The Effects of a Megabank Merger on Firm-Bank Relationships and Borrowing Costs *

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October 22, 2014

Abstract

Using a unique dataset of non-listed firms that identifies the banks the firms transact with, we examine the effects of the largest-ever bank merger in Japan, that between Bank of Tokyo-Mitsubishi (BTM) and UFJ Bank (UFJ) in 2005. We focus on how the merger affected firms through their firm-bank relationships. Specifically, we examine whether there are any differences in how the availability of loans evolved over time for firms that prior to the merger transacted with both of the merged banks, with one of the merged banks, or with none of them. We find the following: (1) Firms that had transacted with both BTM and UFJ saw their borrowing costs increase by 35bp relative to those that had transacted with neither of them. (2) Firms that transacted with one of the two banks saw their borrowing costs increase by a smaller but still significant margin of 12bp relative to those that had transacted with neither of them. And (3) we do not find a significant difference in the extent that borrowing costs increased between firms that transacted with the acquiring bank (BTM) and those that transacted with the acquired bank (UFJ). These results are robust even after controlling for the merger-induced change of market concentration. In sum, the bank merger increased firms' borrowing costs partly through the exogenous decrease in the number of firm-bank relationships and partly through changes in the management of the merged bank.

Keywords: Firm-bank relationships; Interest rates; Switching costs; Market power

JEL classification: G21; G34

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*This study is an achievement of the project "Design of Interfirm Networks to Achieve Sustainable Economic Growth" under the program for Promoting Social Science Research Aimed at Solutions of Near-Future Problems, conducted by the Japan Society for the Promotion of Science (JSPS). An earlier version of the paper was presented at 2012 European Finance Association Meeting (Copenhagen), 5th Winter Conference on Financial Intermediation (Lenzerheide), the JEA Meeting (Kwansei Gakuin), Kobe, Ritsumeikan, Osaka, Kyoto, Waseda, Hitotsubashi, Financial Services Agency, Japan Productivity Center, and the RIETI Study Group on Financial Networks. We would like to thank Sascha Steffen, Mike Mariathasan, Hans Degryse, Martin Brown, Greg Udell, Stijn Claessens, Judit Montoriol-Garriga, Makoto Saito, Makoto Nirei, Etsuro Shioji, Kozo Harimaya, Ralph Paprzycki, Yoshiaki Ogura, Wako Watanabe, Naoyuki Yoshino, Takayuki Tsuruga, Munechika Katayama, Arito Ono, Hirofumi Uchida, Daisuke Miyakawa, Tomoya Nakamura, Yuri Sasaki, Kimie Harada, Yasuhiro Arikawa, Hideaki Miyajima, Katsuyuki Kubo, Shinichi Hirota, Mamoru Nagano, Kozo Ueda, and Yoshitaka Sakai for helpful comments, Makoto Hazama for his superb research assistance and Teikoku Databank Ltd. for the use of the dataset. This research is financially supported by Grant-in-Aid for Scientific Research (S) 25220502 from the Japan Society for the Promotion of Science.

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1 Introduction

Japan, like other developed countries, has seen a wave of bank mergers in the past 20 years. Mainly as a result of these mergers, the number of banks has decreased substantially over this period, falling from 1,069 in 1990 to 595 in 2010. Especially the number of so-called city banks - banks that operate nation-wide and across national borders has declined significantly, dropping from 13 in 1990 to only 4 in 2010.

Policymakers have been concerned about the implications of these bank mergers. Since bank consolidation changes the market structure for loans and firm-bank relationships, a particular focus of such concerns is whether efficiency gains from mergers are passed on to borrowers or are appropriated by the merged banks. Studies seeking to address these issues empirically, such as Sapienza (2002) and Erel (2011), have typically focused on the availability and the price of loans provided by the merged banks. The present study follows this approach, using micro-level data to investigate how the availability of loans and the interest rates that firms have to pay develop after a major merger.

For our analysis, we use the merger of two major city banks, Bank of Tokyo-Mitsubishi (BTM) and UFJ Bank (UFJ), in 2005. The merger of these banks, which took place toward the end of the bank merger wave in Japan, had a sizable impact on the domestic loan market. The combined amount of loans outstanding of the two banks in 2004 stood at 70 trillion yen (700 billion US dollar at the exchange rate at the time), equivalent to 18% of total loans outstanding extended by financial institutions in Japan, making the newly-formed entity, the Bank of Tokyo-Mitsubishi UFJ (BTMU), the largest financial institution in the country.

As pointed out by Williamson (1968) in his theoretical analysis, horizontal mergers in general are likely to increase market power, raise prices for goods and services, and decrease the surplus of firms or consumers demanding the goods and services in the market. This expected negative effect of mergers has been the focus of many previous studies on bank mergers. Conducting a comprehensive review of over 250 studies, Berger, Demsetz, and Strahan (1999) find that the empirical evidence suggests that some types of consolidation indeed result in an increase in market power.

However, in the market for bank loans, the interactions among market power, market structure, and transaction conditions are complicated by the fact that transactions between banks and borrowers often are not at arm's length but involve some sort of relationship. Suppose, for example, that information on the viability of borrower firms is produced through bank-firm relationships and cannot be transferred to potential new lenders. In this case, it is unlikely that all lenders, both incumbents and potential new lenders, can exercise market power and set loan conditions in a similar manner. Instead, bank-firm relationships or, in Sapienza's (2002) terminology, "information-based market power" come to play an important role in determining loan conditions, including interest rates.

Against this background, the primary focus of our study is to examine how a bank merger affects firm-bank relationships and changes the availability of loans after the merger. By focusing on the merger of two megabanks, each with a large number of borrower firms, we are able to classify firms into three categories: firms that transacted with both banks at the time of the merger (BTM and UFJ in the case we are examining); those that transacted with one of the two banks; and firms that transacted with neither of these banks. Classifying firms in this manner, we examine how a bank merger affects the availability of loans through firm-bank relationships.

Specifically, we focus on the following issues. First, for firms in the first category, the merger automatically reduces their number of firm-bank relationships by one, which is likely to have an impact on the loan conditions they face. Studies such as those by Petersen and Rajan (1994) and Harhoff and Körting (1998) regard the number of firm-bank relationships as a proxy for the switching costs a firm faces (the larger the number of relationships, the smaller the switching costs) and examine the link between the number of relationships and the availability of credit. The BTM-UFJ merger provides an excellent opportunity to examine the impact of an exogenous reduction in the number of relationships on loan availability and borrowing costs.

Second, the bank merger is likely to have had a greater impact on firms in the first two categories (firms that transacted with both or one of the merged banks) than those in the third category (firms that transacted with neither) due to changes in organizational structure and the reallocation of resources to increase managerial efficiency at the newly merged bank. Potential organizational changes as a result of the bank merger include the consolidation of branches, directly affecting firms that had a relationship with one or both of the merged banks and maintained a relationship with the merged entity. In the case of the BTM- UFJ merger, an extensive consolidation of the branch network followed, providing an excellent case study to examine this issue.

Third, within the second category of firms, there may well be a difference in the way loans are provided between borrower firms that transacted with the acquiring bank and those that transacted with the acquired bank. As pointed out by Peek and Rosengren (1998), the lending behaviour of a newly merged bank usually mirrors that of the acquiring bank. Hence, firms that transacted with the acquired bank may face more stringent loan conditions following the merger than those that transacted with the acquiring bank. Indirect evidence of such differences in loan conditions depending on whether a firm transacted with the acquiring or acquired bank is provided by Karceski, Ongena, and Smith (2005), who used share price data of listed firms in Norway. Here, we examine the same issue using our database. Since the firms that we focus on, non-listed firms, are weaker in loan negotiations than the listed firms examined by Karceski, Ongena, and Smith (2005), one would expect the impact to be more pronounced, and we use more direct measures than the share prices to examine the impact on loan conditions.

For the analysis, we employ a unique firm-level panel dataset for the years 2004-2010 of more than 110,000 non-listed firms that mostly depend on bank loans for external finance. The dataset contains balance-sheet information, which we use for generating our variables on loan availability and firm performance, and the names of up to ten banks and their branches that a firm transacts with and that we use for identifying firms' relationship with BTM and UFJ. Further, the dataset is augmented with the information on loan markets, which is to control for the effect caused by the market concentration. To measure the effect of the merger of the two banks on firms, we employ the propensity score matching difference-in-differences estimator (PSM-DID). Since there are multiple ways in which the bank merger affects firms' configuration of bank relationships, we follow the procedure proposed by Lechner (2002) and allow for multiple treatments.

Our findings can be summarized as follows. First, firms that transacted with both BTM and UFJ prior to the merger saw their borrowing costs increase by 35 basis points (bp) relative to firms that had no such transaction relationships. Second, firms that transacted with one of the two banks saw their borrowing costs increase by a smaller but still significant margin of 12bp. Third, we do not find a significant difference in the extent that borrowing costs increased between firms that transacted with the acquiring bank (BTM) and those that transacted with the acquired bank (UFJ). Importantly, we find these results robust even after controlling for the merger-induced change in market concentration. Overall, these results indicate that the bank merger increased firms' borrowing costs partly through the exogenous decrease in the number of firm-bank relationships and partly through changes in organizational structure at the merged bank.

The remainder of the paper is organized as follows. Section 2 provides an overview of previous studies and presents the empirical hypotheses. Section 3 then presents details on the merger of BTM and UFJ and its background. Next, Sections 4 and 5 respectively outline the dataset used for the analysis and the empirical approach. Section 6 provides summary statistics and the estimation results followed by a further discussion in Section 7. Section 8 concludes.

2 Previous Studies and Empirical Hypotheses

There are a considerable number of studies examining the impact of bank mergers on firms' borrowing conditions, such as Sapienza (2002) and Erel (2011), who focus on the increasing market concentration in the loan market following a merger. An increase in market concentration through a merger not only results in an increase in market power of the merged banks (through the increase in the market share of loans outstanding) but also of all other banks operating in the market, allowing them to impose more stringent loan conditions and extracting larger rent than before the merger.

At the same time, however, the interactions among market structure, the degree of competition, and transaction conditions are not straightforward due to the role of bank-borrower relationships. The literature on financial intermediation suggests that banks produce valuable information on the viability of borrowers through bank-borrower relationships (Diamond 1984). If such information is not transferable to potential new lenders, borrowers will incur switching costs when terminating a relationship with an existing lender and finding a new lender (Rajan

1992; Sharpe 1990). Firm-bank relationships can be found in most advanced economies, although their duration and importance tends to vary. Reviewing a number of empirical studies on a range of countries, Degryse, Kim, and Ongena (2008) suggest that the average duration of firm-bank relationships ranges from 8 years in Belgium (Degryse and Van Cayseele 2000) and 7 to 11 years in the United States (Petersen and Rajan 1994) to 13 years in Germany (Harhoff and Körting 1998), 14 years in Italy (Angelini, Di Salvo, and Ferri 1998), and 15 to 18 years in Norway (Ongena and Smith 2001). Meanwhile, studies on Japan suggest that the average duration is over 20 years (e.g., Horiuchi, Packer, and Fukuda 1988; Uchida, Udell, and Watanabe 2006), suggesting that particularly in Japan, firm-bank relationships appear to play a key role in the loan market and that, consequently, it is important to focus on such relationships when examining the terms and conditions of loan contracts in Japan.

Changes in firm-bank relationships following a merger have three characteristics which can be directly linked to empirical hypotheses. First, a bank merger results in an exogenous decrease in the number of firm-bank relationships. For firms that used to transact with both of the merging banks, the number of banks they transact with automatically declines by one after the merger. In contrast, the number of unique borrower firms for the merged banks remains the same after the merger.

Regarding the effect of the number of relationships, many studies, such as those by Petersen and Rajan (1994) and Harhoff and Körting (1998), examine the hypothesis that a smaller number of firm-bank relationships means that switching costs for borrowers are higher, endowing banks with "information-based market power" and resulting in more stringent loan conditions such as higher borrowing costs. However, these studies do not focus on the effects of bank mergers. Moreover, they often fail to control for the fact that the number of relationships may be endogenously determined. Further, the results reported in these studies are sometimes the opposite of what theory predicts, but we cannot tell whether this is due to the possible endogeneity of the number of relationships or whether the theoretical predictions are wrong. In contrast, by using the event of a bank merger, the present study can measure the effect of a change in the number of relationships that is clearly exogenous. Thus, we can posit the following hypothesis for firms that used to transact with both of the merged banks:

Hypothesis 1: Firms that used to transact with both of the merged banks experience an exogenous decrease in the number of relationships with banks and face more stringent loan conditions, including higher borrowing costs, following the merger.

Second, as highlighted by Berger, Demsetz, and Strahan (1999) in their comprehensive survey, bank mergers result in a change in the organizational structures and operational procedures of the merged banks, which affects firms through their bank relationships. Firms that had established a relationship with at least one of the merged banks are affected by such changes. On the negative side for borrower firms, the newly merged bank may be too big and organizationally too multi-layered to extend loans to relatively small borrowers. In addition, there may be a loss of soft information by the bank when it consolidates its branches and reallocates loan officers somewhere unrelated to old borrowers. The possible result is more stringent loan conditions for borrowers. On the positive side, the newly merged bank may successfully reduce operating costs and increase its managerial efficiency. This improvement could potentially result in more favorable transaction terms for borrowers. To summarize, we have the following hypothesis:

Hypothesis 2: Firms that used to transact with one of the merged banks also face more stringent loan conditions due to organizational changes or the loss of soft information at the bank. Alternatively, they face more favorable conditions if they receive rents created by improved managerial efficiency at the merged bank.

Third, as shown by Karceski, Ongena, and Smith (2005), bank mergers may have an asymmetric effect on firm-bank relationships depending on whether a firm used to transact with the acquiring bank or the acquired bank. In the case they examined, listed firms in Norway that transacted with acquired banks saw a decrease in their stock price following the bank merger. Our setting here allows us to examine similarly whether the effects of the bank merge are asymmetric, depending on whether a firm used to transact with the acquired (UFJ) or the acquiring bank (BTM).

Hypothesis 3: Firms that used to transact with the acquired bank face more stringent loan conditions than firms that transacted with the acquiring bank.

We are going to examine each of these three hypotheses using our firm-level panel dataset and employing a propensity score matching estimator. Details of the procedure are provided in Sections 5 and 6.

3 The BTM-UFJ Merger

3.1 Japan's banking system and merger activity

This section provides a brief description of the structure of, and developments in, Japan's banking sector in the past few decades, including merger and acquisition activity. Roughly speaking, banks in Japan are categorized into two groups based on the nature of their activities: major banks that operate nation-wide and often across national borders, and regional financial institutions that operate in relatively limited geographical areas.[1] The major banks were traditionally further divided into city banks, trust banks, and long-term credit banks, although the latter type no longer exists.[2] The city banks are legally categorized as regular commercial banks and are the largest in terms of the size of their assets. They extend loans not only to large firms but also to small businesses and individuals. The trust banks extend loans mainly to large firms and provide trustee services to customers. The long-term credit banks provided long-term loans to large firms while issuing long-term debentures in order to collect funds from the public.

Regional financial institutions comprise of regional banks, second-tier regional banks, *shinkin* banks, and credit cooperatives. The regional banks are regular commercial banks and the largest in size among the regional financial institutions. In most cases, however, they focus on local loan markets at the prefecture level. The second-tier regional banks, which used to be mutual banks, primarily lend to small businesses. In 1989, they converted themselves into regular commercial banks and started to be labelled as second-tier regional banks. They usually operate in one or a few adjoining prefectures. Both the *shinkin* banks and the credit cooperatives are non-profit cooperatives composed of members living and working in a defined geographical area. They extend loans mainly to their members, including small businesses.

[1] There exist other types of banks in Japan, including agricultural/fishery cooperatives, government-affiliated financial institutions, and de novo banks. However, we do not include these types of institutions in our brief overview since they are of little relevance to the issues considered here.

[2] There used to be three long-term credit banks; however, two of them failed around the turn of the millennium, while the third merged with two city banks and thus became a regular commercial bank.

Until the 1990s, bank mergers were very rare in any of these bank categories. The number of city banks remained unchanged at 13 until 1990. Mergers among regional and second-tier regional banks were also rare. Only three of the second-tier banks were acquired during the 1970s and 1980s. The number of mergers involving *shinkin* banks and credit cooperatives was also limited until the 1990s.

This stability in the number of banks to a considerable extent was the result of the so-called "convoy system," in which competition among banks was limited due to government restrictions on the opening of new branches; competition between banks and other categories of financial businesses, such as security houses and insurance firms, was also strictly prohibited; and, against the background of these policies, the government arm-twisted larger healthy banks into acquiring failing banks in exchange for the permission to open new branches. As a consequence, most bank mergers during the 1970s and 1980s were initiated at the request of the government in order to bail out weaker banks.

However, Japan's stable banking system became increasingly fragile in the 1990s. This was partly due to the prolonged decline in asset prices during this period and partly due to the financial liberalization undertaken in the 1980s. Yet another factor was the introduction of the Basel Accord, which stipulated risk-based capital requirements and led relatively weak banks to consolidate. As a consequence, there were two mergers among city banks and three mergers among regional banks in the early 1990s.

3.2 A wave of bank mergers

However, starting in 1997, Japan experienced a financial crisis that set off a veritable wave of bank mergers. As a consequence of the crisis, triggered by non-performing loans, the Japanese government was forced to inject large sums into the banking system, resulting in quasi-nationalization that provided the impetus for wide-ranging consolidation in the financial sector. Major mergers during this phase included those between two city banks and one long-term credit bank, Dai-ichi Kangyo Bank, Fuji Bank, and the Industrial Bank of Japan, to form Mizuho Financial Group in 2000, and between Sakura and Sumitomo banks to form the Sumitomo Mitsui Banking Corporation in 2001. The merger between BTM and UFJ did not follow until 2005.

3.3 The BTM-UFJ merger

The Bank of Tokyo-Mitsubishi (BTM), which acquired UFJ Bank, was itself the product of a merger between Mitsubishi Bank, one of the largest city banks, and the Bank of Tokyo in 1996. In contrast with most other city banks, BTM had remained relatively healthy throughout the financial crisis. UFJ, on the other hand, resulted from the merger in 2001 of Sanwa Bank and Tokai Bank and had massive amounts of non-performing loans to several ailing large firms without sufficient reserves for loan losses, although this fact had not been made public at the time. Following a severe dispute with the Financial Services Agency (FSA) on the treatment of these loans, UFJ was forced to report huge loan losses in its financial statement in May 2004, meaning that its capital level was critically low. Desperately in need of cash to shore up its balance sheet and ensure a sufficient level of capital, UFJ agreed with BTM to merge, with the announcement being made in July 2004 and the merger itself becoming effective as of 2005. Bringing together the second-largest (BTM) and the fourth-largest (UFJ) bank in Japan, the merger created the largest financial institution not only in Japan but also in the world, outstripping Citigroup Incorporated in terms of assets.

Several remarks concerning the merger are in order. First, the interval between the disclosure of UFJ's massive loan losses (May 2004) and the announcement of the merger (July 2004) was short. Until the disclosure of those losses, most UFJ officials as well as borrower firms and other customers did not appear to have expected any radical changes in UFJ's management.

Moreover, even after UFJ had been forced to disclose its losses, it initially did not intend to merge with BTM. Instead, it tried to sell one of its operating arms, UFJ Trust Bank, to another financial group, Sumitomo Trust Bank. Therefore, it seems fair to say that the behaviour of neither UFJ nor borrowers was affected by the expectation of a merger until the merger was formally announced.

Second, the merger between BTM and UFJ was almost the last in the merger wave in the Japanese banking sector. There has been no merger involving a city bank since 2005. Even in terms of smaller mergers, there were only one second-tier bank merger and a few *shinkin* bank mergers in the year 2005, while since then, only 34 regional, second-tier regional, and *shinkin* banks have been involved in mergers.[3] Thus, focusing on the merger between BTM and UFJ allows us to examine the effects of a bank merger without confounding factors caused by other big mergers.

The third remark is that the loan losses that triggered the merger were due to non-performing loans to a small number of large firms that were considered to be "too big to fail." The average ex-ante performance of UFJ's small business borrowers, on the other hand, was not significantly worse in our sample than that of BTM's small business borrowers. Thus, it is unlikely that UFJ's balance sheet problems and subsequent merger with BTM were caused by the ex-ante under-performance of UFJ's small business borrowers.

4 Data

4.1 Data sources

The data used in this study are taken from the database of Teikoku Databank Ltd. (hereafter TDB database), a business database company. The TDB database covers more than 1.4 million firms in Japan and provides information on firms' primary characteristics such as firm age, number of employees, ownership structure, industry, location, and the identity of banks and bank branches the firm transacts with. For a sizable subset of firms, the database also has information on financial statements, including the outstanding amount of assets, interest payments, the outstanding amount of short- and long-term loans, business profits, and the outstanding amount of capital. The sample we use for analysis comprises 112,386 firms as of the year 2004 after the following sample selection process. First, we limit our analysis to non-listed firms in the database since our focus is on borrower firms that are likely to be credit-constrained. Another reason for excluding listed firms from the analysis is that it is the large listed firms whose underperformance resulted in the massive non-performing loans that eventually triggered the merger of UFJ and BTM. Second, we restrict the sample to firms that transacted with at least two banks at the time of the merger in order to examine the effect of an exogenous reduction in the number of firm-bank relationships. Third, since there were small bank mergers in 2005 other than the one between BTM and UFJ, we exclude firms that transacted with one or more of these other banks

[3] Specifically, one regional bank, two second-tier regional banks, 19 *shinkin* banks, and 12 credit cooperatives have been involved.

from the sample. As a result, we have an unbalanced panel dataset of 112,386 firms that extends from the year 2004 up to 2010.

4.2 Variables

We have several sets of variables to examine our empirical hypotheses. A list of the variables and their definitions is provided in Table 1.

4.2.1 Outcome variables

First, in order to gauge the availability of loans to a firm, we use several variables. The first variable is the borrowing costs a firm faces ($RATE$), calculated using information from firms' financial statements. Following Caballero, Hoshi, and Kashyap (2008), we use interest and discount expenses divided by the sum of long-term loans, short-term loans, and bills discounted in the previous period. As for the amount of loans that each firm obtains, we use total loans, long-term loans, and short-term loans, all standardized by the total amount of assets. We label these variables $LOAN$, $LONG$, and $SHORT$, respectively. Next, to represent firms' behavior including capital investment and employment, we have two variables. For capital investment, we divide the sum of change in fixed tangible assets and the amount of depreciation by the level of fixed tangible assets in the previous period and label it as $INVEST$. For employment, we take the log of the number of employees and label the variable as $lnEMP$. Finally, to measure firms' performance, we employ two variables. We use cash flow, which is defined as the sum of ordinary profit and the amount of depreciation being divided by the total asset, which is labeled as CF. We also use the amount of sales and label it as $\ln SALES$.

4.2.2 Variables used for the propensity score estimation

To examine the determinants of transaction relationships with banks, we consider four categories of variables: firm-bank relationship characteristics, which are used as the dependent variables, as well as firm characteristics, a lending market condition, regional dummies, and industry dummies. For the firm-bank relationship variables, we generate several dummy variables based on the information on the identity of the banks and bank branches that firms transact with. In the TDB database, each firm reports the identities of up to ten banks and their branches that they deal with. When, in 2004, none of these banks are BTM or UFJ, we set $MERGER0$=1 and 0 otherwise. When one of these banks is either BTM or UFJ, we set $MERGER1$=1 and 0 otherwise. Moreover, in order to determine whether the effects of the merger are asymmetric depending on whether a firm transacted with BTM or UFJ prior to the merger, we set $MERGER1\_1$=1 when BTM is one of the banks listed by a firm and 0 otherwise, and $MERGER1\_2$=1 when UFJ is one of the banks and 0 otherwise. When the banks that a firm transacted with include both BTM and UFJ, we set $MERGER2$=1 and 0 otherwise. The variable $MERGER2$ is used specifically to examine our first hypothesis.

Summarizing these binary variables, we create two index variables, which are used for the multinomial probit estimations. The first is $MTYPE1$, for which the set of values is $MTYPE1 = \{0, 1, 2\}$. Firms with $MERGER0 = 1$ have a value of zero, those with $MERGER1 = 1$ have a value of one, and those with $MERGER2 = 1$ have a value of two. The second index variable is $MTYPE2$, which considers the acquiring and the acquired bank separately and for which the set of values consequently is $MTYPE2 = \{0, 1, 2, 3\}$. Firms with $MERGER0 = 1$ have a value of zero, those with $MERGER1\_1 = 1$ have a value of one, those with $MERGER1\_2 = 1$ have a value of two, and those with $MERGER2 = 1$ have a value of three. The great advantage of focusing on a merger of megabanks, as we are doing here, is that it allows us to employ this range of dummy variables as there are a sufficient number of observations that fall into each category.

As for firm characteristics, we use eight variables: firm age, firm size, credit risk, firm growth, firm profitability, firm cash holdings, firm holdings of fixed tangible assets, and the number of banks the firm transacts with. For firm size, we use the logarithm of the number of employees ($lnEMP$). For firm age, we also use the logarithm of the number of years since firms' establishment ($lnAGE$). For credit risk, we employ the credit score provided in the TDB database as a proxy ($SCORE$). The TDB credit score is an indicator widely used by financial institutions and non-financial firms to assess the credit risk of small businesses in Japan. It ranges between 0-100 and firms with high scores indicate that their quality is high. For firm growth and profitability, we employ $SALESGROWTH$ and CF, respectively. For cash holdings, we employ the ratio of cash and deposits outstanding to the total asset amount ($CASH$). For holdings of fixed tangible assets which may be used for collateral for loans, we use the ratio of fixed tangible asset amount to the total asset amount ($FIXED$). Finally, the number of banks a firm transacts with is employed to gauge the relative importance of a specific firm-bank relationship and labeled as $NBANK$. As for the lending market condition, we construct a Herfindahl-Hirschman index for each of the 47 prefectures by using information on relationships between firms and bank branches (HHI) in the TDB database. We count the number of relationships each bank has in a prefecture and calculate the squared sum of its share for all the banks, including city banks, regional banks, shinkin banks, credit cooperatives, government financial institutions, and other types of banks.[4] In addition to the variables listed above, we also employ dummy variables for the region in which firms are located (10 regions) and for the industry a firm belongs to (11 industries).

5 Empirical Approach

5.1 Propensity score matching with multiple treatments

We measure the effect of the merger of BTM and UFJ on firms that transacted with either one or both of these banks. In most cases, we compare firms in the treatment group that had transaction relationships with either one (or both) of the merged banks and those in the control group that had no transaction relationship with the merged banks.

For each of these treatment and control group firms, we first calculate the differences of variables before and after the merger. Then we calculate another difference, namely the difference in these differences between the treatment and the control group. This estimator is the difference-in-differences (DID) estimator. The DID estimator first controls for firms' time-invariant fixed effects by taking the differences of a variable. Next, it controls for macroeconomic shocks by taking the difference between these two groups. Assuming that each borrower firm is too small to have affected the probability of the merger between BTM and UFJ, we regard the merger as an exogenous event.

There is possibly a selection bias in the DID estimator, since the firms in the treatment group are often sizable and creditworthy. Further, many of the firms in the treatment group are located

[4] For more details on the index, see Ono et al. (2010).

in metropolitan areas. The treatment effect for firms with such characteristics may significantly differ from the treatment effect for firms with different characteristics. In order to control for the potential selection bias, we therefore employ the propensity-score-matching difference-in-difference (PSM-DID) estimator proposed by Rosenbaum and Rubin (1983). The estimator is unbiased for the average treatment effect on the treated (ATT) under the assumptions of unconfoundedness and the balancing condition.

However, for our purposes, the PSM-DID estimator as proposed by Rosenbaum and Rubin still suffers from the shortcoming that it allows for only a single type of treatment, while we need to have multiple treatment groups for our analysis: namely, a group of firms that transacted with both of the merged banks, a group of firms that transacted with either one of the merged banks, and a group of firms that transacted with the acquired (acquiring) bank. If we put all of these in one treatment group, we end up in confounding a variety of effects and cannot tell if the effects of the merger result from the exogenous decrease in the number of firm-bank relationships or from the organizational change at the merged bank. In order to overcome this problem, we adopt the PSM-DID estimator proposed by Lechner (2002), which allows for multiple treatments and calculates propensity scores from the multinomial probit model estimation. See the Appendix for details of how we employ the methodology proposed by Lechner.

5.2 Examination of hypotheses

Following Lechner (2002), we allow for multiple treatments and employ the multinomial probit model in order to obtain propensity scores for each outcome. We then arbitrarily choose pairs of outcomes $\{l, m\}$and calculate conditional propensity scores. We use the group of firms with outcome $\{m\}$as treatments and the group of firms with outcome $\{l\}$ as controls.

In order to examine Hypotheses 1 and 2, we employ the index variable $MTYPE1$ whose values in the set $\{0, 1, 2\}$ correspond to the three mutually exclusive outcomes $MERGER0 = 1$, $MERGER1 = 1$, and $MERGER2 = 1$, implement a baseline multinomial probit estimation, and calculate propensity scores for each outcome. We then choose three pairs of values, namely $MTYPE1 = \{0, 2\}$,$\{1, 2\}$, and $\{0, 1\}$. The first two pairs are used to examine Hypothesis 1. Using the pair $\{0, 2\}$, we compare firms that transacted with both BTM and UFJ and those that transacted with neither BTM and UFJ. The difference of these two outcomes, however, includes two distinct effects, namely, the effect of increased switching costs and the effect of managerial changes at the merged bank. In order to isolate the former effect, we employ the pair $\{1,2\}$, where firms for which $MERGER2 = 1$ are the treatment group and those for which $MERGER1 = 1$ are the control group.

The third pair is used to examine Hypothesis 2. Using the pair of outcomes $\{0,1\}$ means that we are employing firms that transacted with one of the merged banks as the treatment group and firms that transacted with neither of them as the control group. Estimating the treatment effect using our sample allows us to examine the effects of the merger transmitted through the relationship between a firm and one of the merged banks.

In order to examine Hypothesis 3, we use the index variable $MTYPE2$ whose values in the set $\{0,1,2,3\}$ correspond to four outcomes that are again mutually exclusive, namely $\{MERGER0 = 1, MERGER1\_1 = 1, MERGER1\_2 = 1, MERGER2 = 1\}$, and implement a multinomial probit estimation. The difference from the baseline multinomial probit estimation is that we further divide the outcome $MERGER1 = 1$ into the outcome $MERGER1\_1 = 1$, in which firms transacted with BTM, and the outcome $MERGER1\_2 = 1$, in which firms transacted with UFJ. After attaching the propensity scores based on the multinomial probit estimation, we choose three pairs of values, namely $\{0,1\}$,$\{0,2\}$, and $\{1,2\}$. Using the third pair of outcomes, firms that transacted with UFJ are the treatment group and firms that transacted with BTM are the control group. Estimating the treatment effect allows us to examine if there are any asymmetries in the way firms are affected by the merger depending on which of the two banks they transacted with, that is, whether they transacted with the acquiring bank (BTM) or with the acquired bank (UFJ).

6 Results

6.1 Summary statistics

In this subsection, we provide summary statistics for the variables introduced in the previous section. Table 2 shows the summary statistics for the entire sample used for the multinomial probit model estimation, while Table 3 shows the summary statistics for the entire sample as well as for the subsamples that satisfy $MERGER0 = 1$, $MERGER1 = 1$, $MERGER1\_1 = 1$, $MERGER1\_2 = 1$, and $MERGER2 = 1$. Finally, Table 4 summarizes the variables used for measuring outcomes of the bank merger.

6.1.1 Variables used for the multinomial probit model estimation

Table 2 shows that the means of $MERGER0$, $MERGER1$, $MERGER2$, $MERGER1\_1$, and $MERGER1\_2$ are 0.732, 0.211, 0.058, 0.095, and 0.116, respectively, indicating that about 73% of firms in the entire sample did not have a transaction relationship with either of the merged banks prior to the merger, while about 21% had a transaction relationship with one of them and a further 6% with both. The 21% of firms that used to transact with one of the merged banks are relatively evenly split between those that used to transact with BTM (10%) and those that used to transact with UFJ (12%).

The mean values of $lnEMP$ is 2.71, corresponding to about 15 employees in real terms. The distributions of these variables are skewed to the left, with an overwhelming majority of small firms and a small number of large firms that significantly increase the mean values. The mean of the proxy for firms' credit risk, $SCORE$, is about 51, which is slightly above the average for all firms in the TDB database. In terms of firms' location, the $KANTO$ area has the largest number of firms, followed by $KINKI$ and $TOKAI$.

Table 3 presents the summary statistics for the different subsamples. As can be seen, there are considerable differences across the subsamples in the means of many of the variables just mentioned. The mean of $\ln AGE$ differs moderately across subsamples: firms that transacted with both BTM and UFJ ($MERGER2 = 1$) are the oldest on average, while those that transacted with neither of the two ($MERGER0 = 1$) are the youngest. On the other hand, there are substantial differences in the variables on firm size: firms that transacted with both BTM and UFJ ($MERGER2 = 1$) were the largest in terms of employment with a mean of 51 employees, followed by firms that transacted with one of the merged banks ($MERGER1 = 1$), while firms that transacted with neither of the merged banks were the smallest with a mean of 12 employees. Similar patterns can be found regarding the number of banks each firm transacted with as well as the credit score in that firms that fell into the $MERGER2 = 1$ group have the highest values on average, followed by those falling into the $MERGER1 = 1$ group. Since BTM and UFJ were city banks and the second- and fourth-largest in Japan, respectively, firms that transacted with them were on average also larger and more creditworthy than most other firms.

Firms' location also differs significantly across the different subsamples, which presumably reflects the geographical distribution of bank branches. The bank branches of both BTM and UFJ were concentrated in the metropolitan areas of $KANTO$ and $KINKI$, and there is also a concentration of UFJ branches in the area of $TOKAI$. Note, however, that each bank had at least one branch in each area. Approximately half of the firms that transacted either with one or both of the banks ($MERGER1 = 1$ or $MERGER2 = 1$) are located in $KANTO$, about a quarter to a third are located in $KINKI$, and between 10 and 20% are located in $TOKAI$. These figures are much higher than the corresponding figures for firms that transacted with neither of the two ($MERGER0 = 1$). Taken together, these results suggest that there is considerable heterogeneity across the different subsamples, which is the reason why we decided to employ the matching approach outlined above.

6.1.2 Variables that measure the effects of the bank merger

Next, we provide an overview of the variables that measure the effects of the merger, including borrowing costs, loan availability, firms' behavior, and firms' ex-post performance. Table 4 shows not only the level of each outcome variable in the year one year prior to the merger ($t-1 = 2004$), but also its development from $t-1$ to $t+0$, $t+1$, $t+2$, $t+3$, $t+4$, and $t+5$. We choose year 2004 as the base year in order to avoid any possible confounding effect of the merger that was implemented in October 2005. For borrowing costs, the mean value for the entire sample in year $t-1$ is 2.74%. Looking at the different subsamples, firms that transacted with both banks ($MERGER2 = 1$) paid the lowest interest rates (2.51%), while those that transacted with neither ($MERGER0 = 1$) paid the highest rates (2.81%). Turning to the development in borrowing costs from year $t-1$, for the sample as a whole, there is actually a slight decrease from $t-1$ to $t+1$, followed by increases in $t+2$ and $t+3$. Then, the extent of increase rapidly shrinks to $t+4$ and turns negative to $t+5$. These trends reflect the tightening of monetary policy which started in March 2006 followed by the monetary easing in response to the depression after the world financial crisis. Looking at the different subsamples, firms that transacted with both banks ($MERGER2 = 1$) experienced the largest increase in borrowing costs from $t-1$ to $t+3$ (+0.53%), followed by firms that transacted with one of the banks ($MERGER1 = 1$) (+0.23%), while firms that transacted with neither bank ($MERGER0 = 1$) saw the smallest increase (+0.02%). Comparing between firms that transacted with BTM ($MERGER1\_1 = 1$) and those with UFJ ($MERGER1\_2 = 1$), the increase in borrowing costs appears to be larger in the former (+0.28%) than in the latter (+0.19%).

Figure 1 shows that there are considerable differences across the subsamples in the way the distribution of borrowing costs evolves over time from year $t-1$ to $t+3$. Specifically, the extent of the shift appears to be greatest for firms that transacted with both banks ($MERGER2 = 1$), second greatest for those that transacted with either one of them ($MERGER1 = 1$), and smallest for those that transacted with neither ($MERGER0 = 1$). Further, comparing between firms transacted with BTM ($MERGER1\_1 = 1$) and those with UFJ ($MERGER1\_2 = 1$), the extent of the shift appears more sizable in the former than in the latter. Even though a number of factors are yet to be controlled for, this simple comparison between subsamples suggests that firms that transacted with either one or both of the two merged banks tend to have experienced a larger increase in borrowing costs than firms that had no relationship with the two banks. We will revisit this point using the PSM-DID estimator later in this section.

Returning to Table 4, considerable differences across subsamples can also be observed for the loan availability variables. In year $t-1$, the levels of these variables were higher among firms that had transacted with neither of the banks ($MERGER0 = 1$) than those that had transacted with both ($MERGER2 = 1$). Moreover, for firms that had transacted with neither of the banks ($MERGER0 = 1$), $LOAN$ and $LONG$ three years after the merger ($t+3$) were actually higher (+1.29% and +1.36%) than in one year prior to the merger, while $SHORT$ had been slightly lower (-0.25%). In contrast, firms that transacted with one or both of the banks prior to the merger ($MERGER1 = 1$ or $MERGER2 = 1$) experienced a sizeable decline in all of these variables.

For the variables on firm behavior such as employment ($lnEMP$) and the investment ratio ($INVEST$), the levels of these variables were lower among firms that had transacted with neither of the banks ($MERGER0 = 1$) than those that had transacted with both ($MERGER2 = 1$). Moreover, for firms with $MERGER0 = 1$, $lnEMP$ was smaller (-2.61%) three years after the merger than one year prior to the merger, while it was larger (+1.74%) for firms with $MERGER2 = 1$. Similarly, the extent of decline in $INVEST$during the same period was larger for firms with $MERGER0 = 1$(-1.74%) than for those with $MERGER2 = 1$(-1.13%). Note, however, that all of these variables became lower five years after the merger for all the groups of firms, presumably due to the severe recession of the economy after the global financial crisis.

Let us examine the firm performance variables, cash flow (CF) and sales amount ($lnSALES$). As for CF, three years after the merger, firms that had transacted with one or both of the merged banks ($MERGER2 = 1$ or $MERGER1 = 1$) had experienced a smaller decline than firms that had transacted with neither of the banks ($MERGER0 = 1$). At the same time, the former also saw a substantial increase in $lnSALES$, while the latter experienced a slight decrease.

Lastly, for the variable on the number of firm-bank relationships for each firm ($NBANK$), its level was lower among firms that transacted with neither of the banks ($MERGER0 = 1$) than those that had transacted with both ($MERGER2 = 1$). Most notably, for firms with $MERGER2 = 1$, $NBANK$ dropped almost by one (-0.99) on the year of the merger ($t + 0$) than one year prior to the merger ($t - 1$) then gradually recover over the sample period to have the margin of the drop being -0.71. This indicates that the exogenous drop in the number of firm-bank relationships for firms that transacted with both of the merged banks has been partially but not fully recovered by the subsequent increase in the number of these relationships. We may therefore expect that the impact of the decline in the number of firm-bank relationships for firms with $MERGER2 = 1$ is persistent as well.

6.2 Multinomial probit estimation

We proceed to estimate the multinomial probit models in order to attach propensity scores to each observation. In our baseline model, we use $MTYPE1$. The marginal effects when $MTYPE1$ takes a value of 0, 1, or 2 are shown in panel (a) of Table 5. For these values of the dependent variable, most of the explanatory variables have significant parameters. The signs of the parameters are almost the same for values 1 and 2 and are consistent with what we observed in the summary statistics. We find that larger and more creditworthy firms, as well as firms located in metropolitan areas, are more likely to have had a transaction relationship with one or both of the banks. In addition, we find that the size of these parameters in most cases is larger for $MTYPE1 = 1$ than for $MTYPE1 = 2$.

In addition to the baseline model, we estimated a slightly different model in which the dependent variable is $MTYPE2$. The marginal effects when $MTYPE2$ takes a value of 0, 1, 2, or 3 are shown in panel (b) of Table 5. For some of the variables we observe different parameter values for $MTYPE2 = 1$ and $MTYPE2 = 2$, meaning that the characteristics of firms that transacted with BTM are somewhat different from those that transacted with UFJ. For example, although firms were more likely to have transacted with BTM or with UFJ the larger their number of employees and firm age, the size of the marginal effect is larger for BTM than for UFJ. In addition, the signs of the parameters on several of the area dummies differ for firms that transacted with BTM and those that transacted with UFJ. Being located in $TOKAI$ has a significant positive marginal effect on the likelihood that a firm will have transacted with UFJ, but no significant marginal effect on the likelihood that it will have transacted with BTM. Moreover, being located in $KANTO$ has a higher marginal effect on the likelihood that a firm will have transacted with BTM than that it will have transacted with UFJ, while the opposite is the case for $KINKI$. These differences in the regional parameters between the banks may reflect differences in the geographical distribution of bank branches.

Using the results of the above two multinomial probit model estimations, we form several pairs of outcomes in order to attach conditional propensity scores following Lechner's methodology. We then estimate the treatment effects. We detail these procedures in the next subsection.

6.3 Treatment effect estimation

In this subsection, we estimate the treatment effects of the bank merger using PSM-DID estimation. Since we allow for multiple treatments, we choose a pair of outcomes from the multinomial probit estimation in order to match treatment observations with non-treatment observations.

6.3.1 Examining Hypotheses 1 and 2

We employ the following three pairs of outcome values, $MTYPE1 = \{0, 2\}$, $\{1, 2\}$, and $\{0, 1\}$, and estimate the treatment effect within the group of firms that take either one of the values in each pair. Taking the first pair of outcomes, $MTYPE1 = \{0, 2\}$, as an example, firms whose outcome value corresponds to the second value in the bracket (2 in this case, indicating that a firm transacted with both banks) form the treatment group, while firms whose outcome value corresponds to the first value (0 in this case, indicating that a firm transacted with neither of the merged banks) form the non-treatment group. We calculate the conditional propensity scores for firms that belong to the treatment and non-treatment groups. We then apply the nearest-five with caliper matching procedure in order to choose a control group observation for each treatment observation. We conduct PSM-DID estimation for firms that belong to the treatment and control groups and compare the development in outcome variables over time between these groups. Note that we dropped firms that terminated the relationships with BTMU and those that newly started the relationships with BTMU after 2005 from the sample. Table 6 shows the results.

Let us start with column (1), which focuses on firms that transacted with both banks and experienced an exogenous decrease in the number of firm-bank relationships as a result of the merger. In the column, we observe significant increases in borrowing costs ($RATE$) for treatment firms relative to the control firms between years $t-1$ and $t+2$ to $t+5$. We observe the largest increase of 35 basis points (bp) between years $t-1$ and $t+3$. Further, we find another set of evidence for more stringent loan conditions after the merger in loan availability ($LOAN$and $LONG$). We observe significant decreases in $LOAN$and $LONG$ between years $t-1$and all the following years in the sample, with largest declines observed between years $t-1$ and $t+2$. In contrast, we find no significant treatment effects for short-term loans ($SHORT$). On balance, the above evidence provides support for Hypothesis 1, which stated that firms that transacted with both BTM and UFJ were expected to face higher switching costs and more stringent borrowing conditions, including higher interest rates and decreasing amount of loans, especially the amount of long-term loans, following the merger. Interestingly, the stringent loan conditions we have observed thus far for the treatment firms did not have an adverse impact on their employment and investment behavior or on their ex-post performance. For the variables on firm behavior, we observe significant increases in employment ($lnEMP$) for the treatment group relative to the control group between years $t-1$and $t+2$ and thereafter. For the variable on firm performance, we observe significant increases in sales ($lnSALES$) for the treatment firms between years $t-1$and $t+2$ to $t+3$. These results suggest that the treatment firms are not necessarily constrained in their employment and that they perform no worse than those that transacted with neither of the merged banks.

Next, turning to Column (3), it is noteworthy that even here we find significant treatment effects for $RATE$ between years $t-1$and $t+2$ to $t+5$. The size of the increase is in the range of 10 to 16 basis points, which indicates that the effect is persistent until the end of the sample period. We also observe significant decreases in $LOAN$ and $LONG$ between years $t-1$ and $t+1$ until the end of the sample period. The size of the decline is between -0.64 to -0.92 percentage points for $LOAN$ and between -0.55 to -0.77 percentage points for $LONG$. In contrast with the result in Column (1), treatment effects on employment, investment, sales, and cash flow are mostly insignificant and sometimes negative. For example, we observe negative treatment effects for $INVEST$ and $lnSALES$ between years $t-1$ to $t+0$. Since firms in the treatment and the control group have in common that they had a transaction relationship with the newly merged bank and they only differ in that the former transacted with both banks while the latter transacted with only one, one might expect that they were affected by the merger in the same way. Yet, this is not the case. What this suggests is that the merger reduced the number of financing sources for treatment firms (firms that transacted with both banks prior to the merger), resulting in a more stringent environment for the procurement of funds for these firms, while the number of financing sources for control firms remained unchanged.[5]

Further, Column (5) of Table 6 examines Hypothesis 2 that the procurement conditions of firms that transacted with at least one of the merged banks were adversely affected due to organizational changes at the merged bank. Possible adverse effects include the loss of soft

[5] Whether this result is a reflection of the Japanese context, where firm-bank relationships tend to be stable and establishing a new relationship is relatively costly, or whether a similar pattern can be observed elsewhere, is an interesting topic for future research.

information through the consolidation of branch networks and the reallocation of loan officers who have established long-term relationships with borrowers. On the other hand, it is also possible that firms that transacted with at least one of the merged banks before the merger may in fact enjoy more favorable procurement conditions after the merger, for example, because of efficiency improvements at the merged bank. The results in the table are mixed. Although negative effects dominate in firms' loan availability variables, we observe positive effects in a few variables on firm behavior and performance. On the one hand, treatment firms' borrowing costs ($RATE$) three years after the merger had increased by 12bp. This increase in $RATE$ remains until four years after the merger and seems to have disappeared since then. Treatment effects on loan variables, $LOAN$ and $LONG$, are negative between years $t-1$ and $t+0$ to $t+4$. On the other hand, treatment effects on the employment ($lnEMP$) and sales amount ($lnSALES$) are positive between years $t-1$ and all the subsequent years in the sample.

There are two additional remarks regarding the treatment effects obtained in the PSM-DID estimation in Table 6. First, the results in Table 6 suggest that it takes about two to three years for $RATE$ to increase by a statistically significant margin. However, this does not necessarily mean that most individual loan contracts were fixed for the first year or two after the merger. Our measure of borrowing costs is the amount of annual interest payments divided by the total amount of loans outstanding. It may well be the case that individual loan contracts were revised to higher interest rates immediately after the bank merger. However, it may take some time for these new contracts to make up a substantial share in the total amount of loans outstanding. Second, the significantly negative treatment effects for $LONG$ and almost no significant effects for $SHORT$ indicate that the maturity of loans for the treatment firms had become shorter relative to those in the control and that the interest rate for loans that comprised of long-term and short-term loans in the treatment group tend to become lower than the interest rate for the control group. However, despite such a downward bias for the treatment effects on the interest rate, $RATE$ actually increased significantly among treatment firms.

6.3.2 Examining Hypothesis 3

We now turn to the examination of Hypothesis 3, which states that firms that transacted with the acquired bank are expected to face more stringent loan conditions than firms that transacted with the acquiring bank. We form the following three pairs of outcome values: $MTYPE2 = \{0, 1\}$, $\{0, 2\}$, and $\{1, 2\}$. Firms whose outcome value corresponds to the second value in the bracket belong to the treatment group and firms whose outcome value corresponds to the first value belong to the non-treatment group. Following the same steps as in the baseline case, we calculate conditional propensity scores, apply the nearest-five matching procedure with a caliper to obtain a set of treatment and control observations, and obtain PSM-DID estimates for the treatment effects. Table 7 shows the results.

Looking at the results for $RATE$ three years after the merger ($t+3$) suggests that the positive treatment effects are observed for firms that transacted with BTM and those that transacted with UFJ. Specifically, relative to firms that transacted with neither of the two banks, firms that transacted with BTM saw an increase in $RATE$ of 19bp, while the corresponding figure for firms that transacted with UFJ is 12bp. Size of these effects is not statistically different between the two treatment groups, although the increase of $RATE$ appears more sizable for firms that transacted with BTM than for those with UFJ. Regarding the results for other loan availability variables of $LOAN$ and $LONG$, there are negative treatment effects for groups of firms that transacted with BTM or UFJ, respectively. As we saw in the case of $RATE$, size of these effects on $LOAN$ and $LONG$ is not statistically different between the two groups in most intervals. Thus, it seems that the newly merged bank did not treat former UFJ borrowers in a discriminatory manner in terms of borrowing costs or loan provision. This contrasts with the results reported by Karceski, Ongena, and Smith (2005), who, focusing on listed firms, found that the share prices of firms that had borrowed from the acquired bank underperformed significantly relative to those of firms that had borrowed from the acquiring bank.

7 Further Examinations

In addition to the examination of Hypotheses 1 through 3, we provide further empirical analyses. In the first two subsections we implement robustness checks using the same methodology of

PSM-DID we employed in the previous section. In the last subsection, we employ a parametric approach for examining the treatment effect of the bank merger in place of the non-parametric approach with PSM estimator.

7.1 Effects of merger-induced increase of market concentration

The first issue is related to the impact of an increase in market concentration that resulted from the merger between BTM and UFJ. Since the seminal study by Williamson (1968), much of the focus of the research on horizontal mergers, including bank mergers, has been on the effect through increased market power. Sapienza (2002), Garmaise and Moskowitz (2006), and Erel (2010) have established that merger-induced change in the market concentration has a significant impact on firms' loan availability and/or their ex-post performance. Sapienza and Erel identify loan markets that experienced a merger-induced increase in the market concentration by looking at the geographical distribution of areas where merged banks operated. They label such areas as "in-market merger" areas. Garmaise and Moskowitz identify areas that experienced merger-induced increase in the market concentration by counting the number of bank branches within a circle of 15-mile radius.

Our examination thus far has circumvented the issue of merger-induced changes in the market concentration by using the PSM method and by controlling for the impact through such changes. By PSM, we collect control group firms that have similar attributes as those in the treatment group, including locations and the Herfindahl-Hirschman Index that measures the degree of bank concentration for each of the 47 prefectures. Therefore, we have presumed that the extent of increases of market concentration is the same between treatment and control firms.

However, in order to check with the robustness and to verify that the bank merger really had a significant impact through firm-bank relationships rather than through market concentration, we control for the possible impact of merger-induced changes of market concentration in a more accurate manner by the following three ways: (1) limit the sample to prefectures in which many branches of both BTM and UFJ were located at the time of merger, (2) limit the sample to firms for which no less than one branch offices of both BTM and UFJ were located within a distance of 10 km, and (3) limit the sample to firms which transacted with at least one city bank at the time of the bank merger. In any of these three circumstances, we focus on the market with "in-market mergers" in which all the firms in each of the samples had a chance to transact with BTM and/or UFJ because they are geographically close to the branches of these banks or they had already transacted with other banks of the same type. In these samples, treatment and control firms are likely to face the same extent of merger-induced increase in market concentration.

In case of (1), there were a large number of branches of BTM and UFJ in the metropolitan areas of Tokyo and Osaka prefectures and therefore existed sizable market overlaps, in which case, all the firms located in these prefectures faced an increase of market concentration after the merger. In case of (2), we define a loan market for each firm as an area within a 10km radius. The loan market here is much smaller than any of the prefectures in the country.[6] Again, we focus on the firms whose loan market included both BTM and UFJ branches. In case of (3), we have a different presumption on the definition of loan markets from the previous ones. To be more specific, we regard a firm that had established a relationship with any of the city banks as the one that could potentially establish relationships with any other city banks, including BTM and UFJ. In this case, we consider the entire nation as a single loan market and focus on the firms that had transacted with at least one city bank at the time of the merger.

Tables 8(a) to 8(c) show the estimation results for the treatment effect of the bank merger. Overall, results in all the panels are qualitatively the same as those in the baseline estimation results in Table 6. For example, the treatment effects between $t-1$ and $t+3$ with regard to $RATE$ in columns (1) of Tables 8(a), (b), and (c) are 41, 37, and 33 basis points, respectively and comparable to the increase of 35 basis points in the baseline estimation. We observe qualitatively similar treatment effects in the same interval with regard to $RATE$ in other columns (3) and (5) of these tables, which are again comparable to the effects in the baseline case. Looking at other variables including those that represent loan amount ($LOAN$ and $LONG$), firm employment and investment behavior ($lnEMP$ and $INVEST$), and firm ex-post performance (CF and $lnSALES$), we find that the results are qualitatively the same with the ones in the baseline case.

[6] The size of the area surrounded by a 10 km radius circle is about 314 square kilometers, while the size of the smallest prefecture (Kagawa) is 1,876 square kilometers and the largest one (Hokkaido) being 83,456 square kilometers.

In sum, firms whose loan markets include both of BTM and UFJ experienced a quantitatively significant adverse impact of the merger in their loan conditions through firm-bank relationships. This underlines the relevance of firm-bank relationships in transmitting the impact of a bank merger even after controlling for the effect through the change in the market concentration.

7.2 Effects of relationship termination with the merged bank

The second issue we examine is the effect of relationship termination after the merger. After a bank merger, the merged bank and firms decide whether they keep incumbent transaction relationships, terminate them, or start new relationships. As Karceski, Ongena, and Smith (2005) put it succinctly, there are two possibilities for the ex-post performance of firms that drop from the relationships depending on the heterogeneity of borrower firms' switching costs. In case borrower firms have heterogeneous switching costs, an increase of the interest rate results in a termination of relationships that involves firms with low switching costs. As a result, welfare losses are more sizable among borrowers that kept the relationships than those that terminated them. In contrast, in case borrower firms have homogenous switching costs and a merged bank gives some of them discriminatory treatment, these discriminated firms terminate the relationships. As a result, welfare losses are more sizable among those that dropped the relationships than those that maintained. Whether termination of relationships with the merged bank is positively or negatively associated with borrower firms' performance is an empirical issue and we examine it in below.

In the baseline estimation, we have dropped firms that terminated relationships with the merged bank or those that newly started relationships with the merged bank after 2005 from the sample. In the analysis of this subsection, we include all of them in the sample and redo the DID based on the propensity scores we have obtained in the previous multinomial probit model estimation. Note that the firms that newly started relationships with BTMU after 2005 are classified as non-treatment firms since they did not transact with either BTM or UFJ. Table 9 shows the results.

Columns (1), (3), and (5) of Table 9 indicate that results are qualitatively the same for many outcome variables as those in the baseline estimation results in Table 6, while there are several conspicuous differences between them. For example, the treatment effects between $t-1$ and $t+3$ with regard to $RATE$ in columns (1), (3), and (5) are 39, 17, and 13 basis points, respectively and slightly larger than those in the baseline estimation, which are respectively 35, 16, and 12 basis points. We observe qualitatively similar treatment effects with regard to $LOAN$ and $LONG$ as in the baseline estimation results. Regarding the variable on employment $lnEMP$, positive treatment effects in Columns (1) and (5) of the baseline case either disappear or become smaller in the corresponding columns of Table 9. Similarly, the positive treatment effects for firm sales $lnSALES$ observed in Columns (1) and (5) of the baseline case turn almost insignificant in Table 9. In sum, firms that used to transact with BTM and/or UFJ and terminated the relationships with them tend to face slightly more stringent loan conditions and observe smaller increase in their employment as well as their sales than those that kept their relationship with the merged bank. Hence, the results are consistent with the story of homogenous switching costs accompanied by the discriminatory treatment by the merged bank in which case low growth firms were screened out from the incumbent relationships.

7.3 Effects of the number of banks

The final issue concerns the measurement of the interest rate paid by firms. While Sapienza (2002) and Erel (2011) employ contract-level interest rates, our interest rate variable is calculated as a firms' total annual interest payments divided by its total amount of loans outstanding. This means that our interest rate measure includes not only interest payments to BTM and/or UFJ, but also to other banks, and it is therefore difficult to isolate the effects of the pricing behaviour of the two banks.

One way to circumvent this problem of confounding factors with regard to the cost of borrowing is to control for the number of banks a firm transacts with at the time of the merger. If a firm in the treatment group for which $MTYPE1 = 2$(i.e., it had transaction relationships with both BTM and UFJ) had only two banks as transaction partners, then we know that after the merger it paid interest only to the newly merged bank. Further, if the number of banks a firm transacts with is greater than two but nevertheless small, the merged bank will still account for a large share of the firm's interest payments and the firm is therefore more likely to be affected by the merger than other treatment firms that transact with a large number of banks.

In order to control for the number of banks in the treatment effect estimation, we need to employ a parametric approach rather than the nonparametric approach of PSM estimator we have used thus far. In below, we first discuss similarities and differences between these two approaches and apply the parametric approach to examine the treatment effects depending on the number of firm-bank relationships at the time of merger.

Both the parametric and non-parametric estimators for the treatment effects are consistent under the assumption of unconfoundedness and the overlap condition. Since we introduce interaction terms and allow for the treatment effect to vary across subsamples, we employ the parametric estimator -Flores and Mitnik (2009) call it the partial mean linear estimator -rather than the non-parametric estimator, which is more flexible but relatively computationally burdensome. We show that this parametric partial mean linear estimator provides quantitatively similar results to those in the baseline case presented in Table 6. We focus on the development of interest rates, loan amount, employment, and sales, which are, $RATE$and $LOAN$, $lnEMP$, and $lnSALES$ between $t-1$ and $t+3$, since we found in Section 6 that these variables changed significantly between these periods. The equation for the baseline estimation is:

$$E\left[\Delta Y_{it+3}|X_i, MTYPE1_i\right] = const + \sum_{k\in\{1,2\}} \alpha_k 1(MTYPE1_i = k) + X_i'\delta \tag{1}$$

where Y_{it+3} is either one of the outcome variables of $RATE$, $LOAN$, $lnEMP$, and $lnSALES$. X_i is a vector of the explanatory variables employed in the previous section and $1(\cdot)$ is an indicator variable that is unity if the condition in parentheses is satisfied and zero otherwise. Our focus is on the parameters α_k with $k \in \{1,2\}$, which represent the treatment effect. α_2, $\alpha_2 - \alpha_1$, and α_1 respectively represent the treatment effects using the following pairs of outcome values: $MTYPE1 = \{0,2\}$, $\{1,2\}$, and $\{0,1\}$.

The results are shown in Table 10, with the column numbers corresponding to those in Table 6. The results are quantitatively similar to those for the non-parametric estimation in Table 6: The estimator values for $RATE$ are 35, 21, and 14bp, while the corresponding figures in Table 6 are 35, 16, and 12bp, respectively, with similar levels of statistical significance. The estimates for $LOAN$ are also quantitatively close to each other in these tables: The estimator values for $LOAN$ are -0.98%, 0.02% (insignificant), and -0.99% in Table 10, while the corresponding figures in Table 6 are -1.60%, -0.64% (marginally significant), and -1.02%. We also find that the estimates for $\ln EMP$ and $\ln SALES$ tend to show similar values between the tables. Hence, we start from this baseline parametric specification and add an interaction term to examine the impact of the number of banks each firm transacted with.

Based on this line of reasoning, we set up the following equation for the expected value of the change in $RATE$ conditional on the existence of a relationship with one or both of the merged banks, the number of banks, and the interaction term between the two:

$$E\left[\Delta RATE_{it+3} | X_i, MTYPE1_i, NBANK_i\right] = const + \sum_{k \in \{1,2\}} \alpha_k 1(MTYPE1_i = k)$$
$$+ \sum_{k \in \{1,2\}} \beta_k 1(\cdot) NBANK_i + \varphi NBANK_i + X_i^{'} \delta \tag{2}$$

Our aim is to measure the treatment effects represented by α_k and β_k. When we compare firms that transacted with both of the merged banks and those that transacted with neither of them, the treatment effect is calculated as $\alpha_2 + \beta_2 NBANK$. When we compare firms that transacted with either one of the merged banks and those that transacted with neither of them, the treatment effect is calculated as $\alpha_1 + \beta_1 NBANK$.

The results for the treatment effect, which differs depending on the number of banks each firm transacts with, are presented in Figure 2. In both cases, the size of the treatment effect gradually decreases as $NBANK$ increases.[7] This negative correlation between the size of the treatment effect and the number of banks is consistent with our discussion above in that the merger affects loan conditions more severely for firms with fewer alternative financing sources other than the merged banks.

8 Conclusion

This study examined the effects of a major bank merger on firms' financing conditions by focusing on Japan's largest bank merger in history, that between the Bank of Tokyo-Mitsubishi

[7]Note that firms for which $NBANK = 1$ are excluded from the sample since $p(MTYPE1 = 2 | NBANK = 1) = 0$ and thus these firms do not satisfy the positive support condition for $MTYPE1 = 2$.

(BTM) and UFJ Bank (UFJ) in 2005. In contrast with many previous studies investigating the effects of bank mergers, including those by Sapienza (2002) and Erel (2011), which concentrate on the impact on local loan markets, the present study focused on the role of firm-bank relationships in transmitting the effects of a bank merger. This emphasis on firm-bank relationships is based on the theoretical literature on financial intermediation (e.g., Sharpe 1990; Rajan 1992), which assumes that banks establish customer relationships with borrowers in order to gather information and that such information is available only to banks that have lent to a firm. In this case, it is unlikely that both incumbent and potential lenders are able to exercise market power and set loan conditions such as interest rates in a similar manner. Therefore, firm-bank relationships play an important role in determining loan conditions.

The megabank merger we used for our analysis provides an excellent case study for examining the relevance of such firm-bank relationships, since both of the merged banks had relationships with a large number of firms. In addition, a substantial number of firms had relationships with both banks at the time of the merger and continued to maintain them for a considerable period of time. Exploiting the information on firm-bank relationships in our dataset, we were able to investigate how the impact of the merger on firms' borrowing conditions differed depending on whether they had a transaction relationship with none, one, or both of the merged banks. Our findings can be summarized as follows.

First, the borrowing costs of firms that transacted with both BTM and UFJ prior to the merger increased by 35bp relative to firms that transacted with neither and they increased by 16bp relative to firms that transacted with either one of them. Both of these increases were persistent until five years after the merger. We also detect significant treatment effects even after controlling for the number of banks a firm transacted with. Second, the borrowing costs of firms that transacted with one of the two banks rose by a smaller but still significant margin of 12bp, while the increase became insignificant by the end of the sample period. Third, we do not find a significant difference in the extent of the relative increase in borrowing costs between firms that transacted with the acquiring bank (BTM) and those that transacted with the acquired bank (UFJ). Further, the above results that the bank merger increased firms' borrowing costs partly through an exogenous decrease in the number of firm-bank relationships and partly through changes in the merged bank's management are robust even after controlling for the merger-induced increase in market power.

There are several directions for future research. First, disentangling the mechanism in which borrower firms that used to transact with either one of the merged banks are charged higher interest rates is an important research issue. There are a number of changes being made in the newly merged banks ranging from branch consolidation to changes in the promotion system and we need to identify relevant factors that contribute to the change in the lending standards. Second, it would be worthwhile to analyze the impact of bank mergers on the Japanese loan market from a more comprehensive perspective rather than just focusing on one specific merger. Whether similar patterns can be found as in this study, i.e., that borrowers tend to face higher borrowing costs following a merger, has important policy implications.

A Appendix: Propensity Score Matching Estimation with Multiple Treatments

The treatment effect of the merger we would like to detect is the average treatment effect on the treated (ATT), which is expressed as

$$\theta_{ATT} = E\left(Y(1) \mid MTYPE = 1\right) - E\left(Y(0) \mid MTYPE = 1\right) \tag{3}$$

A simple comparison of the outcome variables for firms that transacted with a bank that merged ($MTYPE = 1$) and those for firms that did not ($MTYPE = 0$) can be biased. More precisely, if outcomes of $Y(0)$ are expected to be different between firms that transacted with the merged bank and those that transacted with neither of the merged banks, the simple comparison has the following bias:

$$\begin{aligned} & E\left(Y(1) \mid MTYPE = 1\right) - E\left(Y(0) \mid MTYPE = 0\right) \\ = \ & \theta_{ATT} + E\left(Y(0) \mid MTYPE = 1\right) - E\left(Y(0) \mid MTYPE = 0\right) \end{aligned} \tag{4}$$

To circumvent this problem, we need to control for possible selection bias in our estimation. Thus, we employ the propensity score matching (PSM) estimation approach proposed by Rosenbaum and Rubin (1983). Their methodology is applicable to the case in which the treatment is a binary choice. However, in practice, choices often are multinomial rather than binary. For example, among the firms that transacted with the merged banks, there is likely to be heterogeneity regarding the way they were involved with the banks that merged. That is, some firms will have transacted with the acquiring bank only, while others will have transacted with the acquired bank only, and yet others will have transacted with both banks. Since each of these treatment groups potentially faces different outcomes from the bank merger, it is necessary to examine the differences among the different treatment groups.

Lechner (2002) extends the analysis of Rosenbaum and Rubin, allowing for multiple treatments. In our case, we define the set of treatments as $MTYPE = \{0, 1, \ldots, M\}$, where $M \geq 2$. The corresponding outcomes for these treatments are $\{Y(0), Y(1), \ldots, Y(M)\}$. Unconfoundedness is assumed as

$$\{Y(0), Y(1), ..., Y(M)\} \perp MTYPE \mid X \tag{5}$$

Further, another assumption, which we call the balancing condition, has to be satisfied in order to ensure that we have a consistent estimator of the treatment effect,

$$X \perp MTYPE | p(X) \tag{6}$$

In other words, for a given propensity score, there exists a pool of treatment and control observations. They are, on average, identical and the treatment observations are randomly chosen from the pool. As Flores and Mitnik (2009) point out, satisfying the balancing condition is more difficult in the case of multiple treatments than in the case of a single treatment. Hence, it is important to check for the existence of overlaps prior to the matching estimation. To do so, we not only examine the distributions of propensity scores (results not shown in the paper) but also employ the caliper matching rule, which is the most suitable approach for this purpose. Caliper matching arbitrarily sets a tolerance level and for each treatment observation i searches a control observation j that satisfies the condition $c(p_i) = min_j \|p_i - p_j\| \leq \varepsilon$. For our analysis we do not use treatment observations for which we cannot find a matched observation satisfying the above condition. We set $\varepsilon = 0.01$ here. Thus, we are more likely to satisfy the balancing condition by employing caliper matching.

We estimate the multinomial probit model for the probability of each treatment $\{p^k\}_{k=0}^{M}$. Then we calculate the probability for the treatment m conditional on a pair of two treatments $\{l, m\}$:

$$\begin{aligned} p^{m|l,m}(X) &= p(MTYPE = m \mid MTYPE = l, or MTYPE = m, X) \\ &= \frac{p^m(X)}{p^l(X) + p^m(X)} \end{aligned} \tag{7}$$

We employ the propensity score matching difference-in-differences (PSM-DID) approach. Under the above assumptions, ATT is expressed as:

$$\theta_{ATT}^{l,m} = E_{p^{m|l,m}(X)|MTYPE=m}\left[\begin{array}{c} E\left\{\Delta Y(m) \mid p^{m|l,m}(X), MTYPE = m\right\} \\ -E\left\{\Delta Y(l) \mid p^{m|l,m}(X), MTYPE = l\right\} \end{array}\right] \tag{8}$$

$$= E\left(\Delta Y(m) \mid MTYPE = m\right) - E_{p^{m|l,m}(X)|MTYPE=m}\left[E\left\{\Delta Y(l) \mid p^{m|l,m}(X), MTYPE = l\right\}\right] \tag{9}$$

And a consistent PSM-DID estimator for ATT is

$$\hat{\theta}_{ATT}^{l,m} = \frac{1}{N_T} \sum_{i \in \{MTYPE=m\}} \left[\Delta Y_{it+k}(m) - \sum_{i \in \{MTYPE=l\}} w(i,j) \Delta Y_{jt+k}(l)\right] \tag{10}$$

Using this estimator, we take into consideration the heterogeneity in the way firms were involved with the banks that merged and examine how this heterogeneity affects ex-post firm-bank relationships as well as firms' borrowing conditions after the merger.

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Table 1: List of variables and their definitions

Variable	Definition
Variables used for propensity score estimation	
Dependent variable	
MERGER0	1 if the firm had a relationship with neither BTM nor UFJ in 2004, 0 otherwise.
MERGER1	1 if the firm had a relationship with either BTM or UFJ in 2004, 0 otherwise.
MERGER1_1	1 if the firm had a relationship with BTM in 2004, 0 otherwise.
MERGER1_2	1 if the firm had a relationship with UFJ in 2004, 0 otherwise.
MERGER2	1 if the firm had a relationship with both BTM and UFJ in 2004, 0 otherwise.
MTYPE1	0 if MERGER0=1, 1 if MERGER1=1, 2 if MERGER2=1
MTYPE2	0 if MERGER0=1, 1 if MERGER1=1=1, 2 if MERGER1_2=1, 3 if MERGER2=1
Firm characteristics	
lnAGE	Natural logarithm of firm age in 2004
lnEMP	Natural logarithm of number of employees in 2004
SCORE	Credit rating in 2004 taking a value from 0 to 100
SALESGROWTH	Growth rate of sales from 2003 to 2004
CF	Sum of ordinary profit and depreciation / total asset
CASH	Cash and deposit / total asset
FIXED	Fixed tangible asset / total asset
NBANK	Number of bank relationships in 2004
Lending market condition	
HHI	Herfindahl Hirschman Index of concentration of banking activities by prefecture based on the number of firm-bank relationships
Firm location	
HOKKAIDO	1 if the firm is located in Hokkdaido, 0 otherwise.
TOHOKU	1 if the firm is located in Tohoku, 0 otherwise.
KANTO	1 if the firm is located in Kanto, 0 otherwise.
KOSHINETSU	1 if the firm is located in Koshinetsu (Niigata, Nagano, and Yamanashi), 0 otherwise.
HOKURIKU	1 if the firm is located in Hokuriku (Ishikawa, Toyama, and Fukui), 0 otherwise.
TOKAI	1 if the firm is located in Tokai (Aichi, Shizuoka, and Gifu), 0 otherwise.
KINKI	1 if the firm is located in Kinki, 0 otherwise.
CHUGOKU	1 if the firm is located in Chugoku, 0 otherwise.
SHIKOKU	1 if the firm is located in Shikoku, 0 otherwise.
KYUSHU	1 if the firm is located in Kyushu, 0 otherwise.
Firm industry dummies	
INDUSTRY1-11	1: Mining, 2: Construction, 3: Manufacturing, 4: Elecricity, gas, and heat supply, 5: Telecommunications, 6: Transportation, 7: Wholesale trade, 8: Retail trade, 9: Finance and insurance, 10: Restaurants and accommodation, 11: Other
Outcome variables	
RATE	Interest and discount expenses / the sum of long-term loans, short-term loans, and notes discounted
LOAN	Sum of long-term loans, short-term loans, and notes discounted / total asset
LONG	Long-term loans / total asset
SHORT	Sum of short-term loans and notes discounted / total asset
lnEMP	Natural logarithm of number of employees
INVEST	Sum of change in fixed tangible assets and depreciation / fixed tangible assets in the previous period
lnSALES	Natural logarithm of sales amount
CF	Sum of ordinary profit and depreciation / total asset

Table 2: Summary statistics for the entire sample

Variable	NOB	mean	sd	min	p25	p50	p75	max
Dependent variable								
MERGER0	112386	0.7315	0.4432					
MERGER1	112386	0.2107	0.4078					
MERGER1_1	112386	0.0948	0.2929					
MERGER1_2	112386	0.1159	0.3201					
MERGER2	112386	0.0578	0.2334					
Firm characteristics								
lnAGE	112386	3.1964	0.6396	0	2.7726	3.3322	3.6636	4.7875
lnEMP	112386	2.7104	1.3028	0	1.7918	2.6391	3.5553	6.6161
SCORE	112386	50.9138	7.6392	0	46	51	56	80
SALESGROWTH	112386	0.0390	0.2755	-0.6927	-0.1022	0.0081	0.1338	2.1545
CF	112386	0.0189	0.0873	-0.7825	0.0027	0.0162	0.0463	0.4061
CASH	112386	0.1920	0.1540	0.0010	0.0744	0.1531	0.2703	0.8203
FIXED	112386	0.2722	0.2105	0	0.0939	0.2330	0.4105	0.9055
NBANK	112386	3.4589	1.9923	0	2	3	4	10
Lending market condition								
HHI	112386	0.1860	0.0939	0.0879	0.1076	0.1548	0.2568	0.4201
Firm location								
HOKKAIDO	112386	0.0806	0.2722					
TOHOKU	112386	0.0770	0.2666					
KANTO	112386	0.3208	0.4668					
KOSHINETSU	112386	0.0586	0.2349					
HOKURIKU	112386	0.0307	0.1724					
TOKAI	112386	0.0980	0.2973					
KINKI	112386	0.1389	0.3458					
CHUGOKU	112386	0.0882	0.2835					
SHIKOKU	112386	0.0245	0.1544					
KYUSHU	112386	0.0828	0.2756					
Firm industry								
INDUSTRY1	112386	0.0019	0.0431					
INDUSTRY2	112386	0.5051	0.5000					
INDUSTRY3	112386	0.1432	0.3503					
INDUSTRY4	112386	0.0009	0.0295					
INDUSTRY5	112386	0.0010	0.0314					
INDUSTRY6	112386	0.0218	0.1460					
INDUSTRY7	112386	0.1894	0.3919					
INDUSTRY8	112386	0.0328	0.1782					
INDUSTRY9	112386	0.0221	0.1470					
INDUSTRY10	112386	0.0053	0.0727					
INDUSTRY11	112386	0.0766	0.2659					

Table 3: Summary statistics for subsamples

	ALL	Subsample				
		MERGER0	MERGER1	MERGER1_1	MERGER1_2	MERGER2
Firm characteristics						
lnAGE	3.1964	3.1362	3.3270	3.3304	3.3241	3.4817
lnEMP	2.7104	2.4620	3.2355	3.2961	3.1859	3.9401
SCORE	50.9138	49.8303	53.1028	53.2695	52.9665	56.6460
SALESGROWTH	0.0390	0.0341	0.0532	0.0532	0.0533	0.0490
CF	0.0189	0.0147	0.0288	0.0291	0.0286	0.0364
CASH	0.1920	0.1952	0.1834	0.1839	0.1831	0.1833
FIXED	0.2722	0.2837	0.2440	0.2362	0.2504	0.2286
NBANK	3.4589	2.9410	4.5058	4.6312	4.4032	6.1965
Lending market condition						
HHI	0.1860	0.2068	0.1326	0.1368	0.1291	0.1179
Firm location						
HOKKAIDO	0.0806	0.1065	0.0120	0.0152	0.0093	0.0037
TOHOKU	0.0770	0.1015	0.0121	0.0142	0.0104	0.0029
KANTO	0.3208	0.2578	0.4627	0.6714	0.2921	0.6005
KOSHINETSU	0.0586	0.0773	0.0094	0.0178	0.0025	0.0025
HOKURIKU	0.0307	0.0395	0.0072	0.0084	0.0062	0.0046
TOKAI	0.0980	0.0684	0.2016	0.0316	0.3406	0.0956
KINKI	0.1389	0.1013	0.2328	0.1464	0.3035	0.2716
CHUGOKU	0.0882	0.1109	0.0302	0.0443	0.0187	0.0112
SHIKOKU	0.0245	0.0306	0.0089	0.0094	0.0084	0.0040
KYUSHU	0.0828	0.1063	0.0231	0.0412	0.0083	0.0034
Firm industry						
INDUSTRY1	0.0019	0.0021	0.0013	0.0020	0.0007	0.0011
INDUSTRY2	0.5051	0.5954	0.2879	0.2558	0.3142	0.1536
INDUSTRY3	0.1432	0.1167	0.2110	0.2219	0.2021	0.2304
INDUSTRY4	0.0009	0.0010	0.0006	0.0008	0.0005	0.0005
INDUSTRY5	0.0010	0.0008	0.0013	0.0013	0.0013	0.0023
INDUSTRY6	0.0218	0.0198	0.0260	0.0292	0.0233	0.0315
INDUSTRY7	0.1894	0.1481	0.2844	0.2940	0.2765	0.3661
INDUSTRY8	0.0328	0.0315	0.0351	0.0329	0.0370	0.0406
INDUSTRY9	0.0221	0.0178	0.0326	0.0356	0.0301	0.0385
INDUSTRY10	0.0053	0.0047	0.0062	0.0052	0.0070	0.0100
INDUSTRY11	0.0766	0.0620	0.1137	0.1216	0.1072	0.1254
NOB	112386	82212	23676	10651	13025	6498

Table 4: Summary statistics for the level and development of outcome variables

	ALL	Subsample				
		MERGER0	MERGER1	MERGER1_1	MERGER1_2	MERGER2
	mean	mean	mean	mean	mean	mean
RATE(t-1)	0.0274	0.0281	0.0257	0.0265	0.0251	0.0251
ΔRATE(t+0)	0.0000	0.0000	-0.0001	0.0000	-0.0002	0.0001
ΔRATE(t+1)	-0.0005	-0.0006	-0.0005	-0.0002	-0.0008	0.0000
ΔRATE(t+2)	0.0003	-0.0002	0.0008	0.0014	0.0003	0.0027
ΔRATE(t+3)	0.0012	0.0002	0.0023	0.0028	0.0019	0.0053
ΔRATE(t+4)	0.0003	-0.0005	0.0013	0.0017	0.0009	0.0035
ΔRATE(t+5)	-0.0021	-0.0029	-0.0014	-0.0014	-0.0015	0.0011
LOAN(t-1)	0.4437	0.4640	0.4106	0.4196	0.4032	0.3588
ΔLOAN(t+0)	-0.0009	0.0025	-0.0062	-0.0074	-0.0052	-0.0134
ΔLOAN(t+1)	-0.0058	0.0025	-0.0175	-0.0199	-0.0156	-0.0338
ΔLOAN(t+2)	-0.0090	0.0029	-0.0269	-0.0300	-0.0244	-0.0461
ΔLOAN(t+3)	-0.0016	0.0129	-0.0248	-0.0293	-0.0211	-0.0424
ΔLOAN(t+4)	0.0193	0.0349	-0.0035	-0.0091	0.0011	-0.0262
ΔLOAN(t+5)	0.0154	0.0327	-0.0065	-0.0145	0.0001	-0.0334
LONG(t-1)	0.2748	0.2934	0.2430	0.2473	0.2395	0.2025
ΔLONG(t+0)	0.0037	0.0054	0.0008	0.0011	0.0005	-0.0016
ΔLONG(t+1)	0.0046	0.0089	-0.0011	-0.0006	-0.0015	-0.0119
ΔLONG(t+2)	0.0033	0.0093	-0.0046	-0.0041	-0.0050	-0.0182
ΔLONG(t+3)	0.0063	0.0136	-0.0041	-0.0045	-0.0037	-0.0181
ΔLONG(t+4)	0.0316	0.0409	0.0196	0.0192	0.0200	0.0004
ΔLONG(t+5)	0.0332	0.0432	0.0224	0.0179	0.0262	-0.0004
SHORT(t-1)	0.1651	0.1661	0.1653	0.1703	0.1612	0.1551
ΔSHORT(t+0)	-0.0047	-0.0029	-0.0072	-0.0081	-0.0065	-0.0115
ΔSHORT(t+1)	-0.0109	-0.0072	-0.0170	-0.0203	-0.0142	-0.0214
ΔSHORT(t+2)	-0.0129	-0.0075	-0.0223	-0.0257	-0.0195	-0.0262
ΔSHORT(t+3)	-0.0091	-0.0025	-0.0208	-0.0246	-0.0176	-0.0241
ΔSHORT(t+4)	-0.0140	-0.0083	-0.0239	-0.0285	-0.0200	-0.0266
ΔSHORT(t+5)	-0.0198	-0.0139	-0.0288	-0.0330	-0.0254	-0.0323

Table 4: Summary statistics for the level and development of outcome variables (continued)

	ALL	Subsample				
		MERGER0	MERGER1	MERGER1_1	MERGER1_2	MERGER2
	mean	mean	mean	mean	mean	mean
lnEMP(t-1)	2.8237	2.5620	3.2440	3.3013	3.1967	3.9406
ΔlnEMP(t+0)	-0.0028	-0.0062	0.0045	0.0057	0.0035	0.0031
ΔlnEMP(t+1)	-0.0021	-0.0101	0.0148	0.0164	0.0135	0.0078
ΔlnEMP(t+2)	-0.0034	-0.0165	0.0238	0.0255	0.0224	0.0149
ΔlnEMP(t+3)	-0.0094	-0.0261	0.0241	0.0256	0.0228	0.0174
ΔlnEMP(t+4)	-0.0166	-0.0308	0.0120	0.0115	0.0125	0.0016
ΔlnEMP(t+5)	-0.0268	-0.0392	-0.0029	-0.0063	-0.0002	-0.0147
INVEST(t-1)	0.0689	0.0629	0.0803	0.0836	0.0775	0.0894
ΔINVEST(t+0)	0.0039	0.0011	0.0176	0.0116	0.0226	-0.0154
ΔINVEST(t+1)	0.0111	0.0084	0.0204	0.0228	0.0184	0.0035
ΔINVEST(t+2)	0.0071	0.0039	0.0214	0.0297	0.0144	-0.0124
ΔINVEST(t+3)	-0.0131	-0.0174	-0.0034	0.0131	-0.0172	-0.0113
ΔINVEST(t+4)	-0.0327	-0.0358	-0.0250	-0.0289	-0.0217	-0.0336
ΔINVEST(t+5)	-0.0498	-0.0470	-0.0542	-0.0480	-0.0593	-0.0546
lnSALES(t-1)	13.3070	12.9377	13.9477	13.9951	13.9087	14.7682
ΔlnSALES(t+0)	0.0132	0.0037	0.0343	0.0336	0.0348	0.0288
ΔlnSALES(t+1)	0.0340	0.0196	0.0617	0.0654	0.0585	0.0628
ΔlnSALES(t+2)	0.0499	0.0284	0.0924	0.0986	0.0874	0.0891
ΔlnSALES(t+3)	0.0267	-0.0029	0.0811	0.0904	0.0734	0.0924
ΔlnSALES(t+4)	-0.0585	-0.0787	-0.0207	-0.0134	-0.0268	-0.0225
ΔlnSALES(t+5)	-0.1218	-0.1336	-0.1038	-0.0948	-0.1112	-0.0956
CF(t-1)	0.0203	0.0156	0.0290	0.0291	0.0290	0.0366
ΔCF(t+0)	-0.0018	-0.0030	0.0007	0.0002	0.0012	-0.0001
ΔCF(t+1)	-0.0027	-0.0043	0.0001	0.0003	0.0000	0.0014
ΔCF(t+2)	-0.0038	-0.0060	0.0002	0.0004	0.0000	0.0007
ΔCF(t+3)	-0.0099	-0.0127	-0.0048	-0.0039	-0.0056	-0.0032
ΔCF(t+4)	-0.0227	-0.0239	-0.0213	-0.0197	-0.0225	-0.0182
ΔCF(t+5)	-0.0176	-0.0183	-0.0174	-0.0153	-0.0192	-0.0137
NBANK(t-1)	3.7819	3.2693	4.5476	4.6707	4.4461	6.1657
ΔNBANK(t+0)	-0.0169	0.0748	0.0456	0.0420	0.0487	-0.9927
ΔNBANK(t+1)	0.0371	0.1351	0.0961	0.0971	0.0953	-0.9058
ΔNBANK(t+2)	0.0772	0.1681	0.1495	0.1505	0.1486	-0.8372
ΔNBANK(t+3)	0.0908	0.1706	0.1807	0.1729	0.1872	-0.7930
ΔNBANK(t+4)	0.1007	0.1658	0.2393	0.2138	0.2605	-0.7768
ΔNBANK(t+5)	0.1172	0.1649	0.2990	0.2672	0.3251	-0.7063

Table 5: Multinomial probit estimation results

(a) Baseline estimation

Multinomial probit estimation results

Dependent variable: MTYPE1={0, 1, 2}

	dy/dx	p>|z|	Std. err.	dy/dx	p>|z|	Std. err.	dy/dx	p>|z|	Std. err.
	MTYPE1=0			MTYPE1=1			MTYPE1=2		
lnAGE	-0.0214	***	0.0020	0.0202	***	0.0020	0.0012	***	0.0002
lnEMP	-0.0279	***	0.0012	0.0262	***	0.0012	0.0017	***	0.0001
SCORE	-0.0036	***	0.0002	0.0032	***	0.0002	0.0004	***	0.0000
SALESGROWTH	-0.0043		0.0045	0.0049		0.0045	-0.0007	*	0.0004
CF	-0.0048		0.0158	0.0034		0.0156	0.0014		0.0014
CASH	0.0167	*	0.0088	-0.0169	*	0.0087	0.0002		0.0007
FIXED	0.1218	***	0.0063	-0.1145	***	0.0061	-0.0074	***	0.0006
NBANK	-0.0453	***	0.0007	0.0424	***	0.0006	0.0029	***	0.0002
HHI	1.0031	***	0.0208	-0.9485	***	0.0205	-0.0546	***	0.0034
TOHOKU	-0.1865	***	0.0150	0.1653	***	0.0148	0.0213	***	0.0069
KANTO	-0.4823	***	0.0099	0.3991	***	0.0102	0.0833	***	0.0091
KOSHINETSU	-0.2101	***	0.0179	0.1844	***	0.0174	0.0258	***	0.0090
HOKURIKU	-0.3268	***	0.0229	0.2418	***	0.0222	0.0850	***	0.0210
TOKAI	-0.6566	***	0.0101	0.5786	***	0.0132	0.0780	***	0.0121
KINKI	-0.5728	***	0.0116	0.4583	***	0.0140	0.1145	***	0.0149
CHUGOKU	-0.3013	***	0.0147	0.2738	***	0.0147	0.0274	***	0.0068
SHIKOKU	-0.3504	***	0.0213	0.2973	***	0.0215	0.0531	***	0.0148
KYUSHU	-0.2480	***	0.0148	0.2393	***	0.0148	0.0087	**	0.0037
INDUSTRY1	0.0595	***	0.0199	-0.0574	***	0.0197	-0.0021	**	0.0009
INDUSTRY2	0.0985	***	0.0044	-0.0941	***	0.0043	-0.0044	***	0.0004
INDUSTRY3	0.0344	***	0.0041	-0.0328	***	0.0041	-0.0016	***	0.0002
INDUSTRY4	0.0868	***	0.0214	-0.0838	***	0.0213	-0.0029	***	0.0005
INDUSTRY5	0.0117		0.0313	-0.0147		0.0306	0.0030		0.0028
INDUSTRY6	0.0582	***	0.0058	-0.0562	***	0.0057	-0.0020	***	0.0003
INDUSTRY7	0.0123	***	0.0044	-0.0124	***	0.0044	0.0001		0.0003
INDUSTRY8	0.0496	***	0.0054	-0.0479	***	0.0053	-0.0017	***	0.0003
INDUSTRY9	0.0410	***	0.0061	-0.0393	***	0.0060	-0.0017	***	0.0003
INDUSTRY10	0.0249	*	0.0131	-0.0256	**	0.0128	0.0007		0.0011
NOB	112386								
Wald chi2 (56)	36118.18								
p-value	0.0000								
Log likelihood	-53094.719								

(b) Estimation with four outcome values

Multinomial probit estimation results

Dependent variable: MTYPE2={0, 1, 2, 3}

	dy/dx	p>|z|	Std. err.	dy/dx	p>|z|	Std. err.	dy/dx	p>|z|	Std. err.	dy/dx	p>|z|	Std. err.
	MTYPE2=0			MTYPE2=1			MTYPE2=2			MTYPE2=3		
lnAGE	-0.0198	***	0.0019	0.0111	***	0.0013	0.0074	***	0.0013	0.0013	***	0.0002
lnEMP	-0.0267	***	0.0011	0.0138	***	0.0008	0.0111	***	0.0008	0.0018	***	0.0001
SCORE	-0.0035	***	0.0002	0.0013	***	0.0001	0.0018	***	0.0001	0.0004	***	0.0000
SALESGROWTH	-0.0029		0.0043	0.0012		0.0029	0.0024		0.0029	-0.0007	*	0.0004
CF	-0.0059		0.0150	-0.0011		0.0103	0.0055		0.0103	0.0014		0.0015
CASH	0.0164	**	0.0083	-0.0074		0.0058	-0.0092	*	0.0056	0.0002		0.0007
FIXED	0.1175	***	0.0059	-0.0639	***	0.0041	-0.0457	***	0.0040	-0.0079	***	0.0006
NBANK	-0.0435	***	0.0006	0.0209	***	0.0004	0.0195	***	0.0004	0.0032	***	0.0002
HHI	0.9486	***	0.0205	-0.4363	***	0.0162	-0.4534	***	0.0141	-0.0589	***	0.0036
TOHOKU	-0.1814	***	0.0149	0.0711	***	0.0117	0.0878	***	0.0129	0.0225	***	0.0073
KANTO	-0.4683	***	0.0099	0.2199	***	0.0092	0.1598	***	0.0086	0.0886	***	0.0097
KOSHINETSU	-0.1856	***	0.0178	0.1496	***	0.0160	0.0075		0.0113	0.0285	***	0.0098
HOKURIKU	-0.3217	***	0.0231	0.0993	***	0.0176	0.1353	***	0.0201	0.0872	***	0.0216
TOKAI	-0.6437	***	0.0113	-0.0012		0.0056	0.5643	***	0.0160	0.0806	***	0.0126
KINKI	-0.5671	***	0.0120	0.0956	***	0.0093	0.3536	***	0.0154	0.1179	***	0.0155
CHUGOKU	-0.2903	***	0.0148	0.1548	***	0.0134	0.1057	***	0.0126	0.0298	***	0.0074
SHIKOKU	-0.3472	***	0.0216	0.1068	***	0.0173	0.1856	***	0.0212	0.0548	***	0.0153
KYUSHU	-0.2246	***	0.0149	0.1765	***	0.0144	0.0380	***	0.0103	0.0100	**	0.0042
INDUSTRY1	0.0494	**	0.0196	0.0063		0.0181	-0.0534	***	0.0063	-0.0024	**	0.0010
INDUSTRY2	0.0945	***	0.0041	-0.0473	***	0.0028	-0.0424	***	0.0028	-0.0048	***	0.0004
INDUSTRY3	0.0318	***	0.0039	-0.0049	*	0.0028	-0.0252	***	0.0023	-0.0017	***	0.0002
INDUSTRY4	0.0806	***	0.0192	-0.0346	**	0.0142	-0.0428	***	0.0116	-0.0032	***	0.0006
INDUSTRY5	0.0102		0.0292	-0.0028		0.0190	-0.0105		0.0189	0.0032		0.0030
INDUSTRY6	0.0537	***	0.0053	-0.0177	***	0.0039	-0.0339	***	0.0031	-0.0021	***	0.0003
INDUSTRY7	0.0113	***	0.0041	0.0015		0.0029	-0.0129	***	0.0026	0.0001		0.0003
INDUSTRY8	0.0467	***	0.0049	-0.0233	***	0.0032	-0.0216	***	0.0033	-0.0018	***	0.0003
INDUSTRY9	0.0387	***	0.0055	-0.0178	***	0.0037	-0.0191	***	0.0037	-0.0018	***	0.0003
INDUSTRY10	0.0239	**	0.0121	-0.0184	**	0.0076	-0.0063		0.0086	0.0009		0.0012
NOB	112386											
Wald chi2 (84)	41639.24											
p-value	0.0000											
Log likelihood	-66030.659											

Table 6: Treatment effects estimation results
Baseline estimation

		Method: Nearest five matching within radius								
		Treated: MTYPE1=2			Treated: MTYPE1=2			Treated: MTYPE1=1		
		Control: MTYPE1=0			Control: MTYPE1=1			Control: MTYPE1=0		
		(1)		(2)	(3)		(4)	(5)		(6)
Variables		DID		Std. err.	DID		Std. err.	DID		Std. err.
RATE	t+0	0.0000		0.0006	0.0001		0.0004	-0.0001		0.0003
	t+1	0.0007		0.0007	0.0002		0.0004	0.0003		0.0004
	t+2	0.0021	***	0.0008	0.0014	***	0.0005	0.0005		0.0004
	t+3	0.0035	***	0.0008	0.0016	***	0.0005	0.0012	***	0.0004
	t+4	0.0024	***	0.0009	0.0010	*	0.0005	0.0007	*	0.0004
	t+5	0.0018	**	0.0009	0.0015	***	0.0005	0.0003		0.0004
LOAN	t+0	-0.0074	**	0.0032	-0.0022		0.0019	-0.0030		0.0019
	t+1	-0.0177	***	0.0043	-0.0092	***	0.0027	-0.0065	***	0.0025
	t+2	-0.0232	***	0.0051	-0.0072	**	0.0031	-0.0114	***	0.0029
	t+3	-0.0160	***	0.0060	-0.0064	*	0.0035	-0.0102	***	0.0033
	t+4	-0.0149	**	0.0071	-0.0067	*	0.0038	-0.0060		0.0038
	t+5	-0.0129	*	0.0076	-0.0073	*	0.0042	-0.0060		0.0042
LONG	t+0	-0.0066	**	0.0027	-0.0002		0.0016	-0.0042	***	0.0015
	t+1	-0.0130	***	0.0036	-0.0077	***	0.0021	-0.0063	***	0.0021
	t+2	-0.0173	***	0.0045	-0.0060	**	0.0025	-0.0081	***	0.0024
	t+3	-0.0152	***	0.0050	-0.0058	**	0.0028	-0.0069	**	0.0028
	t+4	-0.0117	**	0.0059	-0.0055	*	0.0031	-0.0061	*	0.0032
	t+5	-0.0124	*	0.0066	-0.0074	**	0.0033	-0.0057		0.0036
SHORT	t+0	-0.0002		0.0027	-0.0017		0.0017	0.0011		0.0014
	t+1	-0.0039		0.0034	-0.0009		0.0021	-0.0005		0.0018
	t+2	-0.0040		0.0039	0.0006		0.0024	-0.0027		0.0021
	t+3	-0.0001		0.0044	-0.0004		0.0027	-0.0027		0.0024
	t+4	-0.0021		0.0050	-0.0007		0.0029	0.0002		0.0026
	t+5	0.0010		0.0052	0.0020		0.0030	0.0014		0.0028
lnEMP	t+0	0.0065		0.0063	-0.0042		0.0041	0.0064	**	0.0031
	t+1	0.0071		0.0092	-0.0102	*	0.0056	0.0146	***	0.0045
	t+2	0.0261	**	0.0110	-0.0102		0.0066	0.0302	***	0.0053
	t+3	0.0313	**	0.0122	-0.0064		0.0074	0.0370	***	0.0060
	t+4	0.0367	***	0.0141	-0.0084		0.0083	0.0415	***	0.0068
	t+5	0.0490	***	0.0164	-0.0067		0.0093	0.0471	***	0.0078
INVEST	t+0	-0.0197		0.0275	-0.0357	**	0.0168	0.0085		0.0126
	t+1	0.0207		0.0292	-0.0185		0.0170	0.0155		0.0136
	t+2	0.0230		0.0297	-0.0269		0.0169	0.0318	**	0.0136
	t+3	0.0187		0.0317	-0.0158		0.0178	0.0223		0.0136
	t+4	0.0029		0.0288	-0.0094		0.0168	0.0070		0.0138
	t+5	0.0141		0.0294	0.0042		0.0156	-0.0038		0.0141
lnSALES	t+0	-0.0027		0.0062	-0.0081	**	0.0040	0.0106	***	0.0033
	t+1	0.0109		0.0086	-0.0024		0.0055	0.0161	***	0.0045
	t+2	0.0280	***	0.0108	-0.0074		0.0070	0.0310	***	0.0055
	t+3	0.0385	***	0.0127	0.0038		0.0081	0.0336	***	0.0064
	t+4	0.0154		0.0144	-0.0100		0.0092	0.0282	***	0.0073
	t+5	0.0303	*	0.0161	0.0022		0.0101	0.0268	***	0.0082
CF	t+0	-0.0001		0.0017	0.0003		0.0010	0.0020	*	0.0010
	t+1	0.0014		0.0020	0.0021	*	0.0011	0.0016		0.0012
	t+2	0.0021		0.0022	0.0010		0.0013	0.0025	**	0.0012
	t+3	0.0020		0.0024	0.0023		0.0014	0.0017		0.0013
	t+4	-0.0036		0.0029	0.0022		0.0016	-0.0017		0.0015
	t+5	-0.0024		0.0026	0.0011		0.0015	-0.0021		0.0015

Note: *,**,*** indicate significance at the 10%, 5%, and 1% level respectively.

Table 7: Treatment effects estimation results
Estimation with four outcome values

		Method: Nearest five matching within radius								
		Treated: MTYPE2=1 (BTM)			Treated: MTYPE2=2 (UFJ)			Treated: MTYPE2=2 (UFJ)		
		Control: MTYPE2=0 (none)			Control: MTYPE2=0 (none)			Control: MTYPE2=1 (BTM)		
		(1)		(2)	(3)		(4)	(5)		(6)
		DID		Std. err.	DID		Std. err.	DID		Std. err.
RATE	t+0	0.0000		0.0004	-0.0004		0.0004	0.0004		0.0006
	t+1	0.0003		0.0004	0.0001		0.0004	0.0002		0.0007
	t+2	0.0011	**	0.0005	0.0005		0.0005	0.0002		0.0008
	t+3	0.0019	***	0.0005	0.0012	**	0.0005	0.0009		0.0009
	t+4	0.0015	***	0.0005	0.0004		0.0005	0.0014	*	0.0008
	t+5	0.0007		0.0005	0.0005		0.0005	0.0015	*	0.0008
LOAN	t+0	-0.0025		0.0022	-0.0033		0.0023	0.0037		0.0036
	t+1	-0.0068	**	0.0029	-0.0070	**	0.0030	0.0049		0.0047
	t+2	-0.0100	***	0.0034	-0.0118	***	0.0035	-0.0012		0.0056
	t+3	-0.0098	***	0.0038	-0.0089	**	0.0040	0.0013		0.0063
	t+4	-0.0080	*	0.0043	-0.0083	*	0.0047	-0.0013		0.0070
	t+5	-0.0103	**	0.0049	-0.0036		0.0052	0.0033		0.0078
LONG	t+0	-0.0047	**	0.0018	-0.0055	***	0.0019	0.0023		0.0029
	t+1	-0.0072	***	0.0024	-0.0084	***	0.0025	0.0042		0.0039
	t+2	-0.0076	***	0.0028	-0.0106	***	0.0029	0.0079	*	0.0045
	t+3	-0.0063	**	0.0031	-0.0096	***	0.0034	0.0076		0.0051
	t+4	-0.0050		0.0037	-0.0114	***	0.0041	0.0037		0.0059
	t+5	-0.0090	**	0.0040	-0.0062		0.0044	0.0187	***	0.0063
SHORT	t+0	0.0026		0.0018	0.0014		0.0017	0.0011		0.0029
	t+1	-0.0008		0.0022	0.0013		0.0022	0.0008		0.0036
	t+2	-0.0015		0.0025	-0.0003		0.0026	-0.0096	**	0.0044
	t+3	-0.0027		0.0028	0.0012		0.0029	-0.0064		0.0047
	t+4	-0.0022		0.0031	0.0027		0.0033	-0.0062		0.0049
	t+5	-0.0010		0.0033	0.0052		0.0034	-0.0133	**	0.0053
lnEMP	t+0	0.0092	**	0.0037	0.0044		0.0038	0.0005		0.0064
	t+1	0.0176	***	0.0053	0.0142	**	0.0056	0.0021		0.0089
	t+2	0.0353	***	0.0063	0.0297	***	0.0068	-0.0083		0.0107
	t+3	0.0414	***	0.0071	0.0370	***	0.0075	-0.0183		0.0122
	t+4	0.0450	***	0.0081	0.0374	***	0.0086	0.0116		0.0138
	t+5	0.0458	***	0.0092	0.0450	***	0.0096	0.0199		0.0156
INVEST	t+0	0.0143		0.0155	0.0094		0.0158	0.0423		0.0261
	t+1	0.0100		0.0167	0.0223		0.0167	0.0343		0.0273
	t+2	0.0436	***	0.0166	0.0245		0.0167	-0.0077		0.0280
	t+3	0.0305	*	0.0172	0.0108		0.0171	-0.0102		0.0285
	t+4	0.0023		0.0171	0.0090		0.0174	0.0206		0.0292
	t+5	0.0046		0.0175	-0.0045		0.0176	0.0022		0.0276
lnSALES	t+0	0.0086	**	0.0040	0.0092	**	0.0040	-0.0006		0.0068
	t+1	0.0168	***	0.0055	0.0077		0.0056	-0.0189	**	0.0096
	t+2	0.0335	***	0.0067	0.0201	***	0.0068	-0.0176		0.0116
	t+3	0.0376	***	0.0078	0.0247	***	0.0079	-0.0240	*	0.0135
	t+4	0.0321	***	0.0088	0.0211	**	0.0092	-0.0133		0.0152
	t+5	0.0305	***	0.0099	0.0156		0.0103	-0.0026		0.0170
CF	t+0	0.0016		0.0012	0.0020		0.0012	0.0005		0.0021
	t+1	0.0021		0.0014	0.0020		0.0014	-0.0043	**	0.0022
	t+2	0.0023		0.0014	0.0016		0.0015	-0.0015		0.0023
	t+3	0.0023		0.0015	0.0022		0.0017	-0.0004		0.0025
	t+4	-0.0003		0.0018	-0.0021		0.0019	-0.0045		0.0029
	t+5	-0.0008		0.0018	-0.0019		0.0019	-0.0028		0.0029

Note: *,**,*** indicate significance at the 10%, 5%, and 1% level respectively.

Table 8: Treatment effect estimation results

(a) Tokyo and Osaka prefectures

		Method: Nearest five matching within radius					
		Treated: MTYPE1=2 Control: MTYPE1=0		Treated: MTYPE1=2 Control: MTYPE1=1		Treated: MTYPE1=1 Control: MTYPE1=0	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	Std. err.	DID	Std. err.	DID	Std. err.
RATE	t+0	0.0004	0.0009	0.0001	0.0005	-0.0003	0.0005
	t+1	0.0010	0.0011	0.0001	0.0006	0.0003	0.0006
	t+2	0.0028 **	0.0012	0.0014 **	0.0006	0.0005	0.0007
	t+3	0.0041 ***	0.0012	0.0016 **	0.0007	0.0018 **	0.0007
	t+4	0.0023 *	0.0012	0.0011	0.0007	0.0008	0.0007
	t+5	0.0011	0.0012	0.0020 ***	0.0007	-0.0006	0.0007
LOAN	t+0	-0.0053	0.0049	-0.0037	0.0025	-0.0010	0.0032
	t+1	-0.0176 ***	0.0066	-0.0106 ***	0.0036	-0.0055	0.0041
	t+2	-0.0158 **	0.0078	-0.0099 **	0.0041	-0.0082 *	0.0049
	t+3	-0.0119	0.0092	-0.0096 **	0.0046	-0.0101 *	0.0056
	t+4	-0.0029	0.0096	-0.0098 *	0.0051	-0.0033	0.0066
	t+5	-0.0063	0.0109	-0.0077	0.0056	-0.0047	0.0076
LONG	t+0	-0.0129 ***	0.0042	-0.0016	0.0021	-0.0056 **	0.0028
	t+1	-0.0184 ***	0.0056	-0.0094 ***	0.0028	-0.0065 *	0.0036
	t+2	-0.0200 ***	0.0067	-0.0079 **	0.0034	-0.0094 **	0.0042
	t+3	-0.0226 ***	0.0082	-0.0090 **	0.0037	-0.0115 **	0.0048
	t+4	-0.0137	0.0089	-0.0116 ***	0.0042	-0.0103 *	0.0058
	t+5	-0.0201 **	0.0097	-0.0101 **	0.0045	-0.0164 **	0.0066
SHORT	t+0	0.0083 **	0.0041	-0.0012	0.0021	0.0045 *	0.0025
	t+1	0.0017	0.0054	-0.0004	0.0028	0.0006	0.0032
	t+2	0.0064	0.0062	-0.0004	0.0032	0.0025	0.0037
	t+3	0.0107	0.0071	-0.0004	0.0036	0.0029	0.0041
	t+4	0.0103	0.0075	0.0021	0.0038	0.0074	0.0046
	t+5	0.0149 *	0.0079	0.0052	0.0040	0.0116 **	0.0048
lnEMP	t+0	0.0006	0.0103	-0.0074	0.0050	0.0122 **	0.0057
	t+1	0.0158	0.0154	-0.0142 **	0.0070	0.0213 **	0.0086
	t+2	0.0474 ***	0.0183	-0.0148 *	0.0085	0.0389 ***	0.0101
	t+3	0.0415 **	0.0199	-0.0068	0.0095	0.0418 ***	0.0111
	t+4	0.0521 **	0.0219	-0.0170	0.0108	0.0539 ***	0.0128
	t+5	0.0802 ***	0.0256	-0.0059	0.0122	0.0685 ***	0.0147
INVEST	t+0	-0.0090	0.0460	-0.0376 *	0.0228	0.0388	0.0259
	t+1	0.0523	0.0521	-0.0192	0.0226	0.0343	0.0281
	t+2	0.0545	0.0502	-0.0373	0.0233	0.0605 **	0.0278
	t+3	0.0307	0.0549	-0.0108	0.0236	0.0179	0.0290
	t+4	0.0349	0.0445	-0.0075	0.0237	0.0349	0.0291
	t+5	0.0360	0.0474	-0.0035	0.0224	0.0096	0.0297
lnSALES	t+0	-0.0085	0.0091	-0.0110 **	0.0050	0.0073	0.0057
	t+1	0.0083	0.0138	-0.0073	0.0071	0.0107	0.0083
	t+2	0.0192	0.0172	-0.0100	0.0090	0.0211 **	0.0098
	t+3	0.0282	0.0201	0.0038	0.0105	0.0196 *	0.0116
	t+4	0.0093	0.0217	-0.0180	0.0118	0.0333 **	0.0131
	t+5	0.0415 *	0.0237	-0.0097	0.0130	0.0440 ***	0.0145
CF	t+0	-0.0031	0.0025	0.0000	0.0014	0.0002	0.0018
	t+1	0.0011	0.0031	0.0025 *	0.0015	0.0000	0.0020
	t+2	0.0013	0.0034	0.0008	0.0017	0.0036 *	0.0022
	t+3	0.0016	0.0037	0.0038 **	0.0019	0.0009	0.0024
	t+4	-0.0034	0.0043	0.0036	0.0022	-0.0042	0.0028
	t+5	-0.0030	0.0043	-0.0002	0.0021	-0.0023	0.0028

Note: *,**,*** indicate significance at the 10%, 5%, and 1% level respectively.

Table 8: Treatment effect estimation results
(b) BTM and UFJ offices located within 10km from the firm

		Method: Nearest five matching within radius									
		Treated: MTYPE1=2 Control: MTYPE1=0			Treated: MTYPE1=2 Control: MTYPE1=1			Treated: MTYPE1=1 Control: MTYPE1=0			
		(1)		(2)	(3)		(4)	(5)		(6)	
Variables		DID		Std. err.	DID		Std. err.	DID		Std. err.	
RATE	t+0	0.0002		0.0007	0.0000		0.0004	-0.0002		0.0004	
	t+1	0.0011		0.0008	0.0003		0.0005	0.0003		0.0005	
	t+2	0.0023	**	0.0009	0.0015	***	0.0005	0.0004		0.0005	
	t+3	0.0037	***	0.0010	0.0016	***	0.0006	0.0016	***	0.0005	
	t+4	0.0029	***	0.0010	0.0012	**	0.0006	0.0011	**	0.0005	
	t+5	0.0019	**	0.0010	0.0016	***	0.0006	0.0002		0.0005	
LOAN	t+0	-0.0068	*	0.0038	-0.0021		0.0021	-0.0022		0.0025	
	t+1	-0.0175	***	0.0051	-0.0088	***	0.0029	-0.0049		0.0031	
	t+2	-0.0230	***	0.0059	-0.0063	*	0.0034	-0.0099	***	0.0036	
	t+3	-0.0121	*	0.0070	-0.0059		0.0037	-0.0091	**	0.0041	
	t+4	-0.0126		0.0081	-0.0069		0.0042	-0.0063		0.0049	
	t+5	-0.0128		0.0091	-0.0074		0.0046	-0.0071		0.0057	
LONG	t+0	-0.0070	**	0.0033	-0.0007		0.0018	-0.0041	**	0.0020	
	t+1	-0.0142	***	0.0044	-0.0082	***	0.0023	-0.0061	**	0.0026	
	t+2	-0.0194	***	0.0052	-0.0058	**	0.0028	-0.0074	**	0.0030	
	t+3	-0.0164	***	0.0061	-0.0062	**	0.0030	-0.0084	**	0.0035	
	t+4	-0.0144	**	0.0070	-0.0083	**	0.0035	-0.0090	**	0.0042	
	t+5	-0.0156	**	0.0078	-0.0084	**	0.0036	-0.0090	*	0.0047	
SHORT	t+0	0.0008		0.0032	-0.0010		0.0018	0.0016		0.0018	
	t+1	-0.0025		0.0040	0.0001		0.0023	0.0005		0.0023	
	t+2	-0.0016		0.0046	0.0015		0.0026	-0.0021		0.0027	
	t+3	0.0050		0.0051	0.0006		0.0029	0.0001		0.0030	
	t+4	0.0022		0.0059	0.0022		0.0031	0.0025		0.0034	
	t+5	0.0038		0.0062	0.0031		0.0033	0.0029		0.0036	
lnEMP	t+0	-0.0022		0.0072	-0.0071		0.0044	0.0035		0.0039	
	t+1	0.0094		0.0106	-0.0146	**	0.0060	0.0128	**	0.0057	
	t+2	0.0274	**	0.0126	-0.0134	*	0.0071	0.0279	***	0.0068	
	t+3	0.0328	**	0.0142	-0.0115		0.0079	0.0328	***	0.0076	
	t+4	0.0389	**	0.0167	-0.0148	*	0.0089	0.0389	***	0.0087	
	t+5	0.0551	***	0.0196	-0.0113		0.0100	0.0413	***	0.0098	
INVEST	t+0	-0.0089		0.0324	-0.0339	*	0.0184	0.0098		0.0172	
	t+1	0.0270		0.0350	-0.0177		0.0187	0.0075		0.0187	
	t+2	0.0287		0.0358	-0.0216		0.0183	0.0320	*	0.0187	
	t+3	0.0218		0.0379	-0.0166		0.0194	0.0165		0.0196	
	t+4	0.0049		0.0330	0.0000		0.0189	0.0095		0.0195	
	t+5	0.0138		0.0370	0.0100		0.0175	-0.0052		0.0198	
lnSALES	t+0	-0.0036		0.0070	-0.0089	**	0.0042	0.0066		0.0041	
	t+1	0.0141		0.0098	-0.0028		0.0059	0.0115	**	0.0057	
	t+2	0.0264	**	0.0121	-0.0096		0.0074	0.0259	***	0.0069	
	t+3	0.0378	***	0.0144	0.0022		0.0086	0.0253	***	0.0081	
	t+4	0.0151		0.0162	-0.0127		0.0098	0.0247	***	0.0092	
	t+5	0.0314	*	0.0183	-0.0054		0.0108	0.0304	***	0.0103	
CF	t+0	-0.0006		0.0020	0.0003		0.0011	0.0014		0.0014	
	t+1	0.0014		0.0024	0.0026	**	0.0012	0.0006		0.0015	
	t+2	0.0021		0.0026	0.0012		0.0014	0.0018		0.0016	
	t+3	0.0014		0.0029	0.0023		0.0015	0.0014		0.0018	
	t+4	-0.0020		0.0034	0.0037	**	0.0017	-0.0027		0.0020	
	t+5	-0.0009		0.0034	0.0015		0.0017	-0.0023		0.0021	

Note: *,**,*** indicate significance at the 10%, 5%, and 1% level respectively.

Table 8: Treatment effect estimation results

(c) Firms transacting with no less than one city bank

		Method: Nearest five matching within radius								
		Treated: MTYPE1=2 Control: MTYPE1=0			Treated: MTYPE1=2 Control: MTYPE1=1			Treated: MTYPE1=1 Control: MTYPE1=0		
		(1)		(2)	(3)		(4)	(5)		(6)
Variables		DID		Std. err.	DID		Std. err.	DID		Std. err.
RATE	t+0	0.0001		0.0006	0.0001		0.0004	-0.0003		0.0003
	t+1	0.0007		0.0007	0.0002		0.0004	0.0000		0.0004
	t+2	0.0021	***	0.0008	0.0014	***	0.0005	0.0003		0.0004
	t+3	0.0033	***	0.0008	0.0016	***	0.0005	0.0011	***	0.0004
	t+4	0.0022	**	0.0009	0.0010	*	0.0005	0.0006		0.0004
	t+5	0.0017	**	0.0009	0.0015	***	0.0005	0.0002		0.0005
LOAN	t+0	-0.0069	**	0.0035	-0.0022		0.0019	-0.0021		0.0020
	t+1	-0.0172	***	0.0046	-0.0092	***	0.0027	-0.0061	**	0.0026
	t+2	-0.0200	***	0.0053	-0.0072	**	0.0031	-0.0084	***	0.0030
	t+3	-0.0136	**	0.0064	-0.0064	*	0.0035	-0.0076	**	0.0034
	t+4	-0.0126	*	0.0075	-0.0067	*	0.0038	-0.0014		0.0040
	t+5	-0.0117		0.0082	-0.0073	*	0.0042	-0.0031		0.0045
LONG	t+0	-0.0063	**	0.0030	-0.0002		0.0016	-0.0040	**	0.0017
	t+1	-0.0132	***	0.0039	-0.0077	***	0.0021	-0.0065	***	0.0022
	t+2	-0.0167	***	0.0047	-0.0060	**	0.0025	-0.0070	***	0.0025
	t+3	-0.0137	**	0.0054	-0.0058	**	0.0028	-0.0055	*	0.0029
	t+4	-0.0091		0.0061	-0.0055	*	0.0031	-0.0021		0.0034
	t+5	-0.0109		0.0067	-0.0074	**	0.0033	-0.0029		0.0038
SHORT	t+0	0.0000		0.0028	-0.0017		0.0017	0.0014		0.0015
	t+1	-0.0033		0.0035	-0.0009		0.0021	-0.0001		0.0019
	t+2	-0.0015		0.0041	0.0006		0.0024	-0.0009		0.0022
	t+3	0.0005		0.0046	-0.0004		0.0027	-0.0014		0.0025
	t+4	-0.0024		0.0051	-0.0007		0.0029	0.0007		0.0028
	t+5	0.0005		0.0055	0.0020		0.0030	0.0013		0.0030
lnEMP	t+0	0.0051		0.0066	-0.0042		0.0041	0.0062	*	0.0034
	t+1	0.0056		0.0095	-0.0102	*	0.0056	0.0142	***	0.0048
	t+2	0.0229	**	0.0113	-0.0102		0.0066	0.0259	***	0.0057
	t+3	0.0284	**	0.0125	-0.0064		0.0074	0.0351	***	0.0063
	t+4	0.0321	**	0.0146	-0.0084		0.0083	0.0377	***	0.0073
	t+5	0.0430	**	0.0168	-0.0067		0.0093	0.0416	***	0.0083
INVEST	t+0	-0.0057		0.0290	-0.0357	**	0.0168	0.0229	*	0.0137
	t+1	0.0283		0.0304	-0.0185		0.0170	0.0271	*	0.0150
	t+2	0.0276		0.0307	-0.0269		0.0169	0.0480	***	0.0151
	t+3	0.0226		0.0331	-0.0158		0.0178	0.0287	*	0.0152
	t+4	0.0127		0.0310	-0.0094		0.0168	0.0192		0.0154
	t+5	0.0183		0.0323	0.0042		0.0156	0.0033		0.0156
lnSALES	t+0	-0.0047		0.0064	-0.0081	**	0.0040	0.0084	**	0.0035
	t+1	0.0093		0.0090	-0.0024		0.0055	0.0146	***	0.0049
	t+2	0.0242	**	0.0112	-0.0074		0.0070	0.0293	***	0.0059
	t+3	0.0332	**	0.0132	0.0038		0.0081	0.0311	***	0.0070
	t+4	0.0098		0.0150	-0.0100		0.0092	0.0270	***	0.0079
	t+5	0.0259		0.0167	0.0022		0.0101	0.0218	**	0.0088
CF	t+0	0.0001		0.0018	0.0003		0.0010	0.0018	*	0.0011
	t+1	0.0018		0.0021	0.0021	*	0.0011	0.0019		0.0012
	t+2	0.0013		0.0023	0.0010		0.0013	0.0020		0.0013
	t+3	0.0015		0.0025	0.0023		0.0014	0.0009		0.0014
	t+4	-0.0035		0.0030	0.0022		0.0016	-0.0028	*	0.0017
	t+5	-0.0024		0.0027	0.0011		0.0015	-0.0033	**	0.0016

Note: *,**,*** indicate significance at the 10%, 5%, and 1% level respectively.

Table 9: Treatment effect estimation results
Including firms that terminated or started the relationships after 2005

		Method: Nearest five matching within radius					
		Treated: MTYPE1=2 Control: MTYPE1=0		Treated: MTYPE1=2 Control: MTYPE1=1		Treated: MTYPE1=1 Control: MTYPE1=0	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	Std. err.	DID	Std. err.	DID	Std. err.
RATE	t+0	0.0001	0.0006	0.0001	0.0004	-0.0001	0.0003
	t+1	0.0009	0.0006	0.0001	0.0004	0.0004	0.0003
	t+2	0.0026 ***	0.0007	0.0013 ***	0.0005	0.0007 *	0.0003
	t+3	0.0039 ***	0.0007	0.0017 ***	0.0005	0.0013 ***	0.0004
	t+4	0.0028 ***	0.0008	0.0011 **	0.0005	0.0012 ***	0.0004
	t+5	0.0026 ***	0.0008	0.0014 ***	0.0005	0.0008 **	0.0004
LOAN	t+0	-0.0068 **	0.0029	-0.0019	0.0019	-0.0038 **	0.0017
	t+1	-0.0156 ***	0.0038	-0.0083 ***	0.0026	-0.0072 ***	0.0022
	t+2	-0.0194 ***	0.0045	-0.0064 **	0.0030	-0.0117 ***	0.0026
	t+3	-0.0152 ***	0.0052	-0.0052	0.0034	-0.0120 ***	0.0029
	t+4	-0.0130 **	0.0061	-0.0048	0.0037	-0.0073 **	0.0033
	t+5	-0.0149 **	0.0067	-0.0071 *	0.0040	-0.0085 **	0.0037
LONG	t+0	-0.0051 **	0.0024	-0.0006	0.0016	-0.0051 ***	0.0014
	t+1	-0.0133 ***	0.0033	-0.0078 ***	0.0021	-0.0080 ***	0.0019
	t+2	-0.0159 ***	0.0040	-0.0061 **	0.0025	-0.0097 ***	0.0022
	t+3	-0.0160 ***	0.0044	-0.0055 **	0.0027	-0.0092 ***	0.0024
	t+4	-0.0143 ***	0.0051	-0.0050 *	0.0030	-0.0082 ***	0.0028
	t+5	-0.0140 **	0.0057	-0.0079 **	0.0032	-0.0084 ***	0.0031
SHORT	t+0	-0.0012	0.0025	-0.0010	0.0016	0.0011	0.0013
	t+1	-0.0015	0.0031	0.0001	0.0021	0.0003	0.0017
	t+2	-0.0016	0.0035	0.0015	0.0024	-0.0015	0.0019
	t+3	0.0014	0.0039	0.0006	0.0026	-0.0019	0.0021
	t+4	0.0020	0.0044	0.0008	0.0028	0.0009	0.0023
	t+5	0.0003	0.0047	0.0026	0.0030	0.0010	0.0024
lnEMP	t+0	-0.0050	0.0057	-0.0039	0.0040	0.0003	0.0029
	t+1	-0.0089	0.0084	-0.0106 *	0.0055	0.0048	0.0041
	t+2	-0.0029	0.0098	-0.0104	0.0065	0.0130 ***	0.0049
	t+3	-0.0003	0.0108	-0.0056	0.0072	0.0168 ***	0.0054
	t+4	-0.0046	0.0127	-0.0076	0.0081	0.0173 ***	0.0062
	t+5	0.0100	0.0146	-0.0001	0.0092	0.0240 ***	0.0070
INVEST	t+0	-0.0224	0.0252	-0.0304 *	0.0165	0.0048	0.0117
	t+1	0.0181	0.0268	-0.0164	0.0167	0.0120	0.0125
	t+2	0.0158	0.0272	-0.0202	0.0166	0.0249 **	0.0126
	t+3	0.0096	0.0296	-0.0119	0.0176	0.0164	0.0126
	t+4	0.0170	0.0266	-0.0030	0.0167	0.0202	0.0126
	t+5	0.0190	0.0269	0.0066	0.0153	0.0122	0.0128
lnSALES	t+0	-0.0097 *	0.0055	-0.0094 **	0.0039	0.0042	0.0030
	t+1	-0.0031	0.0077	-0.0033	0.0054	0.0027	0.0041
	t+2	-0.0019	0.0097	-0.0079	0.0068	0.0094 *	0.0050
	t+3	0.0050	0.0113	0.0056	0.0079	0.0076	0.0058
	t+4	-0.0146	0.0129	-0.0082	0.0090	-0.0006	0.0066
	t+5	-0.0016	0.0144	0.0075	0.0099	-0.0044	0.0073
CF	t+0	0.0001	0.0015	-0.0004	0.0010	0.0022 **	0.0009
	t+1	0.0021	0.0017	0.0016	0.0011	0.0024 **	0.0010
	t+2	0.0023	0.0019	0.0008	0.0013	0.0030 ***	0.0011
	t+3	0.0029	0.0020	0.0017	0.0014	0.0029 **	0.0012
	t+4	-0.0020	0.0025	0.0014	0.0015	-0.0001	0.0013
	t+5	0.0007	0.0023	0.0015	0.0015	0.0003	0.0013

Note: *,**,*** indicate significance at the 10%, 5%, and 1% level respectively.

Table 10 Comparison of the treatment effects between OLS and PSM-DID

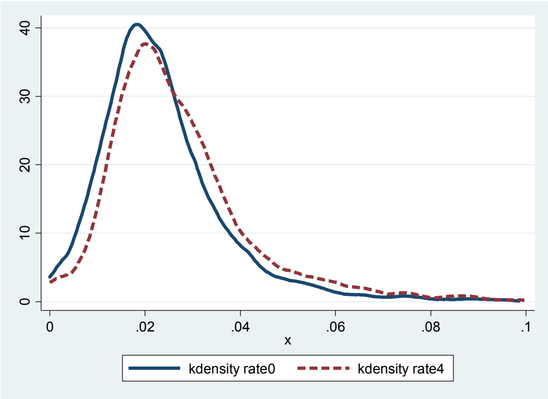
		Method: OLS								
		Treated: MTYPE1=2			Treated: MTYPE1=2			Treated: MTYPE1=1		
		Control: MTYPE1=0			Control: MTYPE1=1			Control: MTYPE1=0		
		(1)		(2)	(3)		(4)	(5)		(6)
Variables		DID		Std. err.	DID		Std. err.	DID		Std. err.
RATE	t+3	0.0035	***	0.0005	0.0021	***	0.0005	0.0014	***	0.0003
LOAN	t+3	-0.0098	**	0.0040	0.0002		#DIV/0!	-0.0099	***	0.0026
lnEMP	t+3	0.0394	***	0.0070	0.0011		0.0063	0.0383	***	0.0045
lnSALES	t+3	0.0265	***	0.0075	-0.0020		-0.0072	0.0285	***	0.0048

		Method: Nearest five matching within radius								
		Treated: MTYPE1=2			Treated: MTYPE1=2			Treated: MTYPE1=1		
		Control: MTYPE1=0			Control: MTYPE1=1			Control: MTYPE1=0		
		(1)		(2)	(3)		(4)	(5)		(6)
Variables		DID		Std. err.	DID		Std. err.	DID		Std. err.
RATE	t+3	0.0035	***	0.0008	0.0016	***	0.0005	0.0012	***	0.0004
LOAN	t+3	-0.0160	***	0.0060	-0.0064	*	0.0035	-0.0102	***	0.0033
lnEMP	t+3	0.0313	**	0.0122	-0.0064		0.0074	0.0370	***	0.0060
lnSALES	t+3	0.0385	***	0.0127	0.0038		0.0081	0.0336	***	0.0064

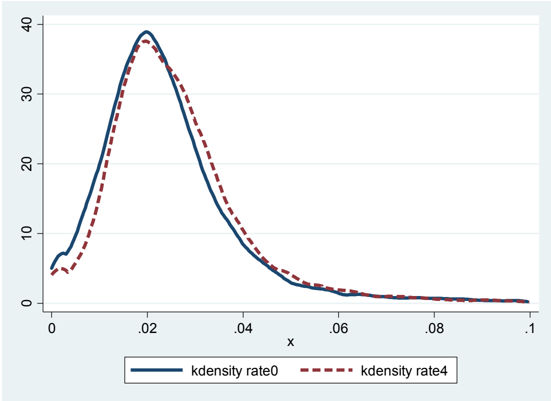
Note: *,**,*** indicate significance at the 10%, 5%, and 1% level respectively.

Figure 1: Distributions of borrowing costs by subsample

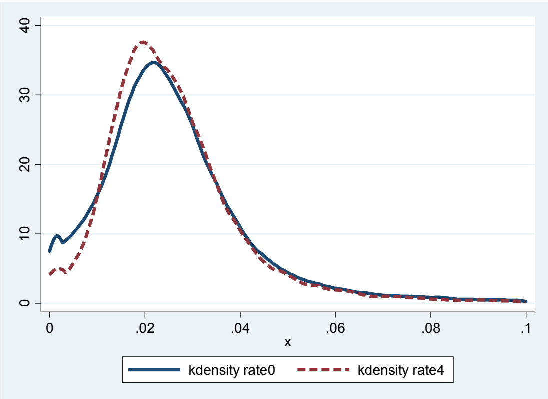
MERGER2 firms



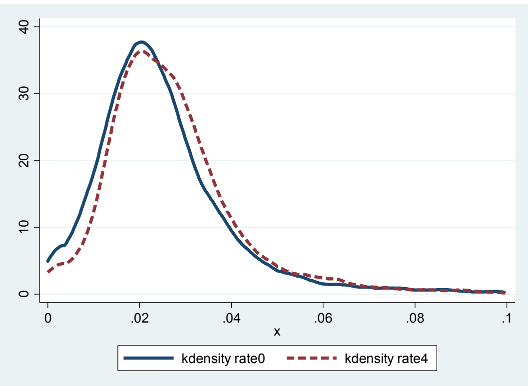
MERGER1 firms



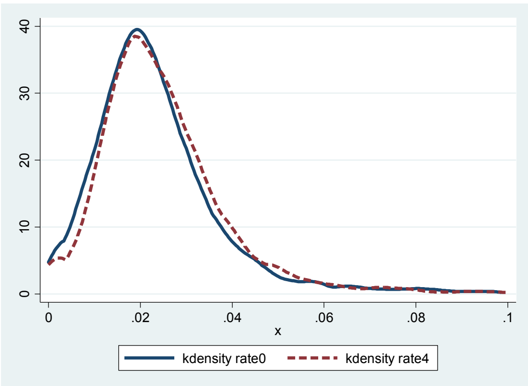
MERGER0 firms



MERGER1_1 firms (BTM)



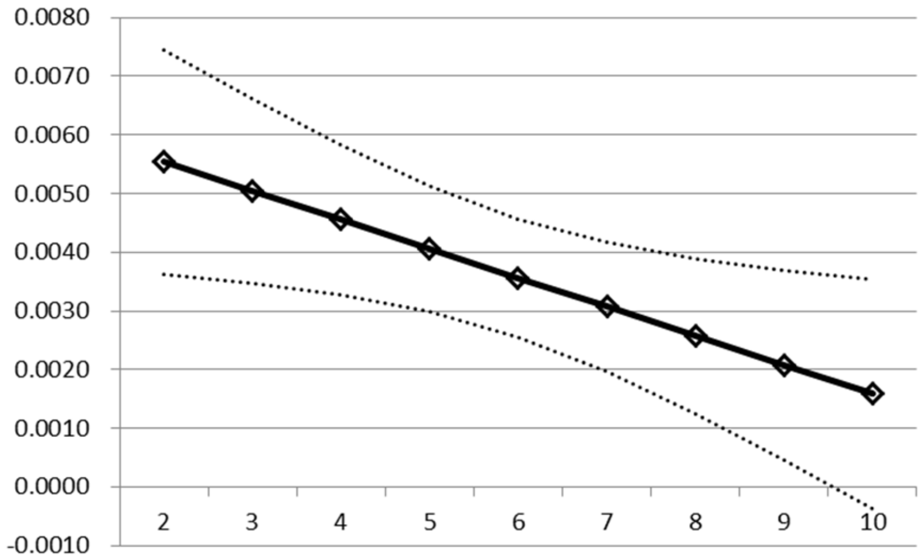
MERGER1_2 firms (UFJ)



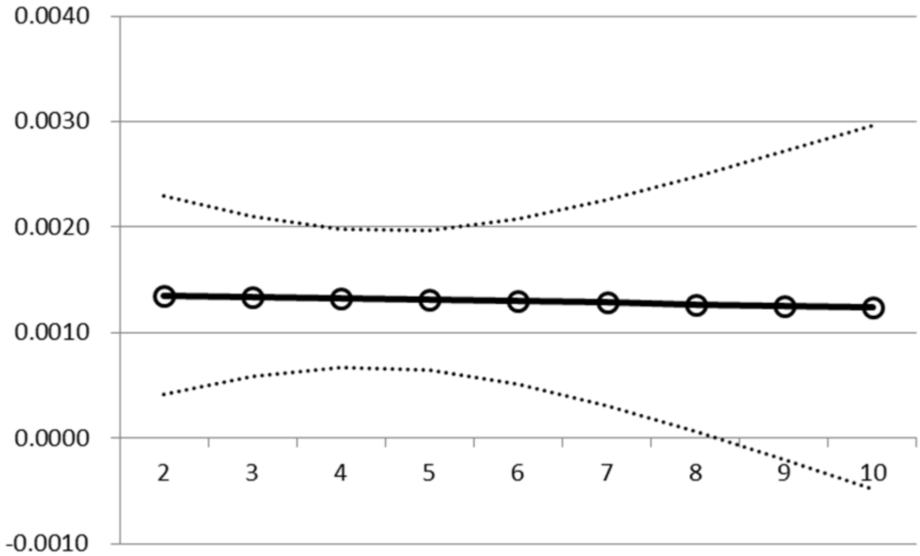
Note: Observations with borrowing costs larger than 10% (0.1 in the x-axis) are dropped from the graph.

Figure 2: Treatment effect depending on the number of firm-bank relationships

Treatment: MTYPE1=1 (MERGER1) and Control: MTYPE1=0 (MERGER0)



Treatment: MTYPE1=2 (MERGER2) and Control: MTYPE1=0 (MERGER0)



Note: X-axis measures the number of banks a firm transacted with in t-1 and Y-axis measures the difference of RATE between t-1 and t+3. Along the Y-axis, we measure real values and thus 0.050 means 50 basis points.