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The Effects of a Megabank Merger on Firm-Bank Relationships and Loan Availability *

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Abstract

Using a unique dataset of non-listed firms that identifies the banks that firms transact with, we examine the effects of the merger between Bank of Tokyo-Mitsubishi (BTM) and UFJ Bank (UFJ) in 2005 – the largest-ever bank merger in the world at the time in terms of assets – on firms through their firm-bank relationships. Specifically, we examine whether there are any differences in how the availability of loans and ex-post performance evolved over time for firms that prior to the merger transacted with both, one, or none of the merged banks. We find the following: (1) Firms that had transacted with both BTM and UFJ saw their borrowing costs increase by 29bp 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 15bp relative to those that had transacted with neither bank. 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 in market concentration and the ex-post termination/continuation of relationships with the merged bank. The findings 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 the management of the merged bank.

Keywords: Firm-bank relationships; Interest rates; Consolidation; Market concentration
JEL classification: G21; G34; L11

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1 Introduction

Since the 1980s, there has been a wave of bank consolidations around the world and both academic research and policymakers have been concerned about the motivation and implications of these consolidations. In response, a burgeoning literature on bank mergers has sprung up over the past two decades, summarized in several review articles such as Berger, Demsetz, and Strahan (1999) and DeYoung, Evanoff, and Molyneux (2009). For instance, DeYoung, Evanoff, and Molyneux (2009) classify over 150 articles into those focusing on banks' motivation to merge, those examining the ex-post performance of merged banks, and those focusing on the external impact on banks' borrowers, depositors, and other stakeholders. Reflecting the increased availability of firm-level or contract-level information, a large number of studies falling into the latter group examine the impact of bank mergers on the price and availability of credit to firms and on firms' ex-post performance.[1]

Since bank consolidation changes the market structure for loans, a particular focus of many of these studies is whether efficiency gains from mergers are passed on to borrowers or are kept within the merged banks. 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.

However, in the market for bank loans, the interactions among market structure, bank organization, 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 firm-bank 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, firm-bank relationships or, in Sapienza's (2002)

[1] Examples include Scott and Dunkelberg (2003), Calomiris and Pornrojnangkool (2005), Carow, Kane, and Narayanan (2006), Garmaise and Moskowitz (2006), Francis, Hasan, and Wang (2008), Craig and Hardee (2009), and Erel (2011) for the United States, Sapienza (2002), Bonaccorsi di Patti and Gobbi (2007), and Panetta, Schivardi, and Shum (2009) for Italy, Degryse, Masschelein, and Mitchell (2011) for Belgium, Montoriol-Garriga (2008) for Spain, Karceski, Ongena, and Smith (2005) and Hetland and Mjøs (2012) for Norway, Ogura and Uchida (2014) and Montgomery and Takahashi (2015) for Japan, Duarte, Repetto, and Valdes (2005) for Chile, and Marsch, Schmieder, and Aerssen (2007) for Germany.

terminology, "information-based market power" come to play an important role in determining loan availability, including interest rates.

A key question in this context is how bank mergers affect firms' loan availability and their ex-post performance through the impact that such mergers have on firm-bank relationships. This is a particularly pertinent issue in countries including Japan where firm-bank relationships traditionally have been close. Against this background, the purpose of this study is to use a major merger of two megabanks in Japan as a case study to examine a number of related issues that have been widely discussed in the literature. We do so by classifying firms into those that transacted with both of the merged banks at the time of the merger; those that transacted with one of the two merged banks; and those that transacted with neither of these banks.

Specifically, we examine the following three issues. First, given that a merger reduces the number of bank relationships a firm has, we examine the impact of the number of firm-bank relationships on firms' borrowing conditions. 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 find mixed results on whether the number of firm-bank relationships positively or negatively affect firms' borrowing costs. We examine if firms' borrowing conditions indeed deteriorated as a result of the number of bank relationships.

The second issue that we examine is whether the impact of a bank merger differs depending on whether a firm had a transaction relationship with one or more of the banks prior to the merger. A priori, the answer to this question is unclear. Many studies, such as Sapienza (2002), Montoriol-Garriga (2008), and Erel (2011), highlight the gains in managerial efficiency resulting from a merger that may be passed on to borrower firms in general. In contrast, other studies, such as Scott and Dunkelberg (2003) and Craig and Hardee (2009), show that loan availability decreases for small firms when banks they transact with merge, which is consistent with theoretical considerations by Stein (2002) suggesting that increasing complexity in a bank decreases loan availability to informationally opaque firms. We examine which of these two hypotheses holds in our bank merger case.

Third, we examine whether there are any asymmetries in the way that a bank merger affects

firms that used to transact with the acquiring bank and those that used to transact with the target bank. Peek and Rosengren (1998) pointed out that the lending behavior of a newly merged bank usually mirrors that of the acquiring bank, while Karceski, Ongena, and Smith (2005) and Carow, Kane, and Narayanan (2006) found asymmetries in the way that the share prices of customer firms of the acquiring bank and those of the target bank responded. In contrast with these studies, we focus on differences in actual loan availability between these two groups of firms and examine if our results are in line with those of the previous studies. In addition to these three major issues, we examine a number of other related issues discussed in the literature and test the robustness of our results.

The megabank mergers observed in Japan in the 2000s provide an ideal laboratory for examining the above issues. In our analysis, we focus on one particular merger, that between the Bank of Tokyo Mitsubishi (BTM) and United Financial of Japan (UFJ) in 2005, the largest-ever bank merger not only in Japan but in the world at the time in terms of assets.[2] The merger, which took place toward the end of the bank merger wave, had a sizable impact on the domestic loan market.

For the analysis, we employ a unique firm-level panel dataset for the years 2004-2010 of more than 120,000 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 that a firm transacts with and that we use for identifying firms' relationship with BTM and UFJ. 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 29 basis points (bp) relative to firms that transacted with neither bank. Second, firms that transacted with one of the two banks saw their borrowing costs increase by a smaller but still significant margin of 15bp. These

[2] "Back in Business," *TheEconomist*, May 18, 2006.

interest rate increases were accompanied by a decrease in the loan amount, and each of these changes had an adverse but short-lived impact on firms' investment and performance. Third, we do not find a significant difference in the extent that borrowing costs increased and loan amounts decreased between firms that transacted with the acquiring bank (BTM) and those that transacted with the acquired bank (UFJ). All of these results are robust to controlling for the merger-induced change in market concentration, the ex-post termination of relationships with the merged banks, and the number of ex-ante firm-bank relationships at the time of the merger. Overall, the bank merger resulted in a deterioration of firms' borrowing conditions partly through the exogenous decrease in the number of firm-bank relationships and partly through operational and organizational changes 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. Section 7 concludes.

2 Previous Studies and Empirical Hypotheses

There are a considerable number of studies on the impact of bank mergers on firms' credit availability and their performance. They can be categorized into three major subgroups: (1) studies on the impact of the increase in banks' market power on the one hand and the increase in their managerial efficiency on the other, which work in opposite directions as far as firms' credit availability is concerned; (2) studies on the impact of changes in the organization and management at the merged bank; and (3) studies on the impact of changes in the relationship between firms and the merged bank. We show below that firm-bank relationships play an important role in all of these areas and construct empirical hypotheses focusing on the interaction between firm-bank relationships and firms' loan availability following a bank merger.

2.1 Increasing market power and managerial efficiency

Regarding the impact of bank mergers on the availability of credit and firm performance, previous studies have highlighted two opposing forces. On the one hand, a merger increases banks' market power and hence potentially has a negative impact; on the other, it may result in improved managerial efficiency at the merged entity and hence have a positive impact. These opposing forces were first pointed out by Williamson (1968) and subsequently empirically examined in studies by Sapienza (2002), Calomiris and Pornrojnangkool (2005), Garmaise and Moskowitz (2006), and Erel (2011), among others.

Employing loan-level data for Italy and the United States, Sapienza (2002) and Erel (2011) respectively examine the interest rates that banks charge borrower firms. They find that interest rates decline for firms transacting with the merged banks in regions where the markets of the merged entities overlap to some extent, but this decline disappears when the market overlap becomes more substantial. Meanwhile, Calomiris and Pornrojnangkool (2005) focus on a region in the United States where a merger of two large banks created a dominant universal bank and a monopolistic market for medium-sized firms. They find significant increases in the interest rates that borrowers of that size are charged. Finally, Garmaise and Moskowitz (2006) examine the impact of the increase in lending market concentration after a bank merger and find that regions which experienced an increase in the Herfindahl Index not only saw a deterioration in their economic performance but also an increase in their crime rate. In sum, the literature in this field shows mixed results regarding which of the two opposing forces – the increase in banks' market power and the improvement in their managerial efficiency – has a dominant impact on firms' loan availability.

Note that, despite the implicit assumption in Williamson (1968) that mergers affect all the customer firms in a market in an equal manner, most of the above empirical studies examine the differential responses of interest rates for firms that used to transact with merged banks and those for firms that did not.[3] They introduce variables not only on existing transaction relationships between firms and merged banks but also on relationships between firms and other

[3] The only exception is the study by Garmaise and Moskowitz (2006), which employs a variable on increased market concentration but not one on firm-bank relationships.

banks. They find that firms that used to transact with the merged banks face a substantially larger impact on the interest rates they are charged than firms located in the same market but that used to transact with other banks.[4]

2.2 Changes in the organization and management at the merged banks

Another issue that previous studies have focused on is the impact of changes in market structure and how a bank changes itself following a merger. This subsection provides a detailed account of the previous literature on how bank mergers affect firms' loan availability through changes in banks' organization and management.[5] Again, almost all the studies in this field find that the impact is transmitted through incumbent relationships between firms and merged banks, highlighting the importance of firm-bank relationships.

First, organizational and managerial changes not only improve the cost and profit efficiency of the merged bank but also have a distinct impact on the way information on borrower firms is processed and loans are extended to them. Focusing on the positive aspects, Panetta, Schivardi and Shum (2009) provide detailed evidence of how mergers improve banks' ability to process credit information on borrower firms, which eventually increases their managerial efficiency. They test the correspondence between default risk and interest rates to find that it is more significant after the merger, indicating that risky borrowers experience an increase in the interest rate they are charged, while less risky borrowers enjoy lower interest rates.

However, there are also numerous studies highlighting the negative aspects of bank mergers. Stein (2002) theoretically predicts that bank mergers will have a negative impact on loan availability for informationally opaque firms. His model implies that bank mergers that result in greater organizational complexity may lead the merged bank to rely more on lending based on hard information than on lending based on soft information. In line with this prediction, Ogura and Uchida (2013) empirically find that banks involved in a merger reduce their production of soft information relative to banks that were not involved in a merger. Further, Scott and Dunkel-

[4] See Table IV in Sapienza (2002) and Table VI in Calomiris and Pornrojnangkool (2005) for the results. Note, however, that they do not statistically compare the impact on the interest rates between firms that used to transact with the merged banks and those that used to transact with other banks.

[5] Changes in market structure caused by bank mergers may affect firms' loan availability through the lending technologies banks choose. For useful insights on this issue see, e.g., Petersen and Rajan (1995), Boot and Thakor (2000), and Hauswald and Marquez (2006).

berg (2003) and Craig and Hardee (2009) find that small businesses experience a deterioration in loan availability either through the prices of loans or through non-pecuniary terms such as collateral and personal guarantee provision. The results of these studies are consistent with the prediction by Stein (2002). Moreover, focusing on Norway, Hetland and Mjøs (2012) observe that informationally opaque firms experience an increase in their borrowing costs after a bank merger, which is consistent with the story that soft information accumulated in the acquiring and/or the target bank was lost after the merger due to branch consolidation or the reallocation of loan officers.

A second aspect related to organizational and managerial changes in the wake of a bank merger is that such a merger may have an asymmetric impact on loan availability for borrower firms. Studies investigating this aspect divide client firms of the merged bank into firms that transacted with the acquiring bank and those that transacted with the acquired bank. Since, as shown by Peek and Rosengren (1998), lending patterns converge to those of the acquiring bank, the way that client firms of the acquired bank are treated may deteriorate relative to the way that client firms of the acquiring bank are treated. Employing data on listed firms in Norway and the United States respectively, Karceski, Ongena, and Smith (2005) and Carow, Kane, and Narayanan (2006) examine cumulative abnormal returns among firms that used to transact with the target banks. They find these returns tend to become negative.

2.3 Changes in the firm-bank relationships

Finally, yet another strand in the literature focuses on the impact of the merger-induced change in the number of firm-bank relationships. First, a bank merger results in an exogenous decrease in the number of firm-bank relationships at the instant of the merger. That is, 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. Regarding the effect of such a decrease in the number of bank relationships, many studies, such as those by Petersen and Rajan (1994) and Harhoff and Körting (1998), examine the hypothesis that this means that switching costs for borrowers increase, endowing banks with "information-based market power" and resulting in more stringent loan conditions such as higher borrowing costs. However, studies such as

these often fail to control for the fact that the number of relationships may be endogenously determined. Therefore, even when the results obtained in these studies are the opposite of what theory predicts, we cannot tell whether this is due to the possible endogeneity of the number of relationships or whether the theoretical predictions are wrong. Since the previous literature on the effect of bank mergers on firms' loan availability has not fully investigated the impact of such exogenous decline in the number of firm-bank relationships, it is worth examining its impact.

Second, it is possible that transaction relationships with merged banks may be terminated ex-post, which would affect firms' loan availability and performance. Karceski, Ongena, and Smith (2005), for example, posit that the termination of a relationship either improves or worsens firms' loan availability and performance, depending on the relative size of switching costs, borrowing costs, and internal rates of return. Firms that maintain their transaction relationship with the merged bank experience an improvement in their ex-post performance relative to those that terminate the relationship if they receive favorable loan conditions and all the firms face similar switching costs. In contrast, firms that maintain their relationship with the merged bank experience a deterioration in their ex-post performance if they face substantially higher switching costs than other firms. Meanwhile, employing contract-level data for Italy and Belgium respectively, Bonaccorsi di Patti and Gobbi (2007) and Degryse, Masschelein, and Mitchell (2011) empirically examine the effect on borrower firms' loan availability and their ex-post performance when firms terminate or continue their relationship with the merged bank or switch to another bank. They find that relationship termination results in a temporary deterioration of loan availability among borrower firms (Bonaccorsi di Patti and Gobbi, 2007), but is less harmful when there were multiple relationships prior to the merger (Degryse, Masschelein, and Mitchell, 2011). These studies on the difference between firms that maintain a relationship with the merged bank and those that terminate it indicate that the results regarding the three hypotheses may differ depending on the sample we employ.

2.4 Empirical hypotheses

Based on the literature review above, we develop various hypotheses regarding the role of firm-bank relationships in transmitting the impact of bank mergers on firms' loan availability. To examine these hypotheses, we later divide firms in our dataset into several subsamples, namely, firms that used to transact with both of the merged banks, firms that used to transact with one of the merged banks, and firms that used to transact with neither. We further divide firms in the second category into those that used to transact with the acquiring bank and those that used to transact with the target bank.

First, we examine the impact of an exogenous decline in the number of firm-bank relationships at the instant of the merger. That is, 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. 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, we examine how the merger-induced change of management and organizational structure at the merged bank affects firms' loan availability through firm-bank relationships. That is, for firms with at least one relationship with the banks that merged, a change in the organizational structures and operational procedures of the merged bank either positively or negatively affects firms' loan availability. A negative aspect for borrower firms, as mentioned earlier, is that the newly merged bank may be too big and organizationally too multi-layered to extend loans to relatively small borrowers. A positive aspect is that the newly merged bank may be able to improve its profit and cost efficiency, which, as highlighted by Berger, Demsetz, and Strahan (1999), could potentially result in more favorable transaction terms for borrowers and a larger amount of loans extended by the merged bank. 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 or managerial changes at the bank. Alternatively, they face more favorable conditions if they receive rents created by improved managerial efficiency at the merged bank.

Third, we examine if there are any asymmetries in the way a bank merger affects loan availability for firms that transacted with the acquiring bank and firms that transacted with the acquired bank. As shown by Karceski et al. (2005) and Carow et al. (2006), 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. Our setting here allows us to examine whether the effects of the bank merger 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 would like to draw attention to the following three points that we will take into account during our empirical examination of the hypotheses above. First, if the merged bank applies more stringent loan conditions, this will possibly constrain firms' daily operations of firms such as their investment and sales activities. Hence, each of the hypotheses implies that firms' performance may deteriorate if borrower firms face more stringent and binding loan conditions. We will examine this issue by looking at several variables on firm investment and performance.

Second, we assume that our hypotheses hold even after we control for the change in loan market concentration as a result of the merger. We therefore introduce several ways to control for the extent of the change in the loan market concentration after the bank merger.

Third, it is possible that transaction relationships with merged banks may be terminated ex-post, which would affect firms' loan availability and performance, as shown by Bonaccorsi di Patti and Gobbi (2007) and Degryse et al. (2011). The results of our examination of the hypotheses above may differ depending on the choice of our sample, that is, whether we include firms that used to transact with the merged banks but terminated their relationship(s) with them after the merger. We therefore employ the following two sets of treatment group firms in the empirical examination: the set of all firms that had a relationship with one or both of

the merged banks at the time of the merger, and the subset of firms that maintained their relationship with the bank even after the merger.

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

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.[6] The major banks were traditionally further divided into city banks, trust banks, and long-term credit banks, although the latter type no longer exists.[7] The city banks are legally categorized as regular commercial banks and are the largest in terms of 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 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 labeled 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

[6] 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.

[7] 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.

cooperatives composed of members living and working in a defined geographical area. They extend loans mainly to their members, including small businesses.

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 in October 2005. Bringing together the second-largest (BTM) and the fourth-largest (UFJ) bank in Japan, the merger created the largest financial institution at the time not only in Japan but also in the world, outstripping Citigroup Incorporated in terms of assets.

The combined amount of loans outstanding of the two banks in 2004 stood at 70 trillion yen (USD 700 billion 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. Even on a global scale, the size of the merger was exceptional. For instance, using Erel's (2011) definition of megabank mergers as mergers involving combined assets in excess of USD 10 billion, the BTMU deal exceeded this threshold by a factor of 70.

Several remarks concerning the merger are in order. First, the time span between the disclosure of UFJ's massive loan losses (May 2004) and the announcement of the merger (July 2004) was very 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 behavior 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 2005, while since then, only 34 regional, second-tier regional, and shinkin banks have been involved in mergers.[8] 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." On the other hand, the average ex-ante performance of UFJ's small business borrowers in our sample was not significantly worse 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), one of the two largest business database companies in Japan. 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, credit score, and the identity of banks and bank branches the firm transacts with. Since the total number of firms including proprietorships is 4.1 million and the number of corporations in Japan is about 1.6 million (2012 Economic Census by the Ministry of Internal Affairs and Communications and Ministry of Economy, Trade and Industry), the coverage of the TDB data-

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

base, which mainly comprises corporations, is quite high. For a sizable subset of firms, the database also has detailed financial information, 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 our analysis consists of 122,206 firms, which we arrive at after the following 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, 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 from the sample. As a result, we have an unbalanced panel dataset of 122,206 firms that extends from 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. The variables consist of two types: outcome variables that measure the impact of the bank merger on borrower firms' loan availability and performance, and variables to examine the determinants of transaction relationships for the propensity score matching estimation.

4.2.1 Outcome variables

Outcome variables in our setting are variables that 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. We use interest and discount expenses divided by the averaged sum of long-term loans, short-term loans, and bills discounted in the previous and the current period. The second and third variables focus on the amount of loans that each firm obtains. We use total loans and long-term loans, both standardized by the total amount of assets, and label these $LOAN$ and $LONG$.[9] Fourth, to represent firms' capital

[9] $RATE$, $LOAN$, and $LONG$ are calculated from firms' balance sheet information and not from loan contract-level information, which means that the variables include information on loans provided by, and interest payments to, all financial institutions a firm transacts with, including the merged banks. Although we primarily aim to

investment behavior, we use their capital investment ratio ($INVEST$), which is defined as the sum of changes in fixed tangible assets and the amount of depreciation, divided by the level of fixed tangible assets in the previous period. Fifth and finally, to measure firms' performance, we employ the logarithm of annual sales ($lnSALES$).

4.2.2 Variables used for the propensity score estimation

To examine the determinants of transaction relationships with banks prior to the bank merger, we consider five categories of variables: variables on firm-bank relationship characteristics, which we use as dependent variables; variables on firm characteristics; a variable representing lending market conditions; regional dummies; and industry dummies. As firm-bank relationship variables, we use several dummy variables based on 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 the firm deals with. The dummy variable $NEITHER$ takes a value of one if these banks include neither BTM nor UFJ in 2004, while ONE takes a value of one if either BTM or UFJ are included. 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 BTM=1 if BTM is among the banks listed by a firm and UFJ=1 if UFJ is among them. If both BTM and UFJ are among the banks listed by a firm, we set $BOTH$=1. The variable BOTH 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 $NEITHER$=1 have a value of zero, those with ONE=1 have a value of one, and those with $BOTH$=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 $NEITHER$=1 have a value of zero, those with BTM=1 have a value of one, those with UFJ=1 have a value of two, and those with $BOTH$=1 have a value of three. The great advantage of focusing on a merger of

examine the impact of the bank merger on firms' overall loan availability rather than the impact on the conditions of each loan contract, the size of the impact may differ depending on the extent a firm relies on the merged banks. Later in the paper, we examine the differential impact by looking at the treatment effect for different numbers of firm-bank relationships prior to the merger.

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, creditworthiness, 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 ($lnEMP$), while for firm age, we use the logarithm of the number of years since a firm was established ($lnAGE$). For creditworthiness, 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 creditworthiness of small businesses in Japan and is composed of seven sub-scores (firm age, stability, size, profitability, credit availability, manager quality, and vitality). It ranges between 0 and 100 and a higher score indicates higher creditworthiness. For firm growth and profitability, we employ $SALESGROWTH$ and $PROFIT$, respectively. For cash holdings, we employ the ratio of cash and deposits outstanding to total assets ($CASH$). For holdings of fixed tangible assets which may be used as collateral for loans, we use the ratio of fixed tangible assets to total assets ($FIXED$). Finally, the number of banks a firm transacts with is employed to gauge the relative importance of a specific firm-bank relationship and is labeled $NBANK$. To represent lending market conditions we construct a Herfindahl-Hirschman Index (HHI) for each of the 47 prefectures in Japan using information on relationships between firms and bank branches in the TDB database. Specifically, we obtain the ratio of the number of relationships each bank has in a prefecture to the total number of firm-bank relationships in the prefecture to calculate the squared sum of the ratio for all the banks, including city banks, regional banks, shinkin banks, credit cooperatives, government financial institutions, and other types of banks.[10] 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).

[10] We use the number of firm-bank transaction relationships instead of the amount of deposits or loans for calculating the HHI since such data are unavailable at the prefecture level for certain types of banks (namely, city banks and trust banks). In total, our calculation includes information on firm-bank relationships in 2004 for 1.2 million firms, accounting for a significant share of firm-bank relationships in Japan.

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 one or both of these banks. We match treatment group firms with control group firms using nearest five neighbors matching with caliper.

For each of these treatment and control group firms, we first calculate the differences of variables before and after the merger. We then 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 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.[11]

However, for our purposes, the PSM-DID estimator as proposed by Rosenbaum and Rubin (1983) 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, firms that transacted with both of the merged banks, firms that transacted with one of the merged banks, and firms that transacted with the acquired (acquiring) bank. If we put the first two of these groups into

[11] We employ PSM-DID instead of linear (ordinary least squares) estimation for the following reason. PSM-DID estimation is non-parametric and avoids potential misspecification of $E(Y|X)$. It requires no specific form for outcome equations and unobservable terms. This virtue of PSM-DID is especially valuable when we employ outcome variables such as loan availability for which no consensus on the appropriate specification of a parametric model exists.

one treatment group, we end up 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 organizational changes 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 a 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 a 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 $NEITHER$=1, ONE=1, and $BOTH$=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 and operational changes at the merged bank. In order to isolate the former effect, we employ the pair $\{1, 2\}$, where firms for which $BOTH$=1 are the treatment group and those for which ONE=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

$\{NEITHER = 1, BTM = 1, UFJ = 1, BOTH = 1\}$, and implement a multinomial probit estimation. The difference from the baseline multinomial probit estimation is that we further divide the outcome ONE=1 into the outcome BTM=1, in which firms transacted with BTM, and the outcome UFJ=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).

5.3 The effects of increasing market concentration and ex-post relationship continuation

In order to control for the impact of the increase in market concentration as a result of the merger in the baseline estimation, we make use of the fact that BTM and UFJ had nationwide branch networks. In fact, both BTM and UFJ had at least one branch office in each of the 10 regions of Japan and it was therefore possible for all firms to establish transaction relationships with these banks. Hence, we place no restrictions in defining non-treatment group firms, from which we choose the control group firms that have similar characteristics as the treatment group firms. In the estimation, we assume that the extent of the increase in market concentration they face is similar for both treatment and control firms.

That being said, one might argue that for some of the non-treatment group firms it would have been impossible to establish relationships with banks as large as BTM and UFJ. They may have been too financially opaque to be accepted for a loan by such large banks or they may have been located too far from the nearest branches of these banks. In order to address this possible objection, we introduce two alternative specifications to the baseline. In the first, we limit non-treatment firms to those that had already established a relationship with at least one of the city banks. The rationale is that such firms were sufficiently creditworthy to potentially transact with BTM and/or UFJ. We then choose firms from the non-treatment group that have similar characteristics to those in the treatment group.

In the second alternative specification, we impose geographical boundaries where treatment and non-treatment firms have to be located. Specifically, taking into account that, as highlighted by Petersen and Rajan (2002), the average distance between a firm and its bank tends to be very small, we define a loan market as the area within a 10km radius of each firm. Note that our definition of the size of the loan market is smaller than in Garmaise and Moskowitz's (2006) analysis of the U.S. loan market. The reason is that economic activities tend to me more concentrated in Japan than in the United States. From the treatment and non-treatment group firms in this specification, we then match control firms with treatment group firms.

In order to examine the transmission of the impact of the bank merger through incumbent firm-bank relationships in more detail, in an alternative specification we focus on firms that continued to transact with the bank after the merger. That is, whereas in the baseline estimation we included firms that terminated their relationship with the merged bank after the merger in the treatment groups, we exclude them in the alternative specification. Comparing the results of these specifications also allows us to examine the extent to which ex-post relationship termination affects firms' overall loan availability and performance.

6 Results

6.1 Summary statistics

In this subsection, we provide summary statistics for the variables introduced in Section 4. 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 firms in the entire sample as well as for firms in the subsamples that satisfy $NEITHER$=1 (firms that transacted with neither BTM nor UFJ), ONE=1 (firms that transacted with one of the merged banks), BTM=1 (firms that transacted with BTM), UFJ=1 (firms that transacted with UFJ), and $BOTH$=1 (firms that transacted with both BTM and UFJ) (hereafter $NEITHER$, ONE, BTM, UFJ, and $BOTH$ firms, respectively). Finally, Table 4 provides summary statistics of 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 $NEITHER$, ONE, $BOTH$, BTM, and UFJ firms are 0.738, 0.206, 0.055, 0.093, and 0.113, respectively, indicating that about 74% 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 (9%) and those that used to transact with UFJ (11%).

The mean and 25 percentile values of $lnAGE$ are respectively 3.18 and 2.77, which correspond to 24 and 16 years. This indicates that young startup firms comprise only a minority in the sample. The mean value of $lnEMP$, a proxy for firm size, is 2.76, which corresponds to about 16 employees. The distribution of $lnEMP$ is skewed to the left, meaning that the overwhelming majority of firms are small and that the mean of lnEMP is substantially pushed up by a small number of large firms. The mean of the proxy for firms' creditworthiness, $SCORE$, 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. There are considerable differences across the subsamples in the means of all the variables. The differences are most substantial between $NEITHER$ firms and $BOTH$ firms in most of the variables. For example, $lnAGE$ is the largest among firms that transacted with both BTM and UFJ ($BOTH$ firms), while it is the smallest among those that transacted with neither of the two ($NEITHER$ firms). Similar patterns can be found regarding the number of banks firms transacted with as well as the credit score in that $BOTH$ firms have the highest values on average, followed by ONE firms, while $NEITHER$ firms have the lowest values.

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 $TOKAI$ area. Note, however, that the merged banks

had at least one branch in each area. Approximately half of the ONE or $BOTH$ firms 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 $NEITHER$ firms. 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 measuring the effects of the bank merger

Next, we provide an overview of the variables that measure the effects of the merger, namely, firms' borrowing costs and amount of loans to gauge loan availability, firms' investment behavior, and firms' ex-post performance. Table 4 shows not only the level of each outcome variable in the year prior to the merger ($t-1$=2004), but also how they change from $t-1$ to t, $t+1$, $t+2$, $t+3$, $t+4$, and $t+5$. We choose 2004 as the base year in order to avoid any possible confounding effect of the merger, which took effect in October 2005. For borrowing costs, the mean value for the entire sample in year $t-1$ is 2.60%. Looking at the different subsamples, $BOTH$ firms paid the lowest interest rates (2.39%), while $NEITHER$ firms paid the highest rates (2.68%). Turning to developments 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 $t+3$. In $t+4$, interest rates fall back to almost the same level as in $t-1$, and in $t+5$ they are actually lower than in $t-1$. These trends reflect the tightening of monetary policy, which started in March 2006, followed by the monetary easing in response to the recession after the global financial crisis. Looking at the different subsamples, $BOTH$ firms experienced the largest increase in borrowing costs from $t-1$ to $t+3$ (+0.49 percentage points or 49 basis points (bp)), followed by ONE firms (+29bp), while $NEITHER$ firms saw the smallest increase (+5bp). Comparing firms that transacted with BTM (BTM firms) and with UFJ (UFJ firms), the increase in borrowing costs appears to be larger for the former (+35bp) than the latter (+25bp).

Figure 1 compares the distribution of borrowing costs for the different subsamples in year $t-1$ (blue solid line) and year $t+3$. The figure shows that there are considerable differences in the way the distribution of borrowing costs evolved over time. Specifically, the extent of the

shift appears to be largest for $BOTH$ firms, second largest for ONE firms, and smallest for $NEITHER$ firms. Further, comparing BTM and UFJ firms, the extent of the shift appears larger for the former than the latter. Even though a number of factors are yet to be controlled for, this simple comparison among subsamples suggests that firms that transacted with one or both of the 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 amount variables. In year $t-1$, the levels of these variables were higher among $NEITHER$ firms than $BOTH$ firms. Moreover, for $NEITHER$ firms, $LOAN$ and $LONG$ three years after the merger ($t+3$) were actually higher (+1.33 and +1.52 percentage points, respectively) than in the year prior to the merger. In contrast, ONE and $BOTH$ firms experienced a sizeable decline in both of these variables.

Turning to firms' investment behavior, we find that the investment ratio ($INVEST$) of $NEITHER$ firms was lower than that of $BOTH$ firms. Looking at developments in the investment ratio over time for the sample as a whole shows that there was an increase from year $t-1$ up to $t+2$, followed by a substantial drop in subsequent years. This up and down reflects developments in the business cycle before and after the financial crisis. Note, however, that differences across the different subsamples can still be observed. For example, ONE firms increased their investment ratio by a larger margin from $t-1$ (+1.51 percentage points) than $NEITHER$ firms (+0.18 percentage points), while $BOTH$ firms actually decreased their investment ratio during the period (-1.69 percentage points). The gap in the change in $INVEST$ remains up to year $t+3$ but then disappears in years $t+4$ and $t+5$.

Next, looking at the variable representing firms' performance, the sales ($lnSALES$) of $NEITHER$ firms were lower than those of $BOTH$ firms. For the entire sample, sales increased from year $t-1$ up to $t+3$, followed by a substantial drop in $t+4$ and $t+5$. However, as in the case of the investment ratio, differences across different subsamples can be observed. For instance, ONE and $BOTH$ firms experienced considerably larger increases in sales (by +3.27% and +2.54%) from $t-1$ to t than $NEITHER$ firms (+0.75%).

Finally, the number of firm-bank relationships for each firm ($NBANK$) was lower for $NEITHER$ firms than $BOTH$ firms. Most notably, for $BOTH$ firms, $NBANK$ dropped almost by one (-0.92) in the year of the merger (t) but then gradually increased, so that in $t+5$ the margin of the drop had shrunk to -0.63. Thus, although following the exogenous drop in the number of firm-bank relationships for firms that had transacted with both of the merged banks $NBANK$ gradually increased, it had not returned to the pre-merger level five years after the merger. It therefore seems likely that the impact of the decline in the number of firm-bank relationships for $BOTH$ firms is persistent as well.

6.2 Multinomial probit estimation

We proceed to estimate the multinomial probit models in order to attach propensity scores to all observations. In our baseline model, we use $MTYPE1$. The marginal effects when $MTYPE1$ takes a value of 0, 1, or 2 – respectively corresponding to $NEITHER$=1, ONE=1, and $BOTH$=1 – are shown in Table 5(a). 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 – corresponding to $NEITHER$=1, BTM=1, and UFJ=1, and $BOTH$=1 – are shown in Table 5(b). 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 that transacted BTM or UFJ tended to have a larger number of employees and tended to be older than firms that transacted with neither of them, the size of these marginal effects is greater for BTM than for UFJ; i.e., firms transacting with BTM tended to be larger and older than those

transacting with 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 $TOKAI$ had a significant positive marginal effect on the likelihood that a firm transacted with UFJ, but no significant marginal effect on the likelihood that it transacted with BTM. Moreover, being located in $KANTO$ had a higher marginal effect on the likelihood that a firm transacted with BTM than that it transacted with UFJ, while the opposite is the case for $KINKI$. These differences in the regional parameters between the banks likely 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 Baseline treatment effect estimation

In this subsection, we provide the results of our baseline estimations on the effects of the bank merger using the PSM-DID estimator and examine the three hypotheses. 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. Three remarks regarding the specification of the empirical model are in order. First, we assume that all firms in the sample could have transacted with BTM or UFJ or both, given that both banks had at least one branch office in each of the ten regions used to construct the regional dummies. Based on this assumption, we further assume that control group firms are located in close geographical proximity to the treatment group firms, since the multinomial probit model used to calculate the propensity scores we employ to match treatment and control firms includes regional dummies. Second, in the baseline estimation, the treatment groups consist of all firms that used to transact with BTM and UFJ prior to the merger and not just firms that continued to transact with BTMU following the merger. Third, we run balancing tests of the covariates of treatment and control group firms to find that the median bias is below the threshold of 5% in all specifications.[12]

[12] We also run balancing tests in all the other PSM-DID estimations in Sections 6.4, 6.5, 6.6, and 6.8 and find that the median bias is always below the threshold value of 5%.

6.3.1 Examining Hypothesis 1

In order to examine Hypothesis 1 in this and Hypothesis 2 in the following subsection, we focus on the three pairs of outcome values $MTYPE1=\{0,2\}$, $\{1,2\}$, and $\{0,1\}$ in turn, and for each pair estimate the treatment effect among the firms that take one of the two values. 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. Table 6(a) shows the results.

Let us start by looking at columns (1) to (4), which show the results for the pair of outcomes $MTYPE1=\{0,2\}$. They suggest that for firms that transacted with both banks loan conditions became more stringent than for firms that transacted with neither of them, which is consistent with Hypothesis 1. The following paragraphs take a closer look at developments in the variables on firms' loan availability and their ex-post performance.

In column (1), we find that borrowing costs ($RATE$) for treatment firms in years t to $t+5$ were substantially higher than they were in $t-1$. The largest difference, of 48 basis points (bp), is observed for $t+3$. Column (2) focuses on the control firms, which transacted with neither of the merged banks but had similar propensity scores to the treatment firms. For these firms, $RATE$ fluctuates, possibly as a result of changes in monetary policy and economic conditions. Specifically, it was lower in the year of the merger and the following (years t and $t+1$), but then slightly increases. However, in $t+5$ $RATE$ falls below that in $t-1$, presumably due to the severe recession after the financial crisis. Column (3), labeled "DID," shows the difference between the figures in columns (1) and (2) and represents the treatment effect over different time horizons. The results indicate that treatment firms experienced a significant increase in borrowing costs ($RATE$) relative to the control firms regardless of the time horizon. The largest difference, of 29bp, can be observed in year $t+3$, but even in year $t+5$, the end of our observation period, the difference is still 24bp.

Further, we find that loan availability ($LOAN$ and $LONG$) decreased for firms that trans-

acted with both banks. Column (1) shows that for treatment firms $LOAN$ was substantially lower in all years than before the merger, with the largest difference observed in $t+2$. Similarly, $LONG$ was lower in all years from t to $t+3$ than before the merger in $t-1$. Column (2) for the control firms shows that $LOAN$ was also lower, but $LONG$ was higher in most years. Next, column (3), which presents the difference between columns (1) and (2), shows persistent significant negative treatment effects for the loan availability variables, $LOAN$ and $LONG$. In sum, the results for $RATE$, $LOAN$, and $LONG$ provide support for Hypothesis 1, which stated that firms that transacted with both BTM and UFJ face more stringent borrowing conditions following the merger in the form of higher interest rates and a decrease in the amount of loans.

An important related issue is whether the increase in borrowing costs and decrease in loans for firms that transacted with both banks affected their investment behavior and ex-post performance. Looking at the results, we find that the investment ratio ($INVEST$) in column (1) in all years was lower than in $t-1$. The decline is most conspicuous in the year of the merger as well as in $t+4$ and $t+5$ in the wake of the global financial crisis. However, the control firms also experienced a steady decline in the investment ratio (column (2)). As a result, as shown in column (3), although the difference between the treatment and control groups is somewhat sizeable in the year of the merger, it is statistically insignificant in all years. Finally, the sales ($lnSALES$) of both of the treatment and control firms fluctuate in a similar fashion reflecting the business cycle (columns (1) and (2)) and no significant treatment effect is observed (column (3)). In sum, although firms that transacted with both banks experienced an increase in borrowing costs and a decrease in loans relative to firms that transacted with neither bank, this did not have a significant adverse impact on their investment or ex-post sales. In other words, we find no statistically significant evidence that the treatment firms faced binding credit constraints.

Next, to further examine Hypothesis 1, we focus on a different pair of outcomes, $MTYPE1=\{1,2\}$, to examine the difference between firms that transacted with both banks and firms that transacted with only one of them. The results are presented in columns (5) to (8) and suggest that firms that had transacted with both banks faced more stringent loan conditions after the merger than firms that had transacted with only one. Specifically, the results for $RATE$ indicate that treatment firms experienced a larger increase in interest rates relative to $t-1$ than control firms

over almost all time horizons. The difference ranges from 5 to 13bp and persists until the end of the observation period. Further, although $LOAN$ and $LONG$ are lower than in $t-1$ in almost all the years from t to $t+5$ for both treatment and control firms, the decline is significantly more pronounced for treatment firms in the first two years after the merger. The difference ranges from -0.70 to -0.75 percentage points for $LOAN$ and -0.51 to -0.68 percentage points for $LONG$. On balance, the above results provide further support for Hypothesis 1, which stated that firms that transacted with both BTM and UFJ were expected to face more stringent borrowing conditions following the merger.

As before, we also examine whether the deterioration in loan availability affected firms' investment and ex-post performance. For $INVEST$, the results show that whereas in year t treatment firms saw a decline in their investment ratio, control firms experienced an increase, indicating a significant negative treatment effect. Although the treatment effect is negative for other time horizons as well, it is not statistically significant. For $lnSALES$, the table shows that, relative to $t-1$, both groups experienced an increase in sales up $t+3$, followed by a decrease, and only in year t a weakly significant treatment effect can be observed. Overall, the results indicate that firms that transacted with both banks experienced an increase in borrowing costs and a decrease in loan availability relative to firms that transacted with only one of the two banks. Moreover, this had a significant adverse impact on their investment and sales in the year of the merger, but not in subsequent years.

6.3.2 Examining Hypothesis 2

Next, in columns (9) to (12) of the same table, we examine Hypothesis 2 by focusing on $MTYPE1 = \{1, 0\}$, that is, the comparison firms that transacted with one of the banks and those that transacted with none of them. This comparison aims to examine the possible adverse effects from organizational or managerial changes at the merged bank, which may result in a reduction of soft information production and/or more stringent loan conditions for small businesses. On the other hand, it is also possible that firms that transacted with one of the banks before the merger may in fact enjoy more favorable loan conditions after the merger because of efficiency improvements at the merged bank.

The evidence presented in the table shows that the treatment group faced more stringent loan conditions following the merger, possibly reflecting managerial and operational changes at the merged bank. The results for $RATE$ indicate that the treatment firms experienced a significant increase in interest rates relative to control firms for almost all horizons. The size of the relative increase ranges from 7 to 15bp, and although it declines slightly in years $t+4$ and $t+5$, the effect persists until the end of the observation period. We also observe significant relative decreases in $LOAN$ and $LONG$ for the entire observation period. The size of the relative decline ranges from -0.34 to -1.37 percentage points for $LOAN$ and -0.53 to -1.18 percentage points for $LONG$. On balance, the results provide support for the first part of Hypothesis 2, which states that firms that transacted with either BTM or UFJ were expected to face more stringent borrowing conditions following the merger.

Turning to firms' investment and sales, we find no evidence of an adverse impact. In fact, for the investment ratio, we even find instances of positive treatment effects. Specifically, as seen in column (11), we find a (marginally) significant positive treatment effect in $t+2$ and $t+4$. On the other hand, for $lnSALES$, no significant differences between treatment and control firms are observed. Overall, the results indicate that the increase in borrowing costs and the decrease in loan availability for firms that transacted with one of the two banks had no significant adverse impact on their investment behavior and ex-post sales when compared to firms that transacted with neither one of the banks.

Two additional remarks regarding the treatment effects obtained in the PSM-DID estimation in Table 6(a) are in order. First, the results in Table 6(a) suggest that it takes about two to three years for the treatment effects for $RATE$, $LOAN$, and $LONG$ to reach their maxima. However, this does not necessarily mean that the terms of each individual loan contract gradually changed year after year following 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 some loan contracts were revised immediately after the bank merger to incorporate higher interest rates. However, it likely took some time for these new contracts to make up a substantial share in the total amount of loans outstanding. Second, the significant negative treatment effects for $LONG$, which are almost the same size as the treatment effects for $LOAN$, indicate that the

maturity of total loans to treatment firms had become shorter relative to those to the control firms. Since interest rates for short-term loans are usually lower than those for long-term loans, firms that obtain loans with shorter maturities tend to face lower borrowing costs for their total loan amount. However, even though this factor biases the treatment effect for the interest rate downward, we nevertheless still observe significant treatment effects for $RATE$.

6.3.3 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 $\{2, 1\}$. 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. Table 6(b) shows the results.

The results for the first pair of outcome values, $MTYPE2 = \{0, 1\}$, are presented in columns (1) to (4), with column (3) showing the DID estimates. The results provide evidence of more stringent loan conditions for firms that transacted with BTM, the acquiring bank. The results for $RATE$ indicate that the treatment effect is significantly positive for all time horizons. The size of the increase ranges from 5bp to 19bp. The results for $LOAN$ and $LONG$ indicate that the treatment effect is significantly negative for almost all time horizons, with the size of the decline ranging from -0.91 to -1.30 percentage points for $LOAN$ and -0.46 to -1.03 percentage points for $LONG$.

Next, we turn to $MTYPE2 = \{0, 2\}$, the pair of outcomes focusing on firms that transacted with UFJ, the acquired bank. The results are displayed in columns (5) to (8), with column (7) presenting the DID estimates. Interestingly, firms that transacted with UFJ also faced more stringent loan conditions. The results for $RATE$ indicate that the treatment effect is significantly positive for almost all time horizons. The size of the increase ranges from 4bp to 12bp, which is smaller than that for firms that transacted with BTM. The results for $LOAN$ and $LONG$ indicate that the treatment effect is significantly negative for almost all time horizons, with the size of the decline ranging from -0.38 to -1.55 percentage points for $LOAN$ and -0.60 to -1.36

percentage points for $LONG$.

Since the results in columns (1) to (4) on the one hand and columns (5) to (8) on the other are qualitatively the same, we expect no significant difference in the treatment effects between firms that transacted with the acquiring bank (BTM) and those that transacted with the acquired bank (UFJ). And indeed, as shown in columns (9) to (12) for the pair of outcome values $MTYPE2 = \{2, 1\}$ comparing the two groups of firms, the DID estimates for the variables $RATE$, $LOAN$, $LONG$, $INVEST$, and $lnSALES$ are not statistically significant. 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, which results in no statistically significant difference in their ex-post performance. This contrasts with the results reported by Karceski, Ongena, and Smith (2005), who, focusing on listed firms that transacted with merged banks in Norway, found that the share prices of firms that had borrowed from acquired banks underperformed significantly relative to those of firms that had borrowed from acquiring banks.

6.4 Limiting the sample to firms that transacted with large banks

In addition to the baseline estimation results examining Hypotheses 1 to 3, we provide the results of further analyses implemented for different purposes. Specifically, the aim is to check the robustness of the baseline results, to better understand the mechanism how firm-bank transaction relationships transmit the impact of the merger, and to better relate the results to the previous literature. The additional analyses consist of five distinct issues: limiting the sample to firms that transacted with large banks (this section); limiting the sample to firms that are located in proximity to branches of the merged banks (Section 6.5); examining the importance of whether a firm continued or terminated its transaction relationship with the merged bank (Section 6.6); controlling for the extent of dependence on the merged banks (Section 6.7); and employing a different starting year from which we measure developments in firms' loan availability and performance variables (Section 6.8).

This and the next subsection discuss how we choose firms in the control group that could have transacted with BTM and/or UFJ but did not, in other words, how we define the loan markets for the merged banks. In the baseline analysis, we assumed that all firms could have transacted

with BTM or UFJ and imposed no limitations in defining non-treatment firms. However, some firms may have been of insufficient creditworthiness to start transacting with megabanks such as BTM and UFJ, or the branches of these banks – even though they had nationwide branch networks – may have been too far.

Taking these possibilities into account, in this subsection we limit our sample to firms that transacted with at least one of the city banks at the time of the merger. We regard these firms as sufficiently creditworthy, so that they could have established a transaction relationship BTM and UFJ, even if they did not.

Table 7 shows the results for the treatment effect when limiting the sample to firms that transacted with at least one city bank at the time of the BTM-UFJ merger. Note that in this table and the tables below, in order to conserve space, we omit the columns for the treatment and control groups and show the DID results and standard errors only. The results are qualitatively the same as those in the baseline estimation in Table 6. For example, the treatment effects between years $t-1$ and $t+3$ with regard to $RATE$ in columns (1), (3), and (5) of Tables 7(a) are 28, 9, and 12bp, which is almost identical to the values in the baseline estimation in Table 6(a), which are in 29, 9, and 15bp. However, there are several quantitative differences from the baseline. Some negative treatment effects, such as LOAN in column (5) of Table 7(a) between years $t-1$ and t, $t+4$, and $t+5$, are now insignificant, indicating that credit constraints in the wake of the merger were less binding among firms that used to transact with one of the merged banks. This may explain why the treatment effect with regard to $INVEST$ turns positive and significant between years $t-1$ and t, while it is insignificant in the baseline estimation. We observe similar differences from the baseline results in columns (1) and (3) of Table 7(b), indicating that the decline in the loan amount becomes less substantial among firms that used to transact with BTM or UFJ, so that the treatment effects regarding $INVEST$ become significantly positive.

6.5 Limiting the sample to firms that were located close to BTM and UFJ branches

Next, we limit the sample to firms that were located in close proximity to the merged banks. In the baseline estimations and in the previous subsection, we implicitly assumed regional or

national loan markets for firms when they borrow from large banks such as BTM or UFJ. Our baseline estimation tries to control for the merger-induced increase in market concentration through PSM. The propensity scores include firms' geographical location, so that firms with similar scores tend to have similar traits, including the geographical location of their headquarters. However, since the propensity scores include a number of factors, it is possible that firms in the control group may be located far from firms in the treatment group, meaning that relying on the propensity scores alone does not provide a guarantee that location is adequately controlled for.

Against this background, here we assume that the loan market for each firm is much smaller in size and more stringently control for the merger-induced increase in market concentration. To define the local loan market, some studies (e.g., Sapienza (2002) and Erel (2011)) employ administrative units such as counties and provinces, while other studies (e.g. Garmaise and Moskowitz (2006)) employ distance-based measures. Since administrative boundaries such as city, county, or prefectural boundaries placed no restrictions on BTM's and UFJ's operations, we follow Garmaise and Moskowitz (2006) and use distance to define loan markets, which circumvents possible biases caused by the unequal size of administrative units. More specifically, we limit the sample to firms which had both BTM and UFJ branches located within a distance of 10 kilometers. Thus, we regard the area bounded by a 10 kilometer radius as the loan market for each borrower and expect that all sample firms face increased market concentration after the merger.

Table 8 shows the results for the treatment effect for the sample of firms which had both BTM and UFJ branches located within a distance of 10km. The results are qualitatively the same as those in the baseline estimation in Table 6. However, there are several slight quantitative differences from the baseline. The negative treatment effects for variables such as $LOAN$ and $LONG$ in column (3) of Table 8(a) between years $t-1$ and $t+1$ and $t+2$ are larger than in the baseline, and this may explain the larger negative treatment effect for $INVEST$ and $lnSALES$ for some of the time horizons. The positive treatment effects for $RATE$ in column (3) of Table 8(b) are larger than in the baseline, while the negative treatment effects for $LOAN$ and $LONG$ in the same column are smaller than in the baseline. In sum, even when we employ different

specifications in order to control for the increase in market concentration after the bank merger, the estimation results of the treatment effects are qualitatively the same as in the baseline.

6.6 Effects among firms that maintained a relationship with the merged bank

The third issue we examine is the effect on firms that used to transact with one or both of the merged banks and maintained their relationship with the merged entity. This analysis has two closely related objectives. The first objective is to check the robustness of the baseline results by limiting treatment group firms to those that maintained their relationship with the merged bank. The second objective is to examine how firms were affected by relationship termination by comparing the baseline results and the results in this subsection. Karceski et al. (2005) theoretically showed that the termination of a relationship could either improve or worsen a firm's loan availability depending on the relative size of the firm's switching costs, borrowing costs, and internal rate of return. Following up on these theoretical considerations, Bonaccorsi di Patti and Gobbi (2007) and Degryse et al. (2011) empirically examined the effect on firms' loan availability when firms terminate their relationship with the merged bank and obtained mixed results. Therefore, if we do find that the positive treatment effect among firms that maintained their relationship with the merged bank is greater than the effect in the baseline estimation, we infer that firms that used to transact with the merged bank but terminated the relationship faced a deterioration in their loan availability. Table 9 shows the results.

We find that the results for loan availability in columns (1), (3), and (5) of Table 9(a) are qualitatively the same as those in the baseline results in Table 6(a). However, there are some small quantitative differences. For example, the treatment effects between years $t-1$ and $t+3$ to $t+4$ with regard to $RATE$ in column (1) are 28 and 25bp, which is slightly lower than those in the baseline estimation (29 and 26bp). We also observe slightly lower treatment effects in column (3) with regard to $RATE$ from year $t-1$ to years t and $t+4$ than in the baseline results. The treatment effects with regard to the loan amount variables $LOAN$ and $LONG$ are also qualitatively the same, while the absolute values of the effects are either larger or smaller than those in the baseline results.

Possibly as a result of the slightly better loan availability among firms that maintained

their relationships with the merged bank and/or as a result of the cleansing effect of excluding relatively low-quality firms from the treatment group, treatment effects with regard to $INVEST$ and $lnSALES$ are now more sizable and significant for some time horizons. In column (3) of Table 9(a), the absolute values of the negative treatment effects for $INVEST$ and $lnSALES$ between $t-1$ and t are smaller than in the baseline results. Moreover, in column (5), the positive treatment effects for $INVEST$ are larger than in the baseline results and the effects for $lnSALES$ are significantly positive for two time horizons.

Next, Table 9(b) shows the separate treatment effects for firms that used to transact with BTM or UFJ and corresponds to the baseline results in Table 6(b). Again, the results are qualitatively the same. The absolute values of the treatment effects regarding $LOAN$ in Table 9(b) are slightly smaller than those in the baseline case, while the effects regarding $INVEST$ and $lnSALES$ are larger and now significant for several time horizons. For example, the treatment effect regarding $INVEST$ between $t-1$ and $t+2$ becomes positive and significant in column (1) of Table 9(b) and in column (3) increases to +3.24 percentage points compared to +3.17 percentage points in the baseline result (Table 6(b), column (7)).

The results shown in Tables 9(a) and (b) indicate that firms that used to transact with BTM and/or UFJ and terminated their relationship(s) tended to face more stringent loan conditions and saw a smaller increase in their investment and sales than firms that maintained their relationship with the merged bank. To summarize, the results are consistent with the notion that firms face homogenous switching costs and the merged bank engaged in discriminatory treatment, screening out and terminating relationships with low quality firms with poor growth prospects. However, the results indicate that when we focus on the overall impact on developments in loan availability for all firms that used to transact with the merged bank, the impact is rather marginal.

6.7 Differential impact by the number of ex-ante firm-bank transaction relationships

The fourth issue we focus on concerns the measurement of the interest rate firms pay. While Sapienza (2002) and Erel (2011) employ contract-level interest rates, our interest rate variable is calculated as a firm's 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 behavior 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 transacted 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 transacted 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 transacted with a large number of banks.

In order to examine how the treatment effect on firms' borrowing costs differs depending on the number of banks a firm transacts with, we need to employ a parametric approach rather than the nonparametric PSM estimator approach. Below, we discuss the similarities and differences between these two approaches and apply a parametric approach to examine the differential treatment effects depending on the number of firm-bank relationships at the time of the 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 (2013) 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 developments in $RATE$, $LOAN$, $LONG$, $INVEST$, and $lnSALES$ between years $t-1$ and $t+3$. We choose this time horizon, since in Section 6.3 we found that these variables changed significantly over these horizons. 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 $RATE$, $LOAN$, $LONG$, $INVEST$, or $lnSALES$. 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, where panel (a) presents results obtained using OLS and panel (b) reproduces PSM-DID results excerpted from Table 6. The results in panel (a) are quantitatively similar to those in the baseline estimation: the estimated treatment effects for RATE based on the OLS estimation are 29, 13, and 16bp, while the corresponding effects based on the PSM-DID estimation are 29, 9, and 15bp, with similar levels of statistical significance. The treatment effects for $LOAN$ are also quantitatively close to each other: the estimator values for $LOAN$ are -1.16, 0.04 (insignificant), and -1.19 percentage points in panel (a), while the corresponding figures in panel (b) are -1.59, -0.26 (insignificant), and -1.18 percentage points. We also find that the estimates for $LONG$, $INVEST$ and $lnSALES$ tend to be similar in that most of them are insignificant. Given these results, we start from this baseline parametric specification, focus on $RATE$, and add an interaction term to examine the differential treatment effects of the different number of banks each firm transacted with before the merger.

Based on equation (1), 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:[13]

[13] Note that in addition to the time horizon from t-1 to t+3, we conducted the same analysis using other time horizons as well. In addition, we also tried the other loan availability variables (i.e., $LOAN$ and $LONG$). Overall, the results are in line with the results reported below. The results of these additional analyses are available from the authors upon request.

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

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 $\alpha_1 + \beta_1 NBANK$.

Figure 2 presents the treatment effect with regard to RATE between years $t-1$ and $t+3$, with panel (a) showing the treatment effect for firms that transacted with both of the merged banks relative to firms that transacted with neither of them and panel (b) showing the treatment effect for firms that transacted with one of the merged banks. The treatment effect differs depending on the number of banks a firm transacted with, and we find that in both panels the size of the treatment effect gradually decreases as $NBANK$ increases. Specifically, in panel (a) for firms that transacted with both banks, the treatment effect is 54bp and significant when $NBANK = 2$, 14bp when $NBANK = 8$, and not significantly different from zero when $NBANK \geq 9$. In panel (b) for firms that transacted with one of the two banks, the treatment effect is 22bp when $NBANK = 2$, 8bp when $NBANK = 8$, and not significantly different from zero when $NBANK \geq 9$.[14] Overall, 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 apart from the merged banks.

6.8 Benchmark year starting from year 2005

Finally, we check whether our results are robust to changing the benchmark year to measure the treatment effects of the bank merger. In the analysis above, we used 2004 – the year prior to the merger of BTM and UFJ – as the reference year. The reason for doing so was that the

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

merger was announced in 2004 and BTM and UFJ may have started changing their lending behavior then. However, one could argue that the treatment effect should be measured from the year that the merger was actually implemented. In this subsection we therefore use 2005 as the benchmark from which we measure the treatment effects. The variables employed for the analysis and the matching methodology are the same as in the baseline estimation. Only the time horizons for the analysis differ, that is, the PSM-DID estimators are measured between t (2005) and $t+1$ (2006) to $t+6$ (2011).

The results are shown in Table 11. We find that although most of the results are qualitatively the same as in the baseline estimation, there are a few notable differences. Starting with the effect on $RATE$, the results are not only qualitatively the same but also quantitatively very similar to the baseline estimation. Specifically, in columns (1), (3), and (5) in Table 11(a), we observe significant treatment effects for almost all the time horizons. The treatment effects between years t and $t+3$ in these columns are 24, 6, and 15bp respectively and close in size to the corresponding treatment effects between years $t-1$ and $t+3$ in the baseline case, which are 29, 9, and 15bp. Note, however, that the treatment effects for $LOAN$ and $LONG$ are smaller in size and significance than those in the baseline estimation. In columns (1) and (5) in Table 11(a), the treatment effects for $LONG$ between years t and $t+2$ are -1.24 and -0.45 percentage points, respectively. These values are about half to one-third of the corresponding effects between years $t-1$ and $t+2$ in the baseline, which are -2.21 and -1.18 percentage points. Moreover, unlike in the baseline estimation, where we observed a significant negative impact on $INVEST$ and $lnSALES$ between t-1 and t in column (7), we find no significant negative impact on $INVEST$ or $lnSALES$ for any time horizon in this estimation. In Table 11(b), we also find smaller treatment effects for $LOAN$ and $LONG$ than in the baseline estimation. In columns (1) and (3) in the table, the treatment effects for $LOAN$ between years t and $t+2$ are -0.67 and -1.01 percentage points, respectively, while those between years $t-1$ and $t+2$ in the baseline estimation are -1.30 and -1.55 percentage points.

Overall, the PSM-DID estimation results we obtain when changing the starting year of the analysis are qualitatively the same as in the baseline, although there are a few substantial exceptions, especially regarding the treatment effect with respect to the loan amount. These

differences from the baseline results suggest that the merged banks may have changed their behavior immediately after the announcement of the merger or at the moment that the merger was implemented.

7 Conclusion

This study examined the effects of a major bank merger on firms' financing conditions by focusing on the world's largest-ever bank merger at the time between the Bank of Tokyo-Mitsubishi (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 mainly 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 and of the consolidation of the number of such relationships as a result of the merger.

The megabank merger we used for our analysis provides an excellent case study for examining the role 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 those relationships for a considerable period of time. Exploiting the information on firm-bank relationships in our dataset, we investigated how the impact of the merger on firms' borrowing conditions differed depending on whether firms 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 29bp relative to firms that transacted with neither of the two banks and by 13bp relative to firms that transacted with one of them prior to the merger. The loan amount of the firms that transacted with both BTM and UFJ decreased by a significant margin relative to firms that transacted with one or none of the two banks. The deterioration in loan availability was persistent and could still be observed five years after the merger. Second, looking at firms that transacted with only one of the banks, we find that their borrowing costs also rose by a significant margin of 15bp and their loan amount declined by a significant margin. Third, these increases in borrowing costs and decreases in loan amount for firms that transacted with

one or both of the merged banks were still observed even after limiting the sample to firms which had BTM and UFJ in their geographical proximity, after controlling for the ex-post termination/continuation of firm-bank relationships, and after controlling for differences in the number of ex-ante firm-bank relationships.

The margin of the increase in borrowing costs is quite sizable relative to the very low level of interest rates in Japan, which should give regulators cause for concern. Although the merger did not create a monopoly as in the case examined by Calomiris and Pornrojnangkool (2005), our results indicate that it not only increased market concentration in the loan market, but also raised switching costs and resulted in a deterioration of loan availability. Thus, even though the Fair Trade Commission examined the combined shares of these banks in the deposit, loan, and trustee markets before allowing the merger to go ahead, it appears that it did not sufficiently examine – or ignored – the effect that the merger would have on the loan market through its impact on firm-bank relationships.

Our finding of higher borrowing costs for firms that transacted with the merged banks contrast with the results obtained by Sapienza (2002) and Erel (2011), who found a decrease in interest rates following most bank mergers. A possible reason for the different findings is that the motives underlying the bank mergers examined differ. According to DeYoung et al. (2005), a large number of bank mergers in the United States and in Europe resulted in efficiency gains, and achieving such gains likely was a major motive. In contrast, the motive underlying the merger we focus on in our study was to write off huge losses on non-performing loans extended to a small number of large firms by the acquired bank rather than to increase managerial efficiency.

Our fourth major finding is that we do not observe 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). This finding of a symmetric treatment between customers of the acquiring bank and the target bank is in contrast with the results obtained by Karceski, Ongena, and Smith (2005) and Carow, Kane, and Narayanan (2006), who, however, focused on different customers (listed firms) and variables (stock market returns) than we did. A possible reason for the symmetrical treatment that we find is that BTM

and UFJ were quite similar in size and management style.[15] We also examined whether firms that continued their relationship with the merged bank and those that terminated it were treated differently. We found that firms with lower growth prospects were charged higher borrowing rates and their relationships were more likely to be terminated. These findings are roughly in line with those obtained by Bonaccorsi di Patti and Gobbi (2007) and Degryse, Masschelein, and Mitchell (2011). However, we do not find any substantial differences in the treatment effects regardless of whether we use the entire sample including all firms or the sample including only firms that maintained their relationship with the bank after the merger. Fifth and finally, we found that the deterioration in loan availability for firms that transacted with the merged banks resulted in a negative but short-lived treatment effect on their investment and sales.

There are several directions for future research. One important issue, for example, would be to clearly identify the mechanism which brings about that borrower firms that used to transact with one of the merged banks are charged higher interest rates. Bank mergers typically result in numerous changes, ranging from branch consolidation to changes to the promotion system, which all may affect the managerial efficiency of the bank. This implies that it is necessary to identify factors that affect banks' efficiency following a merger. Another worthwhile exercise would be to analyze the impact of bank mergers more generally on the Japanese loan market rather than focusing on one specific merger. Whether similar patterns can be found as in this study, that is, that borrowers tend to face higher borrowing costs following a merger, has important policy implications.

[15] Several BTMU officials told the authors in interviews that loan conditions for customers that used to transact with both BTM and UFJ did not necessarily converge to those of the acquiring bank (BTM). If firms used to borrow more from UFJ than BTM before the merger, the former UFJ loan officers rather than those from BTM determined the way new loans were extended.

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 (2013) 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 $\left\{p^k\right\}_{k=0}^{M}$. 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	
NEITHER	1 if the firm had a relationship with neither BTM nor UFJ in 2004, 0 otherwise.
ONE	1 if the firm had a relationship with either BTM or UFJ in 2004, 0 otherwise.
BTM	1 if the firm had a relationship with BTM in 2004, 0 otherwise.
UFJ	1 if the firm had a relationship with UFJ in 2004, 0 otherwise.
BOTH	1 if the firm had a relationship with both BTM and UFJ in 2004, 0 otherwise.
MTYPE1	0 if NEITHER=1, 1 if ONE=1, 2 if BOTH=1
MTYPE2	0 if NEITHER=1, 1 if BTM=1, 2 if UFJ=1, 3 if BOTH=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
PROFIT	Operating profit / total assets
CASH	Cash and deposit / total assets
FIXED	Fixed tangible assets / total assets
NBANK	Number of bank relationships in 2003
Lending market concentration	
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 Hokkaido, 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: Electricity, 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 during the current period / average of the sum of long-term loans, short-term loans, and notes discounted at the end of current and previous period
LOAN	Sum of long-term loans, short-term loans, and notes discounted / total assets
LONG	Long-term loans / total assets
INVEST	Sum of change in fixed tangible assets and depreciation / fixed tangible assets in the previous period
lnSALES	Natural logarithm of sales amount

Table 2: Summary statistics for the entire sample

Variable	Obs.	Mean	Std. dev.	Min.	p25	p50	p75	Max.
Dependent variables								
NEITHER	122206	0.7382	0.4396					
ONE	122206	0.2064	0.4047					
BTM	122206	0.0929	0.2904					
UFJ	122206	0.1134	0.3171					
BOTH	122206	0.0554	0.2288					
Firm characteristics								
lnAGE	122206	3.1822	0.6453	0	2.7726	3.2958	3.6636	4.7875
lnEMP	122206	2.7584	1.2390	0	1.7918	2.6391	3.5553	6.5971
SCORE	122206	50.7871	7.7603	0	46	51	56	80
SALESGROWTH	122206	0.0383	0.2820	-0.6927	-0.1062	0.0068	0.1341	2.1545
PROFIT	122206	0.0145	0.0988	-0.9024	0.0006	0.0200	0.0481	0.4076
CASH	122206	0.2001	0.1615	0.0010	0.0760	0.1581	0.2831	0.8203
FIXED	122206	0.2677	0.2110	0.0000	0.0888	0.2264	0.4049	0.9055
NBANK	122206	3.2372	1.8934	0	2	3	4	10
Lending market concentration								
HHI	122206	0.1857	0.0937	0.0879	0.1076	0.1548	0.2568	0.4201
Firm location								
HOKKAIDO	122206	0.0819	0.2742					
TOHOKU	122206	0.0774	0.2673					
KANTO	122206	0.3228	0.4676					
KOSHINETSU	122206	0.0595	0.2366					
HOKURIKU	122206	0.0305	0.1720					
TOKAI	122206	0.0969	0.2958					
KINKI	122206	0.1371	0.3439					
CHUGOKU	122206	0.0880	0.2833					
SHIKOKU	122206	0.0238	0.1524					
KYUSHU	122206	0.0820	0.2744					
Firm industry								
INDUSTRY1	122206	0.0018	0.0421					
INDUSTRY2	122206	0.5174	0.4997					
INDUSTRY3	122206	0.1370	0.3439					
INDUSTRY4	122206	0.0008	0.0287					
INDUSTRY5	122206	0.0010	0.0316					
INDUSTRY6	122206	0.0212	0.1441					
INDUSTRY7	122206	0.1843	0.3877					
INDUSTRY8	122206	0.0320	0.1761					
INDUSTRY9	122206	0.0225	0.1482					
INDUSTRY10	122206	0.0051	0.0715					
INDUSTRY11	122206	0.0768	0.2663					

Table 3: Summary statistics for subsamples

	All	Subsample				
		NEITHER	ONE	BTM	UFJ	BOTH
Firm characteristics						
lnAGE	3.1822	3.1215	3.3182	3.3204	3.3164	3.4853
lnEMP	2.7584	2.5241	3.2701	3.3305	3.2206	3.9754
SCORE	50.7871	49.7105	53.0562	53.2219	52.9204	56.6779
SALESGROWTH	0.0383	0.0334	0.0528	0.0522	0.0533	0.0484
PROFIT	0.0145	0.0088	0.0288	0.0303	0.0276	0.0374
CASH	0.2001	0.2043	0.1887	0.1895	0.1880	0.1852
FIXED	0.2677	0.2784	0.2401	0.2327	0.2462	0.2276
NBANK	3.2372	2.7889	4.1817	4.2816	4.0998	5.6923
Lending market concentration						
HHI	0.1857	0.2057	0.1321	0.1365	0.1285	0.1178
Firm location						
HOKKAIDO	0.0819	0.1074	0.0117	0.0150	0.0090	0.0035
TOHOKU	0.0774	0.1013	0.0121	0.0145	0.0100	0.0031
KANTO	0.3228	0.2620	0.4657	0.6752	0.2941	0.6007
KOSHINETSU	0.0595	0.0778	0.0094	0.0178	0.0025	0.0024
HOKURIKU	0.0305	0.0391	0.0068	0.0078	0.0059	0.0046
TOKAI	0.0969	0.0675	0.2025	0.0318	0.3424	0.0958
KINKI	0.1371	0.1008	0.2306	0.1440	0.3016	0.2717
CHUGOKU	0.0880	0.1101	0.0296	0.0437	0.0181	0.0109
SHIKOKU	0.0238	0.0295	0.0086	0.0092	0.0081	0.0038
KYUSHU	0.0820	0.1044	0.0230	0.0409	0.0084	0.0034
Firm industry						
INDUSTRY1	0.0018	0.0020	0.0013	0.0019	0.0007	0.0010
INDUSTRY2	0.5174	0.6072	0.2936	0.2619	0.3196	0.1533
INDUSTRY3	0.1370	0.1106	0.2062	0.2167	0.1976	0.2311
INDUSTRY4	0.0008	0.0009	0.0006	0.0007	0.0004	0.0004
INDUSTRY5	0.0010	0.0008	0.0014	0.0014	0.0014	0.0022
INDUSTRY6	0.0212	0.0191	0.0259	0.0291	0.0232	0.0319
INDUSTRY7	0.1843	0.1439	0.2809	0.2900	0.2735	0.3637
INDUSTRY8	0.0320	0.0307	0.0348	0.0327	0.0365	0.0399
INDUSTRY9	0.0225	0.0181	0.0337	0.0364	0.0316	0.0388
INDUSTRY10	0.0051	0.0046	0.0059	0.0050	0.0066	0.0096
INDUSTRY11	0.0768	0.0621	0.1158	0.1243	0.1089	0.1280
Obs.	122,206	90,212	25,222	11,359	13,863	6,772

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

	All	Subsample				
		NEITHER	ONE	BTM	UFJ	BOTH
	Mean	Mean	Mean	Mean	Mean	Mean
RATE(t-1)	0.0260	0.0268	0.0242	0.0248	0.0238	0.0239
ΔRATE(t)	0.0000	-0.0001	0.0002	0.0003	0.0001	0.0006
ΔRATE(t+1)	-0.0003	-0.0006	0.0001	0.0005	-0.0002	0.0006
ΔRATE(t+2)	0.0006	0.0001	0.0013	0.0018	0.0009	0.0029
ΔRATE(t+3)	0.0015	0.0005	0.0029	0.0035	0.0025	0.0049
ΔRATE(t+4)	0.0001	-0.0008	0.0014	0.0019	0.0010	0.0032
ΔRATE(t+5)	-0.0014	-0.0023	-0.0004	-0.0001	-0.0006	0.0011
LOAN(t-1)	0.4364	0.4562	0.4024	0.4094	0.3966	0.3542
ΔLOAN(t)	-0.0004	0.0031	-0.0061	-0.0078	-0.0046	-0.0130
ΔLOAN(t+1)	-0.0050	0.0031	-0.0171	-0.0196	-0.0149	-0.0330
ΔLOAN(t+2)	-0.0078	0.0039	-0.0261	-0.0300	-0.0229	-0.0449
ΔLOAN(t+3)	-0.0007	0.0133	-0.0239	-0.0287	-0.0199	-0.0415
ΔLOAN(t+4)	0.0199	0.0353	-0.0040	-0.0098	0.0009	-0.0257
ΔLOAN(t+5)	0.0168	0.0335	-0.0056	-0.0134	0.0008	-0.0335
LONG(t-1)	0.2688	0.2864	0.2374	0.2396	0.2356	0.1995
ΔLONG(t)	0.0042	0.0061	0.0010	0.0010	0.0009	-0.0017
ΔLONG(t+1)	0.0058	0.0104	-0.0007	-0.0004	-0.0009	-0.0117
ΔLONG(t+2)	0.0047	0.0109	-0.0043	-0.0042	-0.0044	-0.0178
ΔLONG(t+3)	0.0078	0.0152	-0.0033	-0.0042	-0.0026	-0.0173
ΔLONG(t+4)	0.0324	0.0414	0.0199	0.0187	0.0209	0.0010
ΔLONG(t+5)	0.0343	0.0439	0.0232	0.0184	0.0272	-0.0002
INVEST(t-1)	0.0731	0.0682	0.0827	0.0880	0.0782	0.0895
ΔINVEST(t)	0.0037	0.0018	0.0151	0.0071	0.0219	-0.0169
ΔINVEST(t+1)	0.0099	0.0085	0.0160	0.0152	0.0166	0.0020
ΔINVEST(t+2)	0.0050	0.0027	0.0167	0.0193	0.0145	-0.0136
ΔINVEST(t+3)	-0.0153	-0.0189	-0.0076	0.0048	-0.0180	-0.0116
ΔINVEST(t+4)	-0.0366	-0.0410	-0.0278	-0.0322	-0.0242	-0.0315
ΔINVEST(t+5)	-0.0540	-0.0517	-0.0578	-0.0559	-0.0593	-0.0577
lnSALES(t-1)	13.3005	12.9429	13.9349	13.9824	13.8957	14.7642
ΔlnSALES(t)	0.0150	0.0075	0.0327	0.0334	0.0321	0.0254
ΔlnSALES(t+1)	0.0379	0.0261	0.0620	0.0672	0.0576	0.0601
ΔlnSALES(t+2)	0.0554	0.0378	0.0919	0.0989	0.0861	0.0860
ΔlnSALES(t+3)	0.0339	0.0097	0.0799	0.0901	0.0714	0.0891
ΔlnSALES(t+4)	-0.0498	-0.0644	-0.0211	-0.0118	-0.0287	-0.0251
ΔlnSALES(t+5)	-0.1135	-0.1181	-0.1071	-0.0952	-0.1169	-0.1003
NBANK(t-1)	3.7350	3.2727	4.4500	4.5697	4.3511	5.9475
ΔNBANK(t)	0.0112	0.0956	0.0608	0.0472	0.0724	-0.9177
ΔNBANK(t+1)	0.0823	0.1814	0.1042	0.0960	0.1113	-0.8171
ΔNBANK(t+2)	0.1354	0.2383	0.1455	0.1350	0.1543	-0.7449
ΔNBANK(t+3)	0.1620	0.2653	0.1633	0.1420	0.1810	-0.6970
ΔNBANK(t+4)	0.1872	0.2919	0.2034	0.1624	0.2373	-0.6830
ΔNBANK(t+5)	0.2194	0.3355	0.2282	0.1787	0.2688	-0.6336

Table 5: Multinomial probit estimation results

(a) Estimation with three outcome values

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 (NEITHER)			MTYPE1=1 (ONE)			MTYPE1=2 (BOTH)		
lnAGE	-0.0167	***	0.0019	0.0158	***	0.0018	0.0009	***	0.0002
lnEMP	-0.0301	***	0.0012	0.0282	***	0.0012	0.0019	***	0.0001
SCORE	-0.0036	***	0.0002	0.0032	***	0.0002	0.0004	***	0.0000
SALESGROWTH	-0.0088	**	0.0042	0.0089	**	0.0041	-0.0001		0.0003
PROFIT	0.0110		0.0135	-0.0100		0.0133	-0.0009		0.0013
CASH	0.0166	**	0.0080	-0.0167	**	0.0078	0.0001		0.0006
FIXED	0.1175	***	0.0058	-0.1103	***	0.0057	-0.0072	***	0.0006
NBANK	-0.0418	***	0.0006	0.0390	***	0.0006	0.0028	***	0.0001
HHI	1.0073	***	0.0196	-0.9513	***	0.0194	-0.0560	***	0.0034
TOHOKU	-0.1874	***	0.0143	0.1654	***	0.0141	0.0220	***	0.0069
KANTO	-0.4794	***	0.0095	0.3930	***	0.0098	0.0864	***	0.0092
KOSHINETSU	-0.2086	***	0.0170	0.1822	***	0.0165	0.0263	***	0.0088
HOKURIKU	-0.3187	***	0.0223	0.2330	***	0.0213	0.0857	***	0.0208
TOKAI	-0.6534	***	0.0099	0.5744	***	0.0129	0.0790	***	0.0121
KINKI	-0.5749	***	0.0113	0.4531	***	0.0138	0.1219	***	0.0154
CHUGOKU	-0.2983	***	0.0141	0.2709	***	0.0141	0.0274	***	0.0067
SHIKOKU	-0.3568	***	0.0208	0.3001	***	0.0210	0.0567	***	0.0152
KYUSHU	-0.2529	***	0.0142	0.2435	***	0.0141	0.0094	**	0.0038
INDUSTRY1	0.0604	***	0.0186	-0.0579	***	0.0184	-0.0025	***	0.0007
INDUSTRY2	0.1026	***	0.0041	-0.0976	***	0.0040	-0.0049	***	0.0004
INDUSTRY3	0.0334	***	0.0038	-0.0318	***	0.0038	-0.0016	***	0.0002
INDUSTRY4	0.0889	***	0.0195	-0.0859	***	0.0194	-0.0030	***	0.0004
INDUSTRY5	-0.0146		0.0297	0.0106		0.0291	0.0040		0.0032
INDUSTRY6	0.0546	***	0.0055	-0.0527	***	0.0054	-0.0019	***	0.0003
INDUSTRY7	0.0103	**	0.0041	-0.0105	***	0.0041	0.0002		0.0003
INDUSTRY8	0.0448	***	0.0051	-0.0432	***	0.0050	-0.0016	***	0.0003
INDUSTRY9	0.0297	***	0.0059	-0.0285	***	0.0059	-0.0012	***	0.0003
INDUSTRY10	0.0181		0.0127	-0.0192		0.0124	0.0011		0.0012
Obs.	122,206								
Wald chi2(56)	38273.35								
Prob > chi2	0.0000								
Log likelihood	-57536.04								

(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 (NEITHER)			MTYPE2=1 (BTM)			MTYPE2=2 (UFJ)			MTYPE2=3 (BOTH)		
lnAGE	-0.0152	***	0.0018	0.0084	***	0.0012	0.0059	***	0.0012	0.0009	***	0.0002
lnEMP	-0.0288	***	0.0011	0.0150	***	0.0008	0.0117	***	0.0007	0.0020	***	0.0001
SCORE	-0.0034	***	0.0002	0.0013	***	0.0001	0.0017	***	0.0001	0.0004	***	0.0000
SALESGROWTH	-0.0073	*	0.0039	0.0019		0.0027	0.0055	**	0.0027	-0.0001		0.0004
PROFIT	0.0101		0.0127	0.0006		0.0089	-0.0097		0.0088	-0.0010		0.0014
CASH	0.0159	**	0.0075	-0.0047		0.0052	-0.0113	**	0.0050	0.0001		0.0007
FIXED	0.1132	***	0.0055	-0.0609	***	0.0038	-0.0445	***	0.0037	-0.0077	***	0.0006
NBANK	-0.0401	***	0.0006	0.0193	***	0.0004	0.0178	***	0.0004	0.0030	***	0.0002
HHI	0.9508	***	0.0193	-0.4367	***	0.0152	-0.4538	***	0.0133	-0.0603	***	0.0036
TOHOKU	-0.1818	***	0.0143	0.0719	***	0.0112	0.0865	***	0.0123	0.0233	***	0.0073
KANTO	-0.4652	***	0.0096	0.2162	***	0.0086	0.1573	***	0.0083	0.0917	***	0.0097
KOSHINETSU	-0.1827	***	0.0169	0.1455	***	0.0150	0.0082		0.0108	0.0290	***	0.0096
HOKURIKU	-0.3138	***	0.0224	0.0908	***	0.0165	0.1348	***	0.0194	0.0881	***	0.0214
TOKAI	-0.6407	***	0.0111	-0.0005		0.0053	0.5597	***	0.0156	0.0816	***	0.0126
KINKI	-0.5690	***	0.0118	0.0939	***	0.0089	0.3496	***	0.0151	0.1255	***	0.0160
CHUGOKU	-0.2867	***	0.0142	0.1527	***	0.0127	0.1042	***	0.0121	0.0298	***	0.0073
SHIKOKU	-0.3534	***	0.0211	0.1083	***	0.0168	0.1867	***	0.0208	0.0584	***	0.0157
KYUSHU	-0.2291	***	0.0142	0.1751	***	0.0136	0.0430	***	0.0101	0.0109	**	0.0043
INDUSTRY1	0.0504	***	0.0184	0.0033		0.0171	-0.0509	***	0.0058	-0.0028	***	0.0008
INDUSTRY2	0.0982	***	0.0039	-0.0489	***	0.0026	-0.0441	***	0.0026	-0.0053	***	0.0004
INDUSTRY3	0.0305	***	0.0036	-0.0046	*	0.0026	-0.0241	***	0.0021	-0.0018	***	0.0002
INDUSTRY4	0.0821	***	0.0176	-0.0356	***	0.0133	-0.0432	***	0.0099	-0.0033	***	0.0005
INDUSTRY5	-0.0142		0.0282	0.0133		0.0191	-0.0035		0.0194	0.0043		0.0034
INDUSTRY6	0.0501	***	0.0051	-0.0163	***	0.0038	-0.0317	***	0.0029	-0.0021	***	0.0003
INDUSTRY7	0.0092	**	0.0039	0.0025		0.0027	-0.0119	***	0.0024	0.0002		0.0003
INDUSTRY8	0.0422	***	0.0047	-0.0208	***	0.0031	-0.0197	***	0.0031	-0.0017	***	0.0003
INDUSTRY9	0.0280	***	0.0054	-0.0137	***	0.0036	-0.0130	***	0.0036	-0.0013	***	0.0003
INDUSTRY10	0.0174		0.0117	-0.0148	**	0.0076	-0.0039		0.0083	0.0013		0.0013
Obs.	122,206											
Wald chi2(56)	44225.67											
Prob > chi2	0.0000											
Log likelihood	-71275.437											

Table 6: Treatment effect estimation results (baseline)
(a) Three outcome values

		Method: Nearest five matching within radius											
		Treated: MTYPE1=2 (BOTH)				Treated: MTYPE1=2 (BOTH)				Treated: MTYPE1=1 (ONE)			
		Control: MTYPE1=0 (NEITHER)				Control: MTYPE1=1 (ONE)				Control: MTYPE1=0 (NEITHER)			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables		Treated	Controls	DID	S.E.	Treated	Controls	DID	S.E.	Treated	Controls	DID	S.E.
RATE	t	0.0006	-0.0002	0.0008 ***	0.0003	0.0006	0.0001	0.0005 **	0.0002	0.0001	0.0000	0.0002	0.0002
	t+1	0.0006	-0.0009	0.0015 ***	0.0004	0.0006	0.0002	0.0004	0.0003	0.0001	-0.0007	0.0007 ***	0.0002
	t+2	0.0028	0.0004	0.0025 ***	0.0004	0.0028	0.0018	0.0010 ***	0.0003	0.0013	0.0003	0.0010 ***	0.0002
	t+3	0.0048	0.0019	0.0029 ***	0.0005	0.0048	0.0039	0.0009 **	0.0004	0.0029	0.0014	0.0015 ***	0.0003
	t+4	0.0033	0.0007	0.0026 ***	0.0005	0.0033	0.0020	0.0013 ***	0.0004	0.0014	0.0001	0.0013 ***	0.0003
	t+5	0.0012	-0.0012	0.0024 ***	0.0005	0.0012	0.0005	0.0007 *	0.0004	-0.0004	-0.0017	0.0013 ***	0.0003
LOAN	t	-0.0151	-0.0087	-0.0063 **	0.0030	-0.0151	-0.0136	-0.0014	0.0020	-0.0075	-0.0042	-0.0034 **	0.0017
	t+1	-0.0368	-0.0173	-0.0195 ***	0.0038	-0.0368	-0.0293	-0.0075 ***	0.0027	-0.0212	-0.0125	-0.0086 ***	0.0022
	t+2	-0.0490	-0.0228	-0.0263 ***	0.0045	-0.0490	-0.0420	-0.0070 **	0.0032	-0.0304	-0.0167	-0.0137 ***	0.0026
	t+3	-0.0438	-0.0280	-0.0159 ***	0.0051	-0.0438	-0.0412	-0.0026	0.0037	-0.0272	-0.0154	-0.0118 ***	0.0030
	t+4	-0.0270	-0.0137	-0.0132 **	0.0058	-0.0270	-0.0221	-0.0049	0.0041	-0.0050	0.0055	-0.0106 ***	0.0034
	t+5	-0.0333	-0.0190	-0.0143 **	0.0065	-0.0333	-0.0260	-0.0073 *	0.0044	-0.0057	0.0050	-0.0108 ***	0.0037
LONG	t	-0.0022	0.0039	-0.0061 **	0.0024	-0.0022	-0.0022	0.0000	0.0017	0.0004	0.0058	-0.0053 ***	0.0014
	t+1	-0.0125	0.0048	-0.0173 ***	0.0033	-0.0125	-0.0073	-0.0051 **	0.0023	-0.0023	0.0066	-0.0090 ***	0.0020
	t+2	-0.0203	0.0019	-0.0221 ***	0.0041	-0.0203	-0.0134	-0.0068 **	0.0027	-0.0060	0.0058	-0.0118 ***	0.0023
	t+3	-0.0186	-0.0017	-0.0169 ***	0.0045	-0.0186	-0.0153	-0.0034	0.0031	-0.0042	0.0062	-0.0104 ***	0.0026
	t+4	0.0017	0.0175	-0.0159 ***	0.0051	0.0016	0.0076	-0.0059 *	0.0035	0.0228	0.0324	-0.0096 ***	0.0031
	t+5	0.0024	0.0187	-0.0163 ***	0.0057	0.0023	0.0077	-0.0053	0.0036	0.0249	0.0361	-0.0113 ***	0.0033
INVEST	t	-0.0204	0.0016	-0.0219	0.0235	-0.0205	0.0208	-0.0413 **	0.0165	0.0181	0.0019	0.0163	0.0119
	t+1	-0.0005	-0.0075	0.0070	0.0245	-0.0006	0.0100	-0.0105	0.0172	0.0171	0.0087	0.0084	0.0127
	t+2	-0.0151	-0.0226	0.0075	0.0241	-0.0152	0.0049	-0.0200	0.0171	0.0139	-0.0087	0.0226 *	0.0130
	t+3	-0.0124	-0.0300	0.0176	0.0270	-0.0125	-0.0008	-0.0117	0.0187	-0.0113	-0.0083	-0.0030	0.0131
	t+4	-0.0442	-0.0466	0.0024	0.0253	-0.0442	-0.0256	-0.0186	0.0176	-0.0332	-0.0600	0.0268 **	0.0131
	t+5	-0.0603	-0.0595	-0.0009	0.0245	-0.0604	-0.0495	-0.0109	0.0164	-0.0616	-0.0721	0.0105	0.0133
lnSALES	t	0.0269	0.0357	-0.0089	0.0055	0.0268	0.0338	-0.0070 *	0.0040	0.0329	0.0297	0.0031	0.0030
	t+1	0.0620	0.0695	-0.0075	0.0075	0.0619	0.0685	-0.0066	0.0054	0.0642	0.0624	0.0018	0.0042
	t+2	0.0897	0.0918	-0.0021	0.0094	0.0896	0.0988	-0.0092	0.0070	0.0973	0.0907	0.0066	0.0051
	t+3	0.0917	0.0890	0.0026	0.0110	0.0917	0.0935	-0.0018	0.0083	0.0915	0.0824	0.0090	0.0060
	t+4	-0.0186	0.0001	-0.0188	0.0128	-0.0186	-0.0117	-0.0069	0.0094	-0.0101	-0.0084	-0.0017	0.0069
	t+5	-0.0938	-0.0800	-0.0138	0.0142	-0.0938	-0.0998	0.0060	0.0104	-0.0971	-0.0891	-0.0080	0.0077

(b) Four outcome values

		Method: Nearest five matching within radius											
		Treated: MTYPE2=1 (BTM)				Treated: MTYPE2=2 (UFJ)				Treated: MTYPE2=1 (BTM)			
		Control: MTYPE2=0 (NEITHER)				Control: MTYPE2=0 (NEITHER)				Control: MTYPE2=2 (UFJ)			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables		Treated	Controls	DID	S.E.	Treated	Controls	DID	S.E.	Treated	Controls	DID	S.E.
RATE	t	0.0003	-0.0002	0.0005 **	0.0002	0.0000	-0.0001	0.0001	0.0002	0.0003	0.0004	-0.0001	0.0002
	t+1	0.0004	-0.0006	0.0010 ***	0.0002	-0.0003	-0.0007	0.0004 *	0.0002	0.0004	0.0007	-0.0002	0.0003
	t+2	0.0016	0.0005	0.0012 ***	0.0003	0.0009	0.0002	0.0007 **	0.0003	0.0016	0.0021	-0.0005	0.0004
	t+3	0.0034	0.0015	0.0019 ***	0.0003	0.0025	0.0013	0.0012 ***	0.0003	0.0034	0.0038	-0.0004	0.0004
	t+4	0.0019	0.0001	0.0018 ***	0.0003	0.0009	-0.0001	0.0010 ***	0.0003	0.0019	0.0015	0.0003	0.0004
	t+5	-0.0001	-0.0015	0.0014 ***	0.0003	-0.0006	-0.0014	0.0008 **	0.0003	-0.0001	-0.0002	0.0001	0.0004
LOAN	t	-0.0089	-0.0059	-0.0029	0.0020	-0.0063	-0.0025	-0.0038 *	0.0020	-0.0089	-0.0064	-0.0025	0.0024
	t+1	-0.0242	-0.0151	-0.0091 ***	0.0027	-0.0185	-0.0095	-0.0091 ***	0.0027	-0.0242	-0.0211	-0.0031	0.0033
	t+2	-0.0332	-0.0201	-0.0130 ***	0.0032	-0.0281	-0.0126	-0.0155 ***	0.0033	-0.0332	-0.0350	0.0018	0.0039
	t+3	-0.0313	-0.0208	-0.0104 ***	0.0036	-0.0238	-0.0130	-0.0108 ***	0.0037	-0.0313	-0.0321	0.0008	0.0044
	t+4	-0.0108	-0.0003	-0.0104 ***	0.0040	-0.0002	0.0092	-0.0094 **	0.0043	-0.0108	-0.0088	-0.0021	0.0050
	t+5	-0.0133	-0.0031	-0.0101 **	0.0045	0.0006	0.0067	-0.0061	0.0047	-0.0134	-0.0135	0.0002	0.0055
LONG	t	0.0002	0.0048	-0.0046 ***	0.0017	0.0006	0.0066	-0.0060 ***	0.0018	0.0002	0.0007	-0.0005	0.0022
	t+1	-0.0026	0.0064	-0.0091 ***	0.0024	-0.0021	0.0087	-0.0108 ***	0.0025	-0.0026	-0.0021	-0.0006	0.0029
	t+2	-0.0065	0.0037	-0.0103 ***	0.0028	-0.0056	0.0080	-0.0136 ***	0.0029	-0.0066	-0.0081	0.0015	0.0034
	t+3	-0.0050	0.0034	-0.0084 ***	0.0031	-0.0037	0.0060	-0.0097 ***	0.0033	-0.0050	-0.0084	0.0035	0.0038
	t+4	0.0221	0.0296	-0.0075 **	0.0036	0.0233	0.0347	-0.0114 ***	0.0039	0.0220	0.0201	0.0019	0.0045
	t+5	0.0215	0.0308	-0.0093 **	0.0039	0.0276	0.0373	-0.0097 **	0.0042	0.0215	0.0189	0.0027	0.0048
INVEST	t	0.0117	-0.0075	0.0192	0.0149	0.0236	0.0058	0.0178	0.0150	0.0118	0.0205	-0.0087	0.0186
	t+1	0.0164	0.0021	0.0142	0.0157	0.0184	-0.0014	0.0199	0.0159	0.0156	0.0171	-0.0016	0.0184
	t+2	0.0163	-0.0105	0.0267	0.0163	0.0126	-0.0191	0.0317 *	0.0164	0.0155	0.0232	-0.0076	0.0207
	t+3	0.0067	-0.0226	0.0292 *	0.0166	-0.0266	-0.0267	0.0002	0.0164	0.0067	-0.0242	0.0309	0.0201
	t+4	-0.0369	-0.0652	0.0283 *	0.0161	-0.0306	-0.0591	0.0285 *	0.0166	-0.0364	-0.0326	-0.0038	0.0208
	t+5	-0.0551	-0.0749	0.0198	0.0161	-0.0673	-0.0795	0.0122	0.0164	-0.0547	-0.0578	0.0031	0.0206
lnSALES	t	0.0327	0.0288	0.0040	0.0037	0.0330	0.0288	0.0041	0.0037	0.0328	0.0326	0.0002	0.0046
	t+1	0.0669	0.0592	0.0077	0.0051	0.0618	0.0625	-0.0008	0.0052	0.0670	0.0655	0.0015	0.0064
	t+2	0.1017	0.0910	0.0107 *	0.0064	0.0935	0.0918	0.0017	0.0064	0.1016	0.0964	0.0052	0.0081
	t+3	0.0960	0.0763	0.0197 ***	0.0074	0.0875	0.0827	0.0048	0.0075	0.0961	0.0939	0.0021	0.0094
	t+4	-0.0024	-0.0179	0.0155 *	0.0085	-0.0165	-0.0094	-0.0071	0.0087	-0.0023	-0.0042	0.0019	0.0107
	t+5	-0.0864	-0.0878	0.0014	0.0094	-0.1062	-0.0908	-0.0154	0.0095	-0.0863	-0.0843	-0.0020	0.0124

Table 7: Treatment effect estimation results for firms that transacted with city banks

(a) Estimation with three outcome values

		Method: Nearest five matching within radius					
		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=1 (ONE)	
		Control: MTYPE1=0 (NEITHER)		Control: MTYPE1=1 (ONE)		Control: MTYPE1=0 (NEITHER)	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t	0.0008 ***	0.0003	0.0005 **	0.0002	0.0001	0.0002
	t+1	0.0015 ***	0.0004	0.0004	0.0003	0.0006 ***	0.0002
	t+2	0.0023 ***	0.0004	0.0010 ***	0.0003	0.0007 ***	0.0002
	t+3	0.0028 ***	0.0005	0.0009 **	0.0004	0.0012 ***	0.0003
	t+4	0.0026 ***	0.0005	0.0013 ***	0.0004	0.0011 ***	0.0003
	t+5	0.0025 ***	0.0005	0.0007 *	0.0004	0.0013 ***	0.0003
LOAN	t	-0.0066 **	0.0031	-0.0014	0.0020	-0.0018	0.0018
	t+1	-0.0197 ***	0.0040	-0.0075 ***	0.0027	-0.0074 ***	0.0023
	t+2	-0.0255 ***	0.0047	-0.0070 **	0.0032	-0.0116 ***	0.0028
	t+3	-0.0164 ***	0.0054	-0.0026	0.0037	-0.0088 ***	0.0031
	t+4	-0.0127 **	0.0062	-0.0049	0.0041	-0.0057	0.0035
	t+5	-0.0141 **	0.0068	-0.0073 *	0.0044	-0.0060	0.0039
LONG	t	-0.0056 **	0.0025	0.0000	0.0017	-0.0050 ***	0.0016
	t+1	-0.0177 ***	0.0035	-0.0051 **	0.0023	-0.0090 ***	0.0021
	t+2	-0.0222 ***	0.0042	-0.0068 **	0.0027	-0.0111 ***	0.0025
	t+3	-0.0167 ***	0.0048	-0.0034	0.0031	-0.0091 ***	0.0027
	t+4	-0.0135 **	0.0055	-0.0059 *	0.0035	-0.0056 *	0.0032
	t+5	-0.0150 **	0.0061	-0.0053	0.0036	-0.0076 **	0.0035
INVEST	t	-0.0206	0.0243	-0.0413 **	0.0165	0.0271 **	0.0130
	t+1	0.0087	0.0261	-0.0105	0.0172	0.0228	0.0140
	t+2	0.0120	0.0262	-0.0200	0.0171	0.0312 **	0.0144
	t+3	0.0137	0.0287	-0.0117	0.0187	0.0087	0.0145
	t+4	0.0069	0.0264	-0.0186	0.0176	0.0375 ***	0.0145
	t+5	0.0050	0.0260	-0.0109	0.0164	0.0211	0.0146
lnSALES	t	-0.0109 *	0.0057	-0.0070 *	0.0040	0.0022	0.0032
	t+1	-0.0110	0.0079	-0.0066	0.0054	0.0020	0.0045
	t+2	-0.0094	0.0100	-0.0092	0.0070	0.0054	0.0055
	t+3	-0.0039	0.0116	-0.0018	0.0083	0.0076	0.0065
	t+4	-0.0269 **	0.0137	-0.0069	0.0094	-0.0061	0.0075
	t+5	-0.0218	0.0148	0.0060	0.0104	-0.0134	0.0082

(b) Estimation with four outcome values

		Method: Nearest five matching within radius					
		Treated: MTYPE2=1 (BTM)		Treated: MTYPE2=2 (UFJ)		Treated: MTYPE2=1 (BTM)	
		Control: MTYPE2=0 (NEITHER)		Control: MTYPE2=0 (NEITHER)		Control: MTYPE2=2 (UFJ)	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t	0.0004 **	0.0002	0.0001	0.0002	-0.0001	0.0002
	t+1	0.0010 ***	0.0002	0.0004	0.0003	-0.0002	0.0003
	t+2	0.0012 ***	0.0003	0.0005	0.0003	-0.0005	0.0004
	t+3	0.0018 ***	0.0003	0.0011 ***	0.0003	-0.0004	0.0004
	t+4	0.0016 ***	0.0003	0.0009 ***	0.0004	0.0003	0.0004
	t+5	0.0013 ***	0.0003	0.0009 **	0.0004	0.0001	0.0004
LOAN	t	-0.0030	0.0021	-0.0027	0.0021	-0.0025	0.0024
	t+1	-0.0102 ***	0.0027	-0.0076 ***	0.0029	-0.0031	0.0033
	t+2	-0.0136 ***	0.0033	-0.0111 ***	0.0034	0.0018	0.0039
	t+3	-0.0107 ***	0.0037	-0.0063	0.0039	0.0008	0.0044
	t+4	-0.0090 **	0.0041	-0.0005	0.0045	-0.0021	0.0050
	t+5	-0.0095 **	0.0046	0.0025	0.0050	0.0002	0.0055
LONG	t	-0.0047 ***	0.0018	-0.0050 ***	0.0019	-0.0005	0.0022
	t+1	-0.0094 ***	0.0024	-0.0099 ***	0.0026	-0.0006	0.0029
	t+2	-0.0101 ***	0.0029	-0.0116 ***	0.0031	0.0015	0.0034
	t+3	-0.0085 ***	0.0032	-0.0086 **	0.0034	0.0035	0.0038
	t+4	-0.0059	0.0037	-0.0055	0.0041	0.0019	0.0045
	t+5	-0.0088 **	0.0040	-0.0037	0.0044	0.0027	0.0048
INVEST	t	0.0278 *	0.0157	0.0337 **	0.0164	-0.0087	0.0186
	t+1	0.0222	0.0165	0.0314 *	0.0178	-0.0016	0.0184
	t+2	0.0314 *	0.0171	0.0468 **	0.0183	-0.0076	0.0207
	t+3	0.0334 *	0.0176	0.0055	0.0188	0.0309	0.0201
	t+4	0.0349 **	0.0171	0.0426 **	0.0187	-0.0038	0.0208
	t+5	0.0242	0.0171	0.0130	0.0187	0.0031	0.0206
lnSALES	t	0.0029	0.0038	0.0011	0.0041	0.0002	0.0046
	t+1	0.0050	0.0054	-0.0053	0.0057	0.0015	0.0064
	t+2	0.0074	0.0067	-0.0020	0.0069	0.0052	0.0081
	t+3	0.0148 *	0.0078	-0.0023	0.0083	0.0021	0.0094
	t+4	0.0080	0.0089	-0.0159 *	0.0097	0.0019	0.0107
	t+5	-0.0072	0.0097	-0.0244 **	0.0105	-0.0020	0.0124

Table 8: Treatment effect estimation results for firms located close to BTM and UFJ branches

(a) Estimation with three outcome values

		Method: Nearest five matching within radius					
		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=1 (ONE)	
		Control: MTYPE1=0 (NEITHER)		Control: MTYPE1=1 (ONE)		Control: MTYPE1=0 (NEITHER)	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t	0.0010 ***	0.0003	0.0005 **	0.0002	0.0004 *	0.0002
	t+1	0.0015 ***	0.0004	0.0004	0.0003	0.0008 ***	0.0003
	t+2	0.0024 ***	0.0005	0.0010 ***	0.0004	0.0010 ***	0.0003
	t+3	0.0030 ***	0.0006	0.0010 **	0.0004	0.0017 ***	0.0003
	t+4	0.0028 ***	0.0006	0.0013 ***	0.0004	0.0013 ***	0.0003
	t+5	0.0023 ***	0.0006	0.0008 *	0.0004	0.0012 ***	0.0003
LOAN	t	-0.0039	0.0034	-0.0017	0.0022	-0.0033	0.0022
	t+1	-0.0162 ***	0.0046	-0.0092 ***	0.0030	-0.0076 ***	0.0028
	t+2	-0.0228 ***	0.0054	-0.0078 **	0.0035	-0.0130 ***	0.0034
	t+3	-0.0109 *	0.0060	-0.0027	0.0040	-0.0109 ***	0.0037
	t+4	-0.0123 *	0.0069	-0.0051	0.0045	-0.0102 **	0.0043
	t+5	-0.0103	0.0077	-0.0068	0.0047	-0.0084 *	0.0049
LONG	t	-0.0060 **	0.0029	-0.0001	0.0019	-0.0046 **	0.0019
	t+1	-0.0190 ***	0.0040	-0.0062 **	0.0025	-0.0084 ***	0.0026
	t+2	-0.0232 ***	0.0048	-0.0075 ***	0.0029	-0.0107 ***	0.0030
	t+3	-0.0190 ***	0.0054	-0.0038	0.0034	-0.0113 ***	0.0034
	t+4	-0.0206 ***	0.0063	-0.0073 *	0.0038	-0.0115 ***	0.0040
	t+5	-0.0185 ***	0.0070	-0.0057	0.0039	-0.0111 **	0.0044
INVEST	t	-0.0278	0.0288	-0.0472 **	0.0184	0.0135	0.0166
	t+1	-0.0021	0.0306	-0.0122	0.0190	0.0001	0.0179
	t+2	0.0140	0.0302	-0.0220	0.0192	0.0143	0.0179
	t+3	0.0107	0.0341	-0.0082	0.0209	-0.0009	0.0187
	t+4	0.0118	0.0310	-0.0156	0.0195	0.0400 **	0.0184
	t+5	0.0026	0.0328	-0.0103	0.0183	0.0202	0.0186
lnSALES	t	-0.0090	0.0063	-0.0067	0.0043	0.0008	0.0038
	t+1	-0.0102	0.0087	-0.0055	0.0058	-0.0007	0.0052
	t+2	-0.0092	0.0110	-0.0129 *	0.0075	0.0032	0.0065
	t+3	-0.0012	0.0129	-0.0035	0.0088	0.0030	0.0076
	t+4	-0.0156	0.0152	-0.0080	0.0099	-0.0093	0.0088
	t+5	-0.0105	0.0164	0.0040	0.0110	-0.0097	0.0097

(b) Estimation with four outcome values

		Method: Nearest five matching within radius					
		Treated: MTYPE2=1 (BTM)		Treated: MTYPE2=2 (UFJ)		Treated: MTYPE2=1 (BTM)	
		Control: MTYPE2=0 (NEITHER)		Control: MTYPE2=0 (NEITHER)		Control: MTYPE2=2 (UFJ)	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t	0.0005 **	0.0002	0.0003	0.0002	-0.0001	0.0003
	t+1	0.0009 ***	0.0003	0.0006 **	0.0003	-0.0001	0.0003
	t+2	0.0012 ***	0.0003	0.0008 **	0.0004	-0.0002	0.0004
	t+3	0.0019 ***	0.0004	0.0015 ***	0.0004	0.0001	0.0004
	t+4	0.0017 ***	0.0004	0.0010 **	0.0004	0.0009 **	0.0005
	t+5	0.0015 ***	0.0004	0.0008 *	0.0004	0.0002	0.0005
LOAN	t	-0.0026	0.0025	-0.0042 *	0.0025	-0.0020	0.0027
	t+1	-0.0082 **	0.0033	-0.0060 *	0.0034	-0.0040	0.0036
	t+2	-0.0136 ***	0.0039	-0.0121 ***	0.0040	0.0001	0.0043
	t+3	-0.0082 *	0.0043	-0.0083 *	0.0045	0.0000	0.0048
	t+4	-0.0087 *	0.0049	-0.0077	0.0053	-0.0049	0.0055
	t+5	-0.0100 *	0.0055	-0.0046	0.0059	-0.0015	0.0060
LONG	t	-0.0050 **	0.0022	-0.0039 *	0.0023	-0.0017	0.0024
	t+1	-0.0089 ***	0.0029	-0.0097 ***	0.0031	-0.0020	0.0032
	t+2	-0.0097 ***	0.0034	-0.0108 ***	0.0036	-0.0012	0.0037
	t+3	-0.0087 **	0.0039	-0.0099 **	0.0040	0.0006	0.0042
	t+4	-0.0085 *	0.0045	-0.0136 ***	0.0049	-0.0008	0.0049
	t+5	-0.0123 **	0.0049	-0.0093 *	0.0054	0.0000	0.0052
INVEST	t	0.0261	0.0193	0.0287	0.0201	-0.0099	0.0209
	t+1	0.0086	0.0208	0.0186	0.0213	-0.0019	0.0212
	t+2	0.0348 *	0.0210	0.0172	0.0217	0.0014	0.0227
	t+3	0.0284	0.0221	-0.0093	0.0223	0.0410 *	0.0225
	t+4	0.0368 *	0.0205	0.0374 *	0.0226	0.0032	0.0236
	t+5	0.0294	0.0217	0.0141	0.0224	0.0094	0.0232
lnSALES	t	0.0025	0.0044	0.0001	0.0046	0.0019	0.0050
	t+1	0.0059	0.0061	-0.0062	0.0064	0.0037	0.0070
	t+2	0.0077	0.0077	-0.0087	0.0079	0.0067	0.0087
	t+3	0.0120	0.0089	-0.0053	0.0094	0.0076	0.0101
	t+4	0.0030	0.0102	-0.0144	0.0108	0.0079	0.0115
	t+5	0.0010	0.0113	-0.0171	0.0120	-0.0002	0.0132

Table 9: Treatment effect estimation results excluding firms that terminated ex-post their relationship with BTMU

(a) Estimation with three outcome values

		Method: Nearest five matching within radius					
		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=1 (ONE)	
		Control: MTYPE1=0 (NEITHER		Control: MTYPE1=1 (ONE)		Control: MTYPE1=0 (NEITHER)	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t	0.0008 ***	0.0003	0.0004 *	0.0002	0.0002	0.0002
	t+1	0.0015 ***	0.0004	0.0004	0.0003	0.0007 ***	0.0002
	t+2	0.0025 ***	0.0004	0.0010 ***	0.0003	0.0010 ***	0.0002
	t+3	0.0028 ***	0.0005	0.0009 **	0.0004	0.0015 ***	0.0003
	t+4	0.0025 ***	0.0005	0.0012 ***	0.0004	0.0013 ***	0.0003
	t+5	0.0024 ***	0.0005	0.0007 *	0.0004	0.0013 ***	0.0003
LOAN	t	-0.0064 **	0.0030	-0.0024	0.0021	-0.0026	0.0017
	t+1	-0.0195 ***	0.0039	-0.0084 ***	0.0028	-0.0078 ***	0.0022
	t+2	-0.0266 ***	0.0046	-0.0085 ***	0.0033	-0.0127 ***	0.0027
	t+3	-0.0158 ***	0.0051	-0.0026	0.0037	-0.0121 ***	0.0030
	t+4	-0.0133 **	0.0058	-0.0051	0.0042	-0.0095 ***	0.0034
	t+5	-0.0144 **	0.0065	-0.0084 *	0.0045	-0.0090 **	0.0038
LONG	t	-0.0059 **	0.0024	0.0000	0.0018	-0.0050 ***	0.0015
	t+1	-0.0174 ***	0.0033	-0.0048 **	0.0023	-0.0091 ***	0.0020
	t+2	-0.0223 ***	0.0041	-0.0067 **	0.0027	-0.0118 ***	0.0024
	t+3	-0.0168 ***	0.0046	-0.0021	0.0031	-0.0115 ***	0.0027
	t+4	-0.0159 ***	0.0052	-0.0047	0.0035	-0.0101 ***	0.0031
	t+5	-0.0169 ***	0.0057	-0.0052	0.0037	-0.0113 ***	0.0034
INVEST	t	-0.0185	0.0235	-0.0391 **	0.0166	0.0171	0.0122
	t+1	0.0102	0.0245	-0.0038	0.0175	0.0104	0.0129
	t+2	0.0087	0.0240	-0.0213	0.0173	0.0267 **	0.0132
	t+3	0.0189	0.0269	-0.0159	0.0189	0.0019	0.0134
	t+4	0.0010	0.0252	-0.0192	0.0177	0.0281 **	0.0133
	t+5	-0.0032	0.0247	-0.0124	0.0167	0.0104	0.0136
lnSALES	t	-0.0085	0.0055	-0.0062	0.0040	0.0027	0.0031
	t+1	-0.0066	0.0075	-0.0052	0.0055	0.0020	0.0042
	t+2	-0.0009	0.0094	-0.0077	0.0071	0.0088 *	0.0052
	t+3	0.0042	0.0110	0.0000	0.0083	0.0126 **	0.0061
	t+4	-0.0178	0.0128	-0.0072	0.0095	0.0001	0.0070
	t+5	-0.0125	0.0142	0.0060	0.0105	-0.0069	0.0078

(b) Estimation with four outcome values

		Method: Nearest five matching within radius					
		Treated: MTYPE2=1 (BTM)		Treated: MTYPE2=2 (UFJ)		Treated: MTYPE2=1 (BTM)	
		Control: MTYPE2=0 (NEITHER		Control: MTYPE2=0 (NEITHER		Control: MTYPE2=2 (UFJ)	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t	0.0004 **	0.0002	0.0001	0.0002	-0.0002	0.0002
	t+1	0.0010 ***	0.0003	0.0004	0.0003	-0.0001	0.0003
	t+2	0.0012 ***	0.0003	0.0007 **	0.0003	-0.0005	0.0004
	t+3	0.0020 ***	0.0003	0.0011 ***	0.0003	-0.0004	0.0004
	t+4	0.0018 ***	0.0003	0.0010 ***	0.0003	0.0002	0.0004
	t+5	0.0015 ***	0.0003	0.0007 **	0.0004	0.0000	0.0005
LOAN	t	-0.0017	0.0021	-0.0038 *	0.0020	-0.0013	0.0025
	t+1	-0.0084 ***	0.0028	-0.0084 ***	0.0028	-0.0043	0.0035
	t+2	-0.0121 ***	0.0033	-0.0142 ***	0.0033	0.0016	0.0041
	t+3	-0.0101 ***	0.0037	-0.0110 ***	0.0038	0.0004	0.0046
	t+4	-0.0099 **	0.0041	-0.0076 *	0.0045	-0.0043	0.0053
	t+5	-0.0090 *	0.0046	-0.0041	0.0048	-0.0010	0.0057
LONG	t	-0.0042 **	0.0018	-0.0058 ***	0.0018	-0.0002	0.0023
	t+1	-0.0094 ***	0.0024	-0.0108 ***	0.0025	-0.0018	0.0030
	t+2	-0.0111 ***	0.0028	-0.0131 ***	0.0030	0.0001	0.0035
	t+3	-0.0096 ***	0.0032	-0.0106 ***	0.0033	0.0026	0.0039
	t+4	-0.0088 **	0.0037	-0.0113 ***	0.0040	-0.0002	0.0047
	t+5	-0.0101 **	0.0040	-0.0093 **	0.0043	0.0016	0.0051
INVEST	t	0.0209	0.0152	0.0210	0.0153	-0.0145	0.0195
	t+1	0.0165	0.0161	0.0207	0.0162	-0.0039	0.0192
	t+2	0.0336 **	0.0166	0.0324 *	0.0168	-0.0124	0.0215
	t+3	0.0312 *	0.0172	0.0036	0.0170	0.0289	0.0214
	t+4	0.0296 *	0.0165	0.0305 *	0.0172	0.0012	0.0223
	t+5	0.0229	0.0165	0.0109	0.0170	0.0109	0.0219
lnSALES	t	0.0038	0.0038	0.0042	0.0038	-0.0001	0.0048
	t+1	0.0066	0.0052	0.0018	0.0053	-0.0036	0.0067
	t+2	0.0127 *	0.0065	0.0040	0.0066	0.0035	0.0084
	t+3	0.0217 ***	0.0076	0.0094	0.0077	0.0018	0.0098
	t+4	0.0146 *	0.0087	-0.0024	0.0089	-0.0009	0.0112
	t+5	0.0022	0.0096	-0.0125	0.0098	-0.0030	0.0130

Table 10: Comparison of treatment effects: OLS and PSM-DID estimation

		Method: OLS					
		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=1 (ONE)	
		Control: MTYPE1=0 (NEITHER)		Control: MTYPE1=1 (ONE)		Control: MTYPE1=0 (NEITHER)	
		(1)	(2)	(3)	(4)	(5)	(6)
		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t+3	0.0029 ***	0.0003	0.0013 ***	0.0003	0.0016 ***	0.0002
LOAN	t+3	-0.0116 ***	0.0036	0.0004	0.0035	-0.0119 ***	0.0024
LONG	t+3	-0.0133 ***	0.0029	-0.0047 *	0.0026	-0.0086 ***	0.0021
INVEST	t+3	-0.0056	0.0175	-0.0087	0.0158	0.0031	0.0109
lnSALES	t+3	0.0044	0.0074	-0.0109	0.0070	0.0153 ***	0.0049

		Method: Nearest five matching with radius					
		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=1 (ONE)	
		Control: MTYPE1=0 (NEITHER)		Control: MTYPE1=1 (ONE)		Control: MTYPE1=0 (NEITHER)	
		(1)	(2)	(3)	(4)	(5)	(6)
		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t+3	0.0029 ***	0.0005	0.0009 **	0.0004	0.0015 ***	0.0003
LOAN	t+3	-0.0159 ***	0.0051	-0.0026	0.0037	-0.0118 ***	0.0030
LONG	t+3	-0.0169 ***	0.0045	-0.0034	0.0031	-0.0104 ***	0.0026
INVEST	t+3	0.0176	0.0270	-0.0117	0.0187	-0.0030	0.0131
lnSALES	t+3	0.0026	0.0110	-0.0018	0.0083	0.0090	0.0060

Table 11: Treatment effect estimation results using 2005 as the starting year

(a) Estimation with three outcome values

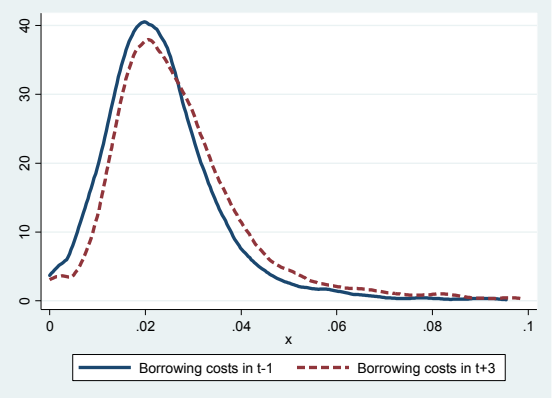
		Method: Nearest five matching within radius					
		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=2 (BOTH)		Treated: MTYPE1=1 (ONE)	
		Control: MTYPE1=0 (NONE)		Control: MTYPE1=1 (ONE)		Control: MTYPE1=0 (NEITHER)	
		(1)	(2)	(3)	(4)	(5)	(6)
Variables		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t+1	0.0006 **	0.0003	0.0000	0.0002	0.0005 ***	0.0002
	t+2	0.0019 ***	0.0004	0.0007 **	0.0003	0.0009 ***	0.0002
	t+3	0.0024 ***	0.0004	0.0006 *	0.0004	0.0015 ***	0.0002
	t+4	0.0018 ***	0.0005	0.0012 ***	0.0004	0.0011 ***	0.0003
	t+5	0.0018 ***	0.0005	0.0006 *	0.0004	0.0011 ***	0.0003
	t+6	0.0015 ***	0.0005	0.0005	0.0004	0.0010 ***	0.0003
LOAN	t+1	-0.0112 ***	0.0030	-0.0064 ***	0.0021	-0.0032 *	0.0018
	t+2	-0.0158 ***	0.0039	-0.0054 **	0.0027	-0.0083 ***	0.0023
	t+3	-0.0053	0.0045	-0.0009	0.0033	-0.0073 ***	0.0028
	t+4	-0.0049	0.0055	-0.0017	0.0039	-0.0066 **	0.0032
	t+5	-0.0079	0.0062	-0.0050	0.0041	-0.0061 *	0.0036
	t+6	-0.0070	0.0064	-0.0072	0.0044	-0.0015	0.0040
LONG	t+1	-0.0093 ***	0.0025	-0.0053 ***	0.0017	-0.0024	0.0015
	t+2	-0.0124 ***	0.0035	-0.0063 ***	0.0023	-0.0045 **	0.0021
	t+3	-0.0075 *	0.0040	-0.0044	0.0028	-0.0037	0.0024
	t+4	-0.0088 *	0.0048	-0.0067 **	0.0032	-0.0027	0.0029
	t+5	-0.0107 **	0.0054	-0.0064 *	0.0034	-0.0047	0.0032
	t+6	-0.0142 **	0.0059	-0.0058	0.0037	-0.0014	0.0035
INVEST	t+1	0.0006	0.0249	0.0143	0.0176	-0.0208	0.0131
	t+2	0.0021	0.0248	0.0033	0.0181	0.0012	0.0137
	t+3	0.0283	0.0262	0.0119	0.0189	-0.0085	0.0141
	t+4	0.0303	0.0256	0.0193	0.0175	0.0139	0.0136
	t+5	0.0195	0.0256	0.0282 *	0.0168	0.0065	0.0140
	t+6	0.0060	0.0263	0.0334 *	0.0179	0.0039	0.0155
lnSALES	t+1	0.0051	0.0054	0.0011	0.0038	0.0014	0.0032
	t+2	0.0043	0.0076	-0.0048	0.0056	0.0054	0.0043
	t+3	0.0095	0.0094	-0.0032	0.0071	0.0126 **	0.0053
	t+4	-0.0127	0.0117	-0.0085	0.0084	-0.0003	0.0064
	t+5	-0.0025	0.0137	0.0093	0.0097	-0.0058	0.0074
	t+6	-0.0033	0.0148	0.0023	0.0107	-0.0024	0.0085

(b) Estimation with four outcome values

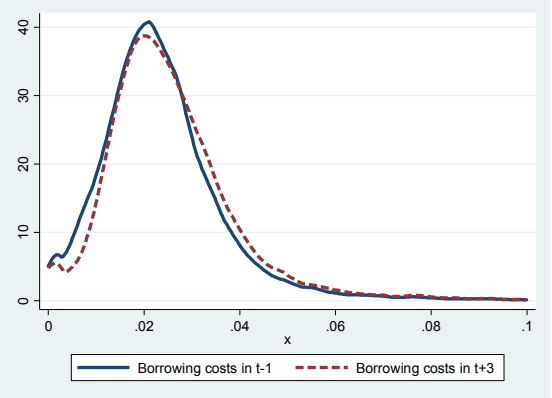
		Method: Nearest five matching within radius					
		Treated: MTYPE2=1 (BTM)		Treated: MTYPE2=2 (UFJ)		Treated: MTYPE2=1 (BTM)	
		Control: MTYPE2=0 (NEITHER)		Control: MTYPE2=0 (NEITHER)		Control: MTYPE2=2 (UFJ)	
		(1)	(2)	(3)	(4)	(5)	(6)
		DID	S.E.	DID	S.E.	DID	S.E.
RATE	t+1	0.0005 **	0.0002	0.0003	0.0002	-0.0001	0.0003
	t+2	0.0008 ***	0.0003	0.0009 ***	0.0003	-0.0005	0.0003
	t+3	0.0016 ***	0.0003	0.0013 ***	0.0003	-0.0005	0.0004
	t+4	0.0012 ***	0.0003	0.0010 ***	0.0003	0.0003	0.0004
	t+5	0.0010 ***	0.0003	0.0008 **	0.0004	0.0000	0.0004
	t+6	0.0013 ***	0.0004	0.0008 **	0.0004	0.0001	0.0005
LOAN	t+1	-0.0031	0.0022	-0.0037 *	0.0022	0.0015	0.0026
	t+2	-0.0067 **	0.0028	-0.0101 ***	0.0029	0.0061 *	0.0034
	t+3	-0.0065 *	0.0033	-0.0053	0.0034	0.0033	0.0040
	t+4	-0.0077 **	0.0038	-0.0024	0.0041	-0.0013	0.0046
	t+5	-0.0083 *	0.0043	-0.0004	0.0045	0.0035	0.0051
	t+6	-0.0091 *	0.0047	0.0072	0.0050	-0.0042	0.0059
LONG	t+1	-0.0027	0.0018	-0.0035 *	0.0019	0.0004	0.0022
	t+2	-0.0024	0.0024	-0.0073 ***	0.0025	0.0026	0.0029
	t+3	-0.0024	0.0028	-0.0033	0.0030	0.0019	0.0034
	t+4	-0.0029	0.0033	-0.0035	0.0037	-0.0015	0.0041
	t+5	-0.0060	0.0037	-0.0040	0.0040	0.0006	0.0045
	t+6	-0.0049	0.0041	0.0004	0.0044	-0.0045	0.0051
INVEST	t+1	-0.0175	0.0160	-0.0020	0.0165	0.0120	0.0201
	t+2	0.0002	0.0171	0.0143	0.0178	0.0056	0.0224
	t+3	0.0104	0.0178	0.0043	0.0177	0.0429 **	0.0218
	t+4	0.0123	0.0168	0.0177	0.0174	-0.0010	0.0217
	t+5	0.0175	0.0169	-0.0011	0.0173	0.0234	0.0208
	t+6	0.0199	0.0187	-0.0136	0.0195	0.0338	0.0236
lnSALES	t+1	0.0052	0.0038	0.0006	0.0040	-0.0030	0.0048
	t+2	0.0068	0.0053	0.0035	0.0053	0.0020	0.0066
	t+3	0.0153 **	0.0065	0.0076	0.0066	0.0021	0.0081
	t+4	0.0084	0.0079	-0.0086	0.0079	0.0043	0.0097
	t+5	-0.0020	0.0090	-0.0161 *	0.0092	0.0006	0.0117
	t+6	0.0054	0.0103	-0.0198 *	0.0107	0.0023	0.0137

Figure 1: Distributions of borrowing costs by subsample

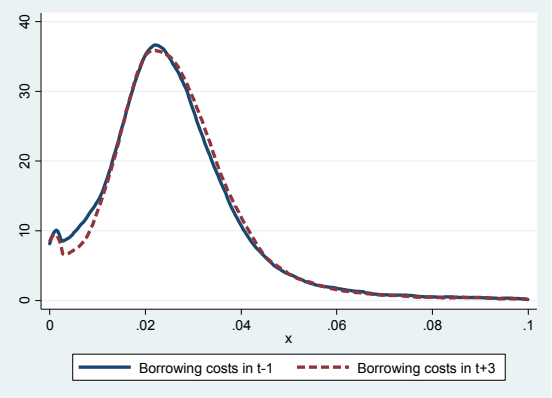
BOTH firms



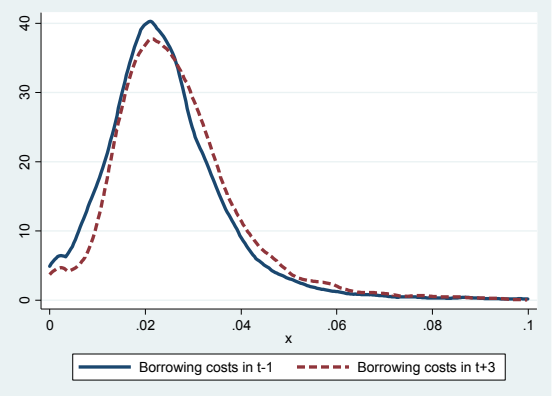
ONE firms



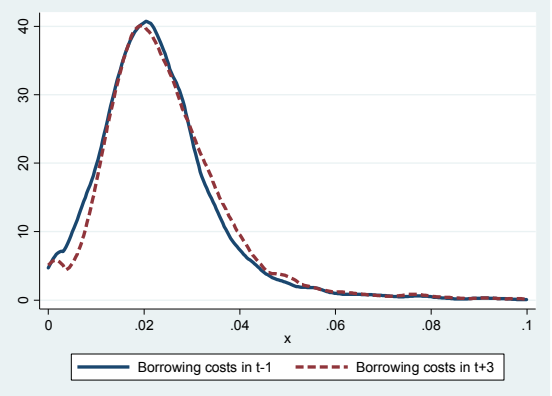
NEITHER firms



BTM firms

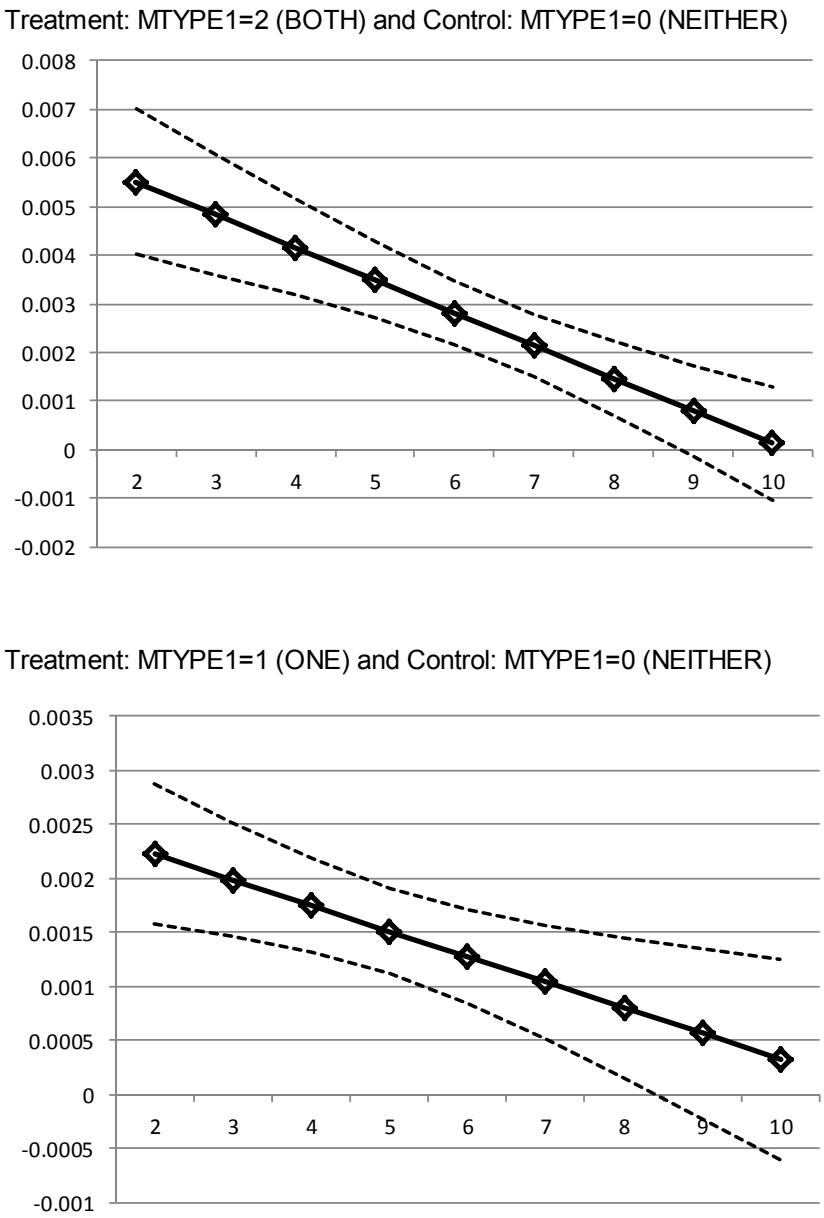


UFJ firms



Note: Observations with borrowing costs of 10% or more (0.1 on the x-axis) are omitted in the graphs.

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



Note: The x-axis represents the number of banks a firm transacted with (NBANK) in t-1, while the y-axis shows the size of the treatment effect for RATE between t-1 and t+3. Along the Y-axis, we measure real values and 0.054 for NBANK=2 in the upper panel means 54 basis points. The interval between the dotted lines represents the 90% confidence band.