of the six major keiretsu groups and zero otherwise;
t statistics based on White (1980) standard error are shown in parentheses. * (**) Significant at 5% (1%).

Table 3.

OLS regression of ROA on firm characteristic varaibles and main bank relation with various sample splits from 1991 to 1998

	Firms that have bonds		Firms that do not have bond		Firm value>median		Firm value<=median		Tobin's q>median		Tobin's q <=median	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variable												
C	0.0332	0.0345	0.0104	0.0110	0.0404	0.0410	0.0075	0.0085	0.0486	0.0502	0.0119	0.0122
	(6.220) **	(6.459) **	(1.277)	(1.347)	(6.708) **	(6.813) **	(0.811)	(0.915)	(6.671) **	(6.831) **	(2.418) *	(2.482) *
LFVALUE	0.0011	0.0010	0.0054	0.0054	0.0003	0.0002	0.0067	0.0066	0.0024	0.0022	0.0020	0.0020
	(3.111) **	(2.833) **	(8.059) **	(8.012) **	(0.715)	(0.577)	(8.163) **	(8.070) **	(4.790) **	(4.475) **	(6.088) **	(6.023) **
LEVERAGE	-0.0528	-0.0528	-0.0525	-0.0524	-0.0546	-0.0543	-0.0562	-0.0562	-0.0707	-0.0704	-0.0414	-0.0413
	(-12.950) **	(-12.824) **	(-13.831) **	(-13.806) **	(-12.932) **	(-12.896) **	(-17.983) **	(-17.966) **	(-14.585) **	(-14.515) **	(-16.447) **	(-16.414) **
TOBINQ	0.0163	0.0162	0.0044	0.0045	0.0156	0.0157	0.0008	0.0009	0.0037	0.0038	0.0237	0.0237
	(5.550) **	(5.474) **	(2.159) *	(2.207) *	(6.468) **	(6.537) **	(0.551)	(0.608)	(1.841)	(1.919)	(7.687) **	(7.685) **
MULTIB	0.0023	-0.0013	0.0037	-0.0007	0.0013	-0.0014	0.0034	-0.0007	0.0033	-0.0030	0.0019	0.0008
	(2.157) *	(-0.886)	(2.019) *	(-0.233)	(1.263)	(-0.876)	(2.203) *	(-0.273)	(2.254) *	(-1.463)	(1.724)	(0.452)
MAIN_BORD	-0.0664	-0.0732	-0.0576	-0.0615	-0.0466	-0.0527	-0.0627	-0.0668	-0.0846	-0.0925	-0.0434	-0.0450
	(-8.450) **	(-8.103) **	(-7.913) **	(-7.674) **	(-6.941) **	(-6.637) **	(-9.167) **	(-8.831) **	(-9.114) **	(-8.961) **	(-8.626) **	(-8.526) **
MULTIB*MAIN_BORD		0.0395		0.0265		0.0295		0.0281		0.0583		0.0085
		(2.762) **		(1.710)		(2.326) *		(1.906)		(3.809) **		(0.653)
BIG6	-0.0066	-0.0065	-0.0146	-0.0147	-0.0056	-0.0056	-0.0105	-0.0106	-0.0106	-0.0105	-0.0055	-0.0055
	(-7.808) **	(-7.713) **	(-4.644) **	(-4.661) **	(-5.667) **	(-5.656) **	(-1.814)	(-1.825)	(-8.257) **	(-8.131) **	(-5.458) **	(-5.471) **
# of Obs	6417	6417	3927	3927	5172	5172	5172	5172	5172	5172	5172	5172
F-value	82.93 **	81.28 **	33.93 **	33.22 **	80.10 **	78.39 **	40.99 **	40.16 **	57.91 **	57.02 **	35.48 **	34.66 **
Adjusted R-Square	0.3436	0.3445	0.2559	0.2563	0.3854	0.3860	0.2407	0.2413	0.3109	0.3127	0.2147	0.2147

The dependent variable is ROA. The definition of variables is as follows: ROA = return on assets; LFVALUE = log of the book value of total liabilities + market value of equity; LEVERAGE = total liabilities divided by firm value (FVALUE); TOBINQ = Tobin's q measured by the ratio of the book value of total liabilities plus the market value of equity to the book value of total assets; MULTIB = dummy variable equal to one if the firm has multiple main banks and zero otherwise; MAIN_BORD = main bank loans divided by total liabilities; BIG6 = dummy variable equal to one if the firm belongs to one of the six major keiretsu groups and zero otherwise;

t statistics based on White (1980) standard error are shown in parentheses. * (**) Significant at 5% (1%).

Table 4.
Probit Estimation and OLS regression: 1991 - 1998

Panel A. Probit Estimation		Panel B. OLS regression with slection bias correction		
			(1)	(2)
Variable		Variable		
C	-0.6207	C	0.0150	0.0159
	(-3.520) **		(3.413) **	(3.597) **
LFVALUE	-0.1440	LFVALUE	0.0019	0.0019
	(-9.808) **		(5.640) **	(5.371) **
LEVERAGE	4.6635	LEVERAGE	-0.0262	-0.0257
	(40.763) **		(-5.180) **	(-5.075) **
TOBINQ	0.5459	TOBINQ	0.0110	0.0112
	(16.205) **		(6.737) **	(6.813) **
BIG6	0.3578	MULTIB	0.0029	-0.0012
	(5.438) **		(3.205) **	(-0.837)
LAGE	0.1089	MAIN_BORD	-0.0629	-0.0684
	(6.760) **		(-11.953) **	(-11.647) **
MBOND	-0.0982	MULTIB*MAIN_BORD		0.0346
	(-2.697) **			(3.428) **
		BIG6	-0.0068	-0.0068
			(-6.890) **	(-6.819) **
		IMILL	0.0250	0.0253
			(7.011) **	(7.092) **
# of Obs	12355	# of Obs	10344	10344
Log Likelihood	-4102.77	F-value	105.68 **	103.72 **
R-Square	0.2641	Adjusted R-Square	0.2983	0.2993

Panel A shows the resutl of Probit estimation which predicts wether the firm has bank loans (=1) or not (=0). Panel B OLS regression regresses ROA on firm chracteristic variables, main bank relation, and the inverse Mil ratio calculated in the Probit estimation in Panel A.

ROA = return on assets; FVALUE = book value of total liabilities + market value of equity ; LFVALUE = log of FVALUE; LEVERAGE = total liabilities divided by firm value (FVALUE); AGE = number of months since the firm's stock was listed on the TSE; LAGE = log of AGE; TOBINQ = Tobin's q measured by the ratio of the book value of total liabilities plus the market value of equity to the book value of total assets; MULTIB = dummy variable equal to one if the firm has multiple main banks and zero otherwise; MAIN_BORD = main bank loans divided by total liabilities; BIG6 = dummy variable equal to one if the firm belongs to one of the six major keiretsu groups and zero otherwise; MBOND = dummy variable equal to one if the firm has corporate bonds, convertible bonds or bonds with warrants in its liabilities and zero otherwise; IMILL = inverse Mill ratio calculated in the Probit estimation in Panel A to take into account selection bias.

t statistics based on White (1980) standard error are shown in parentheses. * (**) Significant at 5% (1%).