The effect of bank mergers on client firms: Evidence from the credit supply channel

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Abstract: This study investigates the effects of bank mergers on client firms. A rich panel of data detailing firm borrowing from individual banks enables controls for demand-side effects to isolate the effect of bank mergers on the supply of credit. The impact of bank mergers on other firm outcomes - growth in total borrowing, distance to default and investment – is also examined. A merger announcement by a firm's main bank results in a contraction in credit supply from the merging bank. Firms are not able to compensate for the reduced credit supply from the main bank, so overall borrowing also declines.

JEL Codes: G21, G34, L14

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1. Introduction

Finance theory holds that banks are special because of their ability to gather soft information about their client firms (Fama, 1985). Because such information builds over time, access to bank finance may be particularly valuable in relationship-based banking systems where bank-firm relationships are long-term commitments. Thus bank mergers – which may trigger termination of such relationships, result in the loss of soft information or just weaken one of the merging bank's decision authority to make use of soft information – may damage affiliated client firms' access to bank credit.

Studies examining the effects of bank mergers on client firms generally provide evidence that bank mergers are bad news for client firms. Client firms whose main bank merges are more likely to have their main bank relationship terminated (Degryse, Masschelein, & Mitchell, 2011; Karceski, Ongena, & Smith, 2005), suffer the loss of soft information (Ogura & Uchida, 2014), experience declines in aggregate outstanding loans and credit lines (Bonaccorsi di Patti & Gobbi, 2007) and pay higher borrowing costs (Sapienza, 2002; Uchino & Uesugi, 2012).

However, no existing study has been able to estimate the effect of bank mergers on individual loans to specific firms. This study fills that gap in the literature. Using a unique dataset that links non-financial client firm outstanding loans to the originating banks, we are able to analyze the effect of banks mergers on the supply of loans from individual banks to specific firms. Applying methodology pioneered by Khwaja and Mian (2008) and Giannetti and Simonov (2013) we control for any omitted variables that may influence firm demand for loans, isolating the effect of bank mergers on the supply of credit. This allows us to examine

whether the supply of credit is affected by the announcement of a merger by the firms' main bank. We then look at the effect of bank mergers on a number of other longer-term variables: growth in total firm borrowing, distance-to-default and firm investment.

We find that banks involved in mergers supply statistically significantly lower credit to their client firms in the year of a bank merger announcement and over the following three years. The decline is especially sharp for client firms that are credit constrained. Firms are not able to compensate for the reduced credit supply from the main bank, so overall growth in firm borrowing also declines. Zombie firms, which enjoy significantly higher credit supply from their main bank, are nonetheless disproportionately affected. Following an announcement of a bank merger by the main bank, zombie firms experience a particularly sharp decline in total firm borrowing. Credit constrained and zombie firms also experience a sharp decline in distance to default and firm investment following a bank merger announcement by their main bank.

The rest of this paper is organized as follows. The next section describes the data set and section 3 explains the empirical methodology. Section 4 presents our main results: the effect of bank merger announcements on the supply of credit from individual banks to affiliated client firms. Section 5 considers the effects on other long-term firm outcomes: growth in total borrowings, distance to default and firm investment. Section 6 concludes.

2. Data

In this study, bank-firm relationships are defined using the Japan Company Handbook survey data which asks firms to identify a "main bank" with which the firm has a special relationship. There is no legal definition of a main bank, but nearly every Japanese company

reports having one[1]. In our sample of 5,102 publicly listed firms in Japan, 97% declare a main bank in every year of the sample. Bank–firm relationships are usually very stable. After controlling for the effect of mergers, most of the firms in our sample stayed with the same main bank for all 23 years of the sample.

The bank-firm relationship data from the Japan Company Handbook is matched with data on bank merger announcements, loans between each bank-firm pair, and financial statements for both banks and client firms in Japan. Bank merger announcements over the sample period 1990-2012 are identified using Nikkei Telecom 21, an archive of Japan's leading newspapers. The sample is restricted to merger announcements that were eventually carried out. Firms' outstanding loans with each individual bank, and annual financial statements are from *Nikkei NEEDS* database.

The final data set yields 367,307 total observations of individual loans between bank-firm pairs over the period 1990 to 2012. The individual loans are then matched up with data on the firms receiving the loans and the lending banks, as well as announcements of bank mergers during the sample period. Summary statistics for the full sample of banks, client firms and merger events are presented in Table 1.

< ***Table 1: Summary Statistics for Banks, Client Firms and Mergers, 1990-2012 (23 years)***>

As reported in table 1, of the 161 banks in the sample, 64 banks have experienced a merger during the sample period. The median bank that merges does so only once, although there is one bank that was involved in 4 mergers.

[1] Aoki, Patrick, and Sheard (1995) report that "according to a survey of some 110,000 companies with annual sales of 1 billion yen or more…. almost every Japanese company has what it calls a main bank relationship" (p. 5).

Of the 4,450 firms in the sample, about half, 2,177 firms, are credit constrained (working capital ratio in the bottom 25% of the sample in any given year) at some point in the sample. Half as much again, 1,012 firms, are not only credit-constrained, but qualify as sick "zombie" firms at some point in the sample period. We adopt Peek and Rosengren's (2005) definition of credit constrained and sick firms, which is working capital ratio in the bottom 25% of the sample in any given year for both credit constrained and zombie firms, and ROA in the bottom 25% of the sample in any given year and annual stock return in the bottom 1/3 of the sample in any given year for sick firms. The idea is that firms with low working capital may face temporary liquidity shortages and difficulty paying short-term debts. These firms are credit constrained and presumably bank dependent, but are not necessarily fundamentally unsound. Sick firms, on the other hand, are not only credit constrained, but also fundamentally unsound. Evidence that these kinds of firms are more likely to receive additional or cheaper bank credit (Peek & Rosengren, 2005), a practice that keeps otherwise insolvent borrowers alive, has led them to be called "zombie" firms (Caballero, Hoshi, & Kashyap, 2008). Note that the credit constrained and zombie firms are not necessarily small firms and in fact on average have higher annual sales than the average firm in the entire sample. Forbearance lending to zombie firms has brought enormous economic costs to the Japanese economy (Caballero et al., 2008).

4. Methodology

4.1 Isolating Credit Supply

The final data set described above has three dimensions: individual banks *b*, individual client firms *i*, and time *t*. It is this rich, three-dimensional panel that allows us to isolate the supply of credit from firm demand for loans. The three dimensions to the data mean that in regression analysis the researcher can potentially control for two out of three dimensions to

the data: bank fixed effects, $Bank_b$, firm fixed effects, $Firm_i$, or time fixed effects, $Year_t$. Following an approach first proposed by Khwaja and Mian (2008) in a natural experimental setting and then later adopted by Giannetti and Simonov (2013) in non-experimental setting, we create an interaction term between firm fixed effects and time fixed effects: $Firm_i \cdot Year_t$. This firm-year fixed effect adds a unique intercept for each firm-year, thus controlling for all firm-side factors, even those that may vary by year, such as demand for loans.

Having controlled for any omitted firm-side factors, we can then use the growth in lending from individual banks to individual firms in each time period to capture the supply of credit from bank *b* to firm *i* in period *t*. In the credit supply analysis, we are also able to include bank fixed effects, $Bank_b$, to investigate within-bank variation in credit supply before and after merger events.

4.2 Difference-in-Difference Analysis

Although our main analysis is on a three-dimensional data set, most of the empirical analysis to follow uses some variant of difference-in-difference techniques. Difference-in-difference analysis is often used for policy evaluation, to track the effect of individuals potentially affected by the policy by comparing changes in outcomes for those receiving the policy intervention, the "treated" group, to a control group that does not. Here, the "treatment" or "policy intervention" of interest is announcement of a bank merger, in particular announcement of a merger by a client firm's main bank. The individuals potentially affected by the policy intervention – the bank merger – are the client firms of the banks announcing the merger.

Measurement of the effect of treatment on the outcome variable may be confounded in two ways: by changes in the response over time for reasons unrelated to the policy change and by pre-existing trends in the outcome of interest that may be different for individuals receiving

"treatment", or a policy intervention, as compared to individuals not receiving policy intervention, the "control" group. Difference-in-difference analysis isolates the policy effect from effects of unrelated events and pre-existing trend differentials in the treated and control groups by including dummy variables identifying the post-intervention period, $Post_t$, and individuals receiving intervention, here a merger announcement by the main bank, $Treatment_b$.

A standard difference-in-difference estimation equation on a three-dimensional panel such as ours would be something like equation (1):

$$y_{i,b,t} = \beta_0 + \beta_1 Treatment_b + \beta_2 Post_t + \beta_3 Treatment_b \cdot Post_t + \varepsilon_{i,b,t} \quad (1)$$

Where subscripts *i*, *b* and *t* stand for the client firm, its main bank and the year, respectively. $y_{i,b,t}$ is the outcome variable of interest. $Treatment_b$ is a dummy variable indicating a bank *b* announced a merger during the sample period. $Post_t$ is a dummy variable that takes a value of one in the year a bank merger is announced and, for evaluation of long-term effects, the following three years.

The parameter of interest in difference-in-difference analysis is the coefficient estimate on the interaction term of the two dummy variables, $Treatment_b \cdot Post_t$ in this case. The parameter estimate on the difference-in-difference term, β_3 in equation (1), captures the average effect of treatment, a main bank merger announcement, isolated from unrelated changes over time and any differentials in pre-existing trends for the treatment and control groups.

Two assumptions are required for difference-in-difference analysis to be valid. Firstly, treatment, whether a bank merges, must not be systematically related to other factors that

affect the outcome variable of interest, bank-firm relationship termination. There must not be any omitted variable that simultaneously affects whether a main bank merges and whether the bank-firm relationship is terminated. Secondly, counterfactual trend behavior for the treated and control groups must be the same. Under the counterfactual of no bank merger, underlying trends in bank-firm relationship termination must be the same for both the treated (firms whose main bank merges) and control (firms whose main bank does not merge) groups. In other words, any observed differences in the trend of bank-firm relationship termination rates between client firms of the merging banks and client firms of the non-merging banks after a bank merger announcement should be due *only* to treatment, the fact that the main bank announced a merger.

The first condition for unbiased difference-in-difference estimation is addressed by including time fixed effects and bank-firm pair fixed effects, an interaction term of bank fixed effects and firm fixed effects. It is unlikely that a single client firm outcome (termination of the relationship) affects its main bank's decision to merge once unobserved time-varying factors such as macroeconomic conditions are taken into account through the inclusion of time fixed effects. Although it is possible that client firm outcomes (bank-firm relationship termination) are correlated to the banks' tendency to merge at the formation of the bank-firm relationship, the inclusion of bank-firm pair fixed effects accounts for this and any other potential endogeneity in bank-firm matching[2]. The inclusion of bank-firm fixed effects effectively isolates within bank-firm pair variation, allowing comparison of the same bank-firm pair in events in which the main bank merges and events in which the main bank does not merge.

[2] Note that matching endogeneity can be more complex than simply the case of weak firms pairing with weak banks, as is often assumed in the literature (Chodorow-Reich, 2014; Gan, 2007). Bank-firm pair fixed effects capture the effects of any unobserved factors, including things like geographic and corporate cultural proximity between banks and client firms, banks' specialization in the client firm business, etc...

The second condition for unbiased difference-in-difference estimation is met through something similar to sampling with replacement: the "treated" group of client firms of merged banks is replaced in the sample as part of the control group once the effects of merger announcement have passed, which we assume to be 3 years after announcement. This strategy has been used in other policy intervention studies (e.g. Bertrand and Mullainathan (2003)). Since client firms move in and out of the treated and control group for each bank merger announcement event, the treated and control group are quite homogeneous. Thus any observed differences in bank-firm relationship termination following bank merger announcements can plausibly be attributed to announcement of the merger.

4.3 Distance to Default

In examining the effect of bank mergers on firm outcomes other than the supply of credit from the main bank, we include the firm's distance to default. A firm's distance-to-default shows how far the firm is from the default point at which the firm cannot repay its debts without rolling them over. It is an application of Black-Scholes options pricing model due to Black and Scholes (1973) and Merton (1974) and used widely in industry (Crosbie & Bohn, 2003) as well as in academia (Duffie, Saita, & Wang, 2007; Gropp & Moerman, 2004; Gropp, Vesala, & Vulpes, 2006; Harada & Ito, 2011).

For a given firm, the distance-to-default is defined as follows:

$$DD_t = \frac{\log(V_t/D_t) + (\mu - 0.5\sigma^2)T}{\sigma\sqrt{T}} \qquad (2)$$

Where subscript *t* stands for year, and

V_t is market value of total assets,

D_t is book value of total debts,

T is time to maturity of currently outstanding debts, which is usually assumed to be 1 year,

μ is mean of growth rate of V_t and

σ is standard deviation of growth rate of V_t.

In the Black-Scholes model, the numerator of equation (A1) is the evolution of a firm's market value of assets until the firm's debts mature. Thus, conceptually, the distance-to-default is the number of standard deviations the firm is from the default point (V=D).

Since the market value of assets cannot be directly observed, we calculate it through the following iterative process:

1. Set initial value of V_t, for which we use previous year's book-value total assets of a firm.
2. Calculate σ as $sd\left(\log\left(\frac{V_t}{V_{t-1}}\right)\right)$, where sd stands for standard deviation.
3. Update V_t using the following equation:

$$V_t = W_t/\Phi(\mathrm{d}_1) - D_t \exp(-r)\,\Phi(d_2)/\Phi(d_1) \tag{3}$$

Where W_t is market capitalization of a firm, r is the risk-free rate, the 1 year Japanese government bond yield, Φ is a standard normal cdf and d_1 and d_2 are defined as follows:

$$d_1 = \frac{\log(V_t/D_t) + (r + 0.5\sigma^2)}{\sigma} \tag{4}$$

and

$$d_2 = d_1 - \sigma \tag{5}$$

4. If the updated value of V_t is close enough to the initial value of V_t, use V_t in equation (A1) to calculate distance to default. Otherwise, set the updated value of V_t as initial value and repeat from step 2.

The book value of total debt, D_t, is defined as the sum of bank loans, corporate bonds and commercial paper.

5. Bank Mergers and the Supply of Credit

Applying the difference-in-difference techniques explain above to analysis of main bank supply of credit to client firms following announcement of a bank merger event yields the following specification:

$$\frac{\Delta L_{i,b,t}}{L_{i,b,t-1}} = \beta_1 MainBank_{i,b,t-1} \cdot Merged_b \cdot Post_t + BankControls_b + Firm_i \cdot Year_t + Bank_b + \varepsilon_{i,b,t} \quad (6)$$

Where $L_{i,b,t}$ is outstanding loans from bank *b* to firm *i* in year *t* and Δ is the first difference operator. $MainBank_{i,b,t-1}$ is a dummy variable indicating whether bank *b* is firm *i*'s main bank in year *t-1*. $BankControls_b$ include the main bank dummy variable, bank size, bank profitability and bank regulatory capital surplus.

As discussed above, the key to isolating supply of credit in the analysis is the $Firm_i \cdot Year_t$ term, which represents firm-year fixed effects, an interaction term between firm fixed effects and time fixed effects. By adding a unique intercept for each firm-year, this term controls for all firm-side factors, including loan demand. $Bank_b$ is a standard bank fixed

effect, which enables us to investigate variation within a given bank before and after the merger by absorbing other cross-sectional variations.

$\varepsilon_{b,t}$ is the error term. Standard errors are clustered at the individual firm level because potential violation of the assumption of an independently and identically distributed error term (iid)[3] is particularly serious in a setting such as this one, where the time dimension is long and the difference-in-difference term is constant during the treatment period. Bertrand, Duflo, and Mullainathan (2004) have shown that failure to address potential serial correlation within a difference-in-difference framework leads to dramatically underestimated standard errors.

We also estimate a variation of the above equation that accounts for firm heterogeneity by including some triple-difference and quadruple-difference terms. $CreditContrained_{i,t-1}$, a dummy variable indicating a client firm is credit constrained and $Zombie_{i,t-1}$, a dummy variable indicating a client firm is not only credit-constrained, but a sick, presumably bank-dependent "zombie" firm, are included and interacted with the difference-in-difference term. This yields the following specification:

$$\begin{aligned}\frac{\Delta L_{i,b,t}}{L_{i,b,t-1}} = {} & \beta_1 MainBank_{i,b,t-1} \cdot Merged_b \cdot Post_t + \beta_2 CreditContrained_{i,t} \\ & \cdot MainBank_{i,b,t-1} + \beta_3 CreditContrained_{i,t} \cdot MainBank_{i,b,t-1} \\ & \cdot Merged_b \cdot Post_t + \beta_4 Zombie_{i,t} \cdot MainBank_{i,b,t-1} \\ & + \beta_5 Zombie_{i,t} \cdot MainBank_{i,b,t-1} \cdot Merged_b \cdot Post_t \\ & + BankControls_b + Firm_i \cdot Year_t + Bank_b + \varepsilon_{i,b,t}\end{aligned} \tag{7}$$

[3] Consistency of OLS standard error estimate rests on an assumption that the error term is iid (independently and identically distributed), but panel data typically violate the independence assumption due to serial correlation within cross-sectional units (Petersen, 2009).

Table 2 presents the main results of estimation of equation (6) and (7) in two time horizons: the year of merger announcement (short-medium run) and the year of announcement plus the following 3 years (long run).

<Table 2. Banks' Supply of Credit after Bank Merger Announcement>

Columns 1-2 of table 2 show the effect of bank merger announcements on banks' supply of credit to their client firms in the year of announcement, while columns 3-4 turn to the longer-term impacts of bank merger announcements on the supply of credit in not only the year of a bank merger announcement, but also the following three years. The main takeaway from Table 2 is that the announcement of a merger by a firm's declared main bank on average results in a highly statistically significant cut in the supply of credit from the main bank to the client firm. The cut in credit supply ranges from an estimated -1.7% reduction in the short to medium run to a cumulative -2.4% cut in the long-run. Credit-constrained firms are especially hard hit in the long-run, experiencing a further -2% cut in the supply of credit from the main bank, for a total estimated reduction in credit supply of -3.7%.

One other interesting result that comes out of table 2 is the empirical support for the "evergreening" theory that Japanese banks keep alive credit-constrained, sick, bank-dependent zombie firms. Estimates of equation (7), reported in columns 2 and 4 of table 2, show that zombie firms in general enjoy highly statistically significant higher credit supply from their declared main bank on the order of 5.1%-5.3%.

6. Other long-term outcomes

Having established that bank merger announcements result in cuts in the supply of credit from the affiliated firms' main bank, we next investigate whether bank merger announcements affect other long-term outcomes for firms. Applying difference-in-difference

techniques explained in section 4 above to an analysis of other long-term firm outcomes yields the following specification:

$$y_{i,b,t} = \beta_1 Merged_b \cdot Post_t + FirmControls_i + Firm_i \cdot Bank_b + Year_t + \varepsilon_{i,b,t} \quad (8)$$

In equation (8), $y_{i,b,t}$ represents various firm outcomes: growth in total firm borrowing, distance to default and investment. Total borrowing is defined as the sum of bank loans (from all banks, not just the declared main bank), corporate bonds and commercial paper outstanding. Calculation of distance to default, how far the firm is from the default point at which the firm cannot repay its debts without rolling them over, is explained in detail in the appendix. Investment is measured as the growth in tangible assets.

$FirmControls_i$ include firm size, firm profitability and firm working capital ratio. $Firm_i \cdot Bank_b$, an interaction term between firm fixed effects and bank fixed effects, is included to address any potential endogeneity in bank-firm matching. $Year_t$ is a time fixed effect which absorbs any unobserved time-varying factors that may simultaneously affect the outcome variables and bank mergers, such as macroeconomic conditions. $\varepsilon_{b,t}$ is the error term. As discussed above, standard errors are clustered at the individual firm level to account for potential within-firm serial correlation in the error term.

As in the analysis above, we also estimate a variation of the above equation that includes some triple difference terms:

$$\begin{aligned} y_{i,b,t} = {} & \beta_1 Merged_b \cdot Post_t + \beta_2 CreditContrained_{i,t} + \beta_3 CreditContrained_{i,t} \\ & \cdot Merged_b \cdot Post_t + \beta_4 Zombie_{i,t} + \beta_5 Zombie_{i,t} \cdot Merged_b \cdot Post_t \\ & + FirmControls_i + Firm_i \cdot Bank_b + Year_t + \varepsilon_{i,b,t} \end{aligned} \quad (9)$$

In equation (9), as above, $CreditContrained_{i,t-1}$ is a dummy variable indicating a client firm is credit constrained and $Zombie_{i,t-1}$ is a dummy variable indicating a client firm is not only credit-constrained, but a sick, presumably bank-dependent "zombie" firm.

The results of estimation of equations (8) and (9) are presented in table 3.

<Table 3. Client Firm Outcomes after Bank Merger Announcement>

The results in table 3 show that while bank merger announcements on average do not have a statistically significant impact on firm distance to default, bank merger announcements do result in a significant reduction in the growth of total firm borrowing and firm investment.

6.1 Total Borrowing

Columns (1)-(2) of table 3 report the results of estimation of equations (8) and (9) on growth in total borrowing. As reported in column (1), following an announcement of bank merger by the main bank, growth in total firm borrowing (not just credit supplied by the main bank) to client firms declines on average by a statistically significant -1.7%, about the same as the drop in credit supplied from the main bank in table 2, above. Column (2) illustrates that, while even healthy firms experience a reduction in total firm borrowing, the fall is particularly sharp for zombie firms, which experience an additional -5.8% fall in total borrowing, for a cumulative -7.3% drop.

Combined with the results reported in table 2, above, the findings reported in table 3 suggest that after an announcement of merger by their main bank, even healthy firms are unable to make up for the reduced credit supplied by their main bank by turning to other banks for bank loans or issuing other kinds of debt such as corporate bonds of commercial paper. Zombie firms, which do not seem to suffer disproportionate cuts in credit from their main bank

following a bank merger announcement, are much more significantly impacted when we take into account total bank loans and other sources of debt financing.

6.2 Distance to Default

Next we turn to distance-to-default, reported in columns (3)-(4) of table 3. The average distance-to-default for the firms included in the analysis is 5.15 standard deviations. Column (3) demonstrates that in the three years following a merger announcement by their main bank, the distance-to-default of most of the firms in the sample is unaffected by the announcement of a merger by their main bank. However, column (4) shows the effects to be heterogeneous. The distance to default for healthy firms actually *rises* by 0.156 following an announcement of a bank merger by the firms' main bank. However, for credit constrained firms, the distance to default falls by a highly statistically significant -0.517. For credit-constrained, sick, zombie firms, which already have a lower distance-to-default to begin with of 1.83 standard deviations, the distance-to-default falls by an additional -0.422. Since zombie firms are a sub-set of credit-constrained firms, that implies a total reduction of -0.939 for zombie firms: a reduction of about 50% of their initial distance-to-default.

6.3 Firm Investment

Finally, in columns (5)-(6) of table 3, we turn to the effect of bank merger announcements on client firm investment. The average rate of investment for the firms in the sample is 3.8%. As reported in column (5), in the 3 years following announcement of a merger by their main bank, investment falls on average by a statistically significant but relatively small amount: -0.7%. Column (4) sheds further light on firm investment, however, indicating that the decline in firm investment following a merger announcement by the main bank is concentrated in credit-constrained firms, which experience a -1.9% decline in firm investment. Investment by zombie firms falls an additional 3.1%, for a total decline in investment of -5.0%. Note that a

decline in investment of that scale is economically as well as statistically significant since it is greater than the average firms' total investment for one year over the sample period.

7. Conclusions

The focus of this study is the effect of bank merger announcements on the client firms of those banks. First, the effect of bank merger announcements on the supply of credit from the merging main bank to the client firm is examined. Then the analysis turns to other long-term outcomes: growth in total firm borrowing, distance to default and firm investment. Two main conclusions emerge.

Firstly, in general, client firms of banks that announce a merger experience a significant reduction in the supply of credit from the former main bank. Even though the firms analyzed in this study are publicly listed and presumably have access to other forms of financing, firms are unable to hedge against this fall in credit availability from the main bank and experience a similar and statistically significant reduction in total firm borrowing.

Secondly, the effect of bank merger announcements on client firms exhibits substantial heterogeneity. There is evidence that credit-constrained, sick, zombie firms benefit from evergreening of loans from their main bank throughout the sample period, but zombie firms find it especially difficult to hedge against the fall in credit supplied by the main bank following a bank merger announcement. Thus, the zombie firms experience a precipitous drop in total firm borrowing following the announcement of a merger by their main bank. In addition, all credit-constrained firms, but especially zombie firms, experience significantly shorter distance-to-default and lower firm investment following a merger announcement by their main bank.

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Figures, Tables & Graphs

Table 1: Summary Statistics for Banks, Client Firms and Mergers, 1990-2012 (23 years)

	n	# obs., N	Mean	Median	1st percentile	99th percentile
Banks	161					
Total assets, trillion yen		3,128	5.9	2.0	0.2	74.2
Regulatory capital ratio surplus, %		2,508	4.6%	4.5%	0.1%	12.9%
ROA, %		3,127	-0.1%	0.1%	-4.0%	1.2%
Merged Banks	64					
Total assets, trillion yen		1,111	11.3	2.7	0.2	111.1
Regulatory capital ratio surplus, %		888	4.1%	3.4%	0.0%	22.4%
ROA, %		1,111	-0.1%	0.1%	-4.0%	2.4%
Merger events, number		102	1.6	1	1	4
Client Firms	4,450					
Sales, billion yen		63,373	128	27	1	1,873
ROA, %		63,352	3.9%	3.3%	-8.2%	17.5%
Working capital ratio, %		63,376	16.2%	15.8%	-29.1%	62.5%
Credit Constrained Firms	2,177					
Sales, billion yen		15,847	148	29	1	2,122
ROA, %		15,844	2.8%	2.5%	-8.5%	14.3%
Working capital ratio, %		15,850	-9.1%	-7.0%	-34.3%	3.8%
Zombie Firms	1,012					
Sales, billion yen		1,960	131	24	0.4	2,680
ROA, %		1,961	-1.3%	-0.2%	-12.0%	2.8%
Working capital ratio, %		1,961	-9.8%	-7.5%	-34.7%	3.6%
Mergers	46					
Size of the deal, trillion yen			28.3	6.3	1.1	184.0
Number of merged banks		53	2	2	0	3
Number of merged banks' client firms		2,883	140	15	0	937

Table 2: Bank Supply of Credit after Bank Merger Announcement

	Short-Medium Run Year of merger announcement		Long Run Year of merger announcement and the following 3 years	
	(1)	(2)	(3)	(4)
Main bank x Merged bank x Post merger	-0.017** [0.008]	-0.005 [0.014]	-0.024*** [0.005]	-0.017*** [0.006]
Credit constrained firm x Main bank		0.005 [0.006]		0.006 [0.005]
Credit constrained firm x Main bank x Merged bank x Post merger		0.003 [0.030]		-0.020** [0.010]
Zombie firm x Main bank		0.051*** [0.015]		0.053*** [0.013]
Zombie firm x Main bank x Merged bank x Post merger		-0.043 [0.042]		0.007 [0.014]
Observations	268,450	234,547	303,556	278,153

Table 3: Client Firm Outcomes after Bank Merger Announcement						
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	**Total Borrowing Growth**		**Distance to Default**		**Investment**	
Main bank merged x Post merger	-0.017***	-0.015**	0.010	0.156***	-0.007**	0.002
	[0.006]	[0.007]	[0.053]	[0.059]	[0.003]	[0.003]
Credit constrained firm		-0.016**		0.096		-0.002
		[0.008]		[0.069]		[0.005]
Credit constrained firm x Main bank merged x Post merger		0.008		-0.517***		-0.019***
		[0.008]		[0.073]		[0.006]
Zombie firm		0.024***		-0.001		0.011*
		[0.009]		[0.055]		[0.007]
Zombie firm x Main bank merged x Post merger		-0.058***		-0.422***		-0.031***
		[0.012]		[0.105]		[0.011]
Observations	52,976	46,919	49,390	45,872	61,044	52,871