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Regional Bank Consolidations Contribute to Cost Reduction: Evidence from Japan

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Abstract

We investigate the effect of regional bank consolidations in Japan since 2005 by applying the DID-event study design. We find that i) any type of consolidations reduces operating costs on average, ii) this cost reduction effect exceeds the anti-competitive effect in any type of merger, iii) the cost reduction effect is passed through to bank users by reducing borrowing costs, and that iv) cost reduction effect is larger in full-spec mergers than BHC establishments. These findings imply that the regional bank consolidations were beneficial mainly for users.

JEL Classification: G21, G34, L22

Keywords: regional banks, bank consolidations, bank holding companies

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1 Introduction

We have witnessed a wave of regional bank consolidations in Japan since the late 2010s. This phenomenon is understood as regional banks' attempts to reduce operating costs to adapt to the diminished profit margin due to the diminishing loan demands under local aging population and the resulting extremely low long-term interest rates (e.g., FSA 2014, Ogura 2020). A policy by the Japanese banking regulator, the Financial Services Agency (FSA), to promote such consolidations sparked a policy debate with the Fair-Trade Commission (FTC) in charge of anti-trust regulations. The former argued that consolidations, especially mergers of banks whose branch networks are overlapped, would significantly improve cost-efficiency, and it would be passed through to users by reducing borrowing costs and improving credit availability, while the latter argued that the resulting higher market concentration would restrict the competition and do harm for users. The primary purpose of this study is to empirically reveal which force is dominant in Japan's regional banking sector.

We already have a tremendous accumulation of empirical studies on bank consolidations in the US since the 1970s branching deregulations and in Europe since the 2000s banking market integration in Euro area¹. More recently, Mayordomo et al (2026) reveal the improvement in the cost efficiency, especially in terms of monitoring cost, in the consolidations of Spanish savings bank by DID regressions and structural estimation exploiting the policy shock as a natural experiment. They also find the increase in the users' borrowing cost resulting from reduced competition.

The empirical studies on regional bank consolidations in Japan have not been fully

¹ A survey of the empirical studies in US and Europe in and before the 2000s is provided by DeYoung, Evanoff, and Molyneux (2009).

conducted due to the lack of incidences before the 2010s.² Hosono et al (2009) presents the empirical result that regional bank consolidations reduced their operating costs during Japan's banking crisis in the late 1990s. Ogura (2021) presents evidence that mergers among regional banks reduces both costs and revenues from a matched sample between those had merged in the years from 2002 to 2017 and those had never experienced a merger and have a similar asset size and a similar market. Nakasato (2025) presents an empirical study with more recent regional bank mergers and establishment of bank holding companies (BHC) in the years from 2004 and 2020. In the study, it is found that the consolidation by establishing a BHC improves cost efficiency better than full-spec mergers. Regarding the cooperative banks, which are called *Shinkin banks*, Ogura and Uchida (2014) found a significant reduction in information production after a merger from the survey data targeting users. Harada and Kitamura (2016) find a significant reduction in their operating cost after mergers. However, some of these past DID event-study designs appear to suffer from the problem of a forbidden comparison caused by confusion of those who are not yet treated and those who have already been treated in the past within the control group (Baker, Larcker, and Wang 2022). Thus far, due to this shortcoming of the existing studies, we do not have clear and robust evidence useful for the above policy debate.

To obtain robust evidence, we apply a more robust DID event-study design, Sun and Abraham (2021) method, which are free from the forbidden comparison problem. Our dataset is the panel data of regional banks in the fiscal years from 2001 to 2024, which include several controversial mergers since the late 2010s. In the estimation, we control

² There are several existing studies about the effect of consolidations of Japanese major banks, which are operating nation-wide or internationally (e.g., Uchino and Uesugi 2022, Montgomery and Takahashi 2018).

for the potential impact of the public capital injection policy in this period.

We compare consolidations by establishing a bank holding company, in which each participating bank remains a stand-alone entity, with those by a full-spec merger, in which participating banks are united into one legal entity. Among full-spec mergers, we also compare in-market mergers, in which participating banks' branch locations are highly overlapped, and cross-market mergers, in which participating banks' branch locations are overlapped to a lesser extent. In the latter comparison, we propose a new measure to gauge the extent of overlapping of branch networks.

The estimation results are as follows. First, any type of merger significantly reduces operating costs. Second, this cost reduction effect exceeds the anti-competitive effect in any type of merger. Third, the cost reduction effect is passed through to the reduction in lending interest rates. Fourth, the cost reduction effect is larger in full-spec mergers than BHC establishments. Thus, the results so far support the FSA's argument than the FTC's argument.

The remaining part of this paper is organized as follows. In section 2, we describe the institutional details and relevant policies in Japan's regional banking sector. Section 3 is the description of our data. Section 4 is the description of our estimation method. Section 5 describes our estimation results. In section 6, we discuss a possible interpretation of our findings. Section 7 is our conclusion.

2 Institutional Background

2.1 Promotion policy for regional bank consolidations

A report in 2014 by Financial Services Agency (FSA), in charge of bank supervision in Japan, presented the prediction that regional loan demand in Japan will diminish rapidly,

especially in rural areas, where the working-age population is rapidly diminishing³ (Financial Services Agency 2014). Based on this prediction, FSA published a statement to promote consolidations of regional banks to maintain the stability of the regional banking sector.

To promote regional bank consolidations more effectively in 2021, the government started to provide subsidies for information and communication technology (ICT) related expenses in regional bank mergers, and to exempt regional bank mergers from the merger review by Fair Trade Commission required for mergers resulting in concentration higher than a regulatory threshold. Besides, the Bank of Japan, the central bank, introduced an additional interest on reserve for banks who plan a consolidation to improve cost efficiency.

In response to the structural problem and the policies, we witnessed many consolidations among regional banks as is listed in Table 1.

In-market mergers, which consolidate banks who have a more geographically overlapped branch network, are increasing recently. Fukuoka Financial Group (Fukuoka FG)'s announcement in 2016 of its plan to acquire Juhachi Bank and merge it with Shinwa Bank, which was already held by Fukuoka FG, sparked a policy controversy between the Fair Trade Commission (FTC) and FSA, since the consolidation of these two banks was expected to occupy more than 70% of the market share of the loan market in Nagasaki Prefecture.⁴ FSA supports for the consolidation from the expectation for the significant

³ Among academic articles, Ogura (2020) estimates the loan demand function and the supply function in each prefecture in Japan and finds that the loan demand responds to a lesser extent to the massive monetary expansion in the prefectures where the working age population is rapidly decreasing. This finding partially supports the FSA's prediction.

⁴ After the merger announcement by Fukuoka FG, FTC started the merger review in 2017. After two years of review, the merger was approved under a condition that the bank sells 100 billion JPY of existing loans to the other banks. Shinwa bank and Juhachi bank complied with this condition and merged in 2020, three years behind the original schedule.

improvement in cost-efficiency by consolidating duplicated branch networks, whereas FTC was against it from the expectation for the significant anti-competitive effects due to the excessive market concentration, which can be harmful for these bank users in general. The increase in in-market mergers after this consolidation case casts another question: is there any difference between in-market mergers and cross-market mergers? In-market mergers are expected to have more significant cost-reduction and anti-competitive effects, whereas cross-market mergers are expected to facilitate a better global optimization of loan allocation and improve risk-adjusted profitability. Which of these competing forces was more influential in the context of regional banks in Japan is another empirical question.

We also have another dimension of comparison in terms of consolidation methods, we had many consolidations by founding a bank holding company (BHC, hereafter), which holds multiple banks, and business combinations (full-spec merger, hereafter), which combines two banks into one bank. The former method is a lighter version of bank consolidations, at the point that participating banks keep their entities as it was before the consolidation, whereas the latter is a more thorough version of consolidation because multiple banks integrate into one entity. It is often argued that the former method is less costly in terms of post-merger integration of information system and organization.

2.2 Pre-emptive public capital injection for regional banks

Since 1998 amid the Japanese banking crisis after the burst of the real estate bubble, the government repeatedly injected public capital into several regional banks in response to the crisis, such as the global financial crisis in 2007-09, the east-Japan great earthquake

in 2011, and the COVID-19 pandemic in 2020.⁵ In all these schemes, the Deposit Insurance Corporation in Japan injected capital to applicant banks by buying the preferred stocks that they issued. The banks are required to repurchase them by the prespecified due date, typically five years later, at the above-par price. To receive the capital, banks are required to submit a reform plan to improve profitability and efficiency and accept monitoring by the regulator. Thus, we expect that this capital injection scheme will also improve the cost efficiency of regional banks, and so we must control this effect to correctly identify the impacts of bank consolidations.

3 Data

3.1 Source and sample selection

To test the effect of regional consolidations, we use the financial data of regional banks⁶ from fiscal year 2001 to 2024, which was collected from Nikkei NEEDS database, augmented by the Japanese bankers' association's database. The merger incidences included in our dataset is indicated by "yes" in Table 1. Merger information is collected from Nikkin Shiryo Nen'po before 2020, or Nihon Kin'yu Meikan after 2019. To measure the overlap of branch networks of merging banks, we collected the branch location information from the CD-ROM appendix of Nihon Kin'yu Meikan, which record all branch locations of all banks as of October in each year since 2002.

⁵ The relevant ones for our dataset of regional banks in 2002-2023 are those based on the following legislations.

- 早期健全化法 *Act on Emergency Measures for Early Strengthening of Financial Functions* (1998),
- 組織再編促進特措法 *Act on Special Measures for Promotion of Organizational Restructuring of Financial Institutions* (2002)
- 金融機能強化法 *Act on Special Measures for Strengthening Financial Functions* (2004)

⁶ Regional banks include those who are a member of Japanese regional bankers' association or Japanese second-tier regional bankers' association.

These data are compiled into a consolidated bank and year panel data. Pre-merger financial data for eventually merged banks is the sum of merging banks for B/S and income statement items, or the weighted average for ratios, such as ROA, where weight is defined by the denominator of each ratio. We treat those who became a subsidiary under a BHC as independent banks without consolidating the financial values.

For the event study design, the treatment group is the banks who consolidated in the fiscal years 2004-2021, i.e., from April 2004 to March 2022. Those merged before fiscal year 2004 or after 2021 are deleted from our dataset to secure the observations for 3 years before and 3 years after a merger and to keep the control group clean. Those experienced mergers or BHC establishment multiple times in the fiscal years from 2001 to 2024 are deleted from our dataset to assure the clear identification of the consolidation impact.⁷ We also dropped those banks who were involved in a merger of three or more banks, for which measuring the branch network overlapping is complicated. The control group is the banks who never experienced any type of consolidation in the fiscal year from 2001 to 2024. Some BHC were founded to prepare for a full-spec merger later. Such a BHC is treated as a full-spec merger in the year of the full-spec merger. The resulting set of observations in our analysis on the consolidated basis is 60 banks in the control group without any consolidation⁸, 11 banks who experienced a single full-spec merger and 15 banks who joined a BHC once.

3.2 Definition of key variables

⁷ At this step, we excluded Shinwa-Juhachi bank because Shinwa bank merged with Kyushu bank in 2003 and merged with Juhachi bank in 2020.

⁸ We exclude Kitakyushu bank, which was spined off in FY 2010 from Yamaguchi Bank. We also excluded Yamaguchi bank to avoid a resulting noise.

We examine the consolidation impact on i) cost, ii) revenue, and iii) risk-taking or portfolio.

Cost measures include the number of branches(*branch_adj*), the number of bank full-time employees(*n_banker*), funding rate (*funding_rate*), the ratio of overhead cost over assets (*overhead/asset*), the ratio of overhead cost over gross income (*overhead/income*)⁹, and the marginal cost (*mc*). As for the number of branches, many Japanese banks consolidated branches by moving geographical address of a branch to another without changing branch ID, which is often called a “branch-in-branch”. We count these branches that share an identical address as one branch to capture the effective reduction of branches. Funding rate is defined by the funding cost in the income statement over the total funding in the liability side of the balance sheet. Since deposits account for more than 80% of liability in our dataset, this funding cost is almost equal to the deposit interest rate in effect. Overhead costs include personnel expenses, supplies expenses, and tax expenses except for corporate tax. Gross income is measured by the sum of net income and overhead cost.¹⁰ The marginal cost is calculated from the fitted value of the first-order differentiation with respect to loan of the total cost estimated by a linear regression with data of all banks including major banks and regional banks in the fiscal years from 1979-2024.¹¹ For the pre-merger observations, we use the loan-weighted average of marginal

⁹ Overhead/income is winsorized as follows. The values above 99 percentile of the sample for regression analysis, and the negative values due to the negative gross income are replaced with the 99 percentile to enable us to interpret the values in a consistent manner.

¹⁰ To put more precisely, Gross income is 業務粗利益, net income is 業務純益, overhead cost is 営業経費 in the financial statements of Japanese banks.

¹¹ The linear model is as follows.

$$overhead_{bt} = \beta_0 + \beta_1 loan_{bt} + \beta_2 loan_{bt}^2 + \beta_3 otherasset_{bt} + \beta_4 otherasset_{bt}^2 + y_t + e_{bt},$$

costs of merging banks.

Revenue measures include gross income, ROA, and interest rate. ROA is the ratio of gross income over total assets. Interest rate is measured by the ratio of loan interest income over average total outstanding loan, which is the average of the total outstanding loan at the end of the previous year and that of the current year.

Risk-taking measures include total assets (*asset*), total loan (*loan*), small and medium-sized enterprise loan (*SME loan*), securities, such as government bonds (*JGBs*), and stocks (*stocks*), capital ratio (*leverage_ratio*), provision rate (*provision_rate*), and non-performing loan ratio (*npl_ratio*). Provision rate is measured by the ratio of the stock of loan-loss provision over total loan. The details of the definition are listed in Table 2. The descriptive statistics in the sample for each regression are listed in Table 3.

To control for the effect of the public capital injection. We use a dummy variable, *cap_inject*, which equals one after a bank receives a public capital injection and before repaying it. The information about the public capital injection was collected from the website of the Deposit Insurance Corporation of Japan.¹²

To identify in-market mergers and cross-market mergers¹³, we introduce a novel measure. We define the similarity of branch locations between merging banks as follows:

$$similarity \equiv \frac{g_i' g_j}{\|g_i\| \|g_j\|} \quad (1)$$

where overhead is the overhead cost, loan is the total loan, other asset is total asset excluding loan, y_t is year fixed effect. We define the marginal cost from the estimated quadratic cost function as follows:

$$mc_{bt} = 0.0088 - (3.26E - 10) * loan_{bt}$$

¹² Deposit Insurance Corporation of Japan, Capital Injection and Capital Participation, https://www.dic.go.jp/english/e_katsudo/page_000297.html (last visited, December 18, 2025)

¹³ Sapienza (2002) is the seminal study to examine the different impacts of in-market mergers and cross-market mergers. Sapienza (2002) defines a merger of banks who operate in the same province as an in-market merger, and an acquisition by a bank who operates in the other provinces as out-of-market merger. Clearly, our measure of the branch overlapping, which is defined on the municipality (city, town, and village) basis, is finer and more precise.

where g_i is the vector of the number of branches in each municipality as of the year prior to a merger. In other words, the similarity between bank i and bank j is measured by the correlation coefficient between g_i and g_j . If this similarity is closer to one, it indicates that the branch locations of these banks are very similar, which means the merger is *in-market*. If this similarity is close to minus one, it indicates that the branch locations of these banks are very different and complementary, which means the merger is *cross-market*. To compare these two types of mergers, we classify those mergers with similarity above 0.5 as in-market mergers, and those with negative similarity as *cross-market* mergers. The similarity is listed in the list of merger incidences in Table 1. Mean similarity of full-spec mergers within our sample is 0.39, and that of BHC is -0.14. The similarity of BHC incidents within our sample were all negative before 2017. Thus, BHCs are more likely to be cross-market consolidations.

4 Identification Strategy

We estimate the impact of various types of mergers by DID event-study design. Our baseline estimation is based on Sun-Abraham (2021) regression:

$$y_{bt} = \beta_0 + \sum_{c=2005}^{2024} \sum_{l=-3,-2,0,1,2,3} \beta_{lc} merge_{yc} \times time_l + \beta_1 cap_inject_{bt} + f_b + y_t + \epsilon_{bt}, \quad (2)$$

where y_{bt} is a bank cost, performance, or risk-taking measures, β 's are coefficients to be estimated, $time_l$ is the dummy indicating the years elapsed since a merger. β_{lc} is the average treatment effect relative to a year before the consolidation and can vary by the year of consolidation incidence to accommodate the heterogeneous treatment effects. To avoid forbidden comparison due to the confounding of those never merged and those merged earlier, $time_3$ is set to one if 3 years or more had elapsed since merger, $time_{-3}$ is set to one if 3 years or more before merger. $merge_b$ is the dummy equals to

one if a bank eventually merged in the period from April 2004 to March 2022, or zero otherwise. cap_inject_{bt} is a dummy indicating the recipient of the public capital injection, which is equal to one after bank b received a public capital injection and before repaying it. f_b is the consolidation-basis bank fixed effect. y_t is the year fixed effect. e_{bt} is the error term.

To ensure the clear identification of the impact of full-spec mergers, we estimate this linear model by the dataset including the clean control group of those who have never experienced any types of consolidations and the treatment group who have experienced only one full-spec merger. Likewise, to secure the clear identification of the impact of BHCs, we estimate this linear model by the dataset including the clean control group and the treatment group who have experienced only one BHC.

To extract the impact of in-market mergers, we estimate the above model with the dataset including the clean control group and the treatment group who have experienced only one full-spec in-market merger. Likewise, to extract the impact of cross-market mergers, we estimate the above model with the dataset including the clean control group and the treatment group who have experienced only one full-spec cross-market merger.

5 Results

5.1 Full-spec Mergers of regional banks

The left side of each panel in Figure 1 (a) shows the results of the estimation of the equation (2) with respect to full-spec mergers. The exact estimates are listed in Panel (a), Table 4. The upper part of the panel shows the impact on operating costs. The estimated coefficients indicate the within difference from the previous year of a merger. The most notable effect is the reduction in the number of branches, $branch_adj$, and full-time

employees, $n_bankers$, both are negative and statistically significant at a 5 or 1% significance level since the year of a merger. The coefficient indicates that, on average, about 40 branches are shut down or consolidated with another branch by the third year after a merger, which is economically significant for the sample median branch number of each bank is 92 (Table 3). As for the full-time employees, the number is reduced by about 585 people on average by the third year after a merger, which is also economically significant for the sample median number of full-time employees, 1407. Besides, we also find the post-merger reduction in marginal cost, mc , which is also statistically significant at a 1% significance level in the year of a merger and later. Marginal cost is reduced by about 0.5 percent in three years after a merger, which is economically significant for the sample median of marginal cost 1.01 percent. This reduction is driven by the concavity of the estimated cost function (see footnote 10), i.e., the economy of scale.

Consistent with these results, the reduction in *overhead/asset* is statistically significant at a 1 % level in the third or later years after a merger. However, another cost indicator, *overhead/income*, does not show such significant reduction. This is because the gross income, the denominator, is also significantly reduced after a merger. On the other hand, we do not find any significant impact on the funding rate, which mainly consists of the deposit interest rate. Thus, we do not find any significant anti-competitive effect in the deposit market.

Middle part of the panel shows the merger impact on bank revenue. The most notable impact is found in the average interest rate of loans, *interest rate*. It is reduced right after a merger. The reduction is statistically significant at a 1 % significance level in the third or later years after a merger. The reduction is about 18 basis points in the third or later years after a merger. It is economically significant for the sample median interest rate 174

basis points. This reduction in the interest rate resulted in the reduction of gross income and ROA in the third or later years after a merger.

Lower part of the panel shows the merger impact on portfolio and risk-taking. A clearer post-merger impact is a positive impact on *leverage ratio*, which is statistically significant at 1 % significance level in the third or later years after a merger. The ratio increases by about 1 percentage points. This is economically significant for the sample median 4.9 percent. Full-spec mergers improve financial soundness on average.

To sum, banks successfully cut down on operating and overhead costs by consolidating duplicated branch networks and back-office functions, and improve the financial soundness represented by the leverage ratio. The benefit of cost reduction is almost entirely passed through to users in the form of reduced loan interest rates.

5.2 Establishment of a bank holding company (BHC)

The right side of each panel in Figure 1 (a) shows the results of the estimation of the equation (2) with respect to BHC. The exact estimates are listed in Panel (b), Table 4. The upper part of the panel is the list of impacts on items related to operating costs. The extent of cost reduction, such as the number of branches and bank employees, is smaller in BHC than in full-spec mergers and statistically less significant. Despite the smaller extent of reduction in the number of employees, *overhead/asset* and *overhead/income* are reduced significantly at a 1% significance level in the third and later years after a BHC establishment. This significant impact on overhead ratios despite the marginal impacts on branches and employees, relative to full-spec mergers, is mainly driven by the different impacts on the denominators: gross income and asset. Indeed, gross income is reduced significantly after a full-spec merger, whereas the extent of its reduction is smaller for

BHC due to the smaller and insignificant reduction in loan interest rate. Regarding portfolio, Assets, especially loans, increase in the third and later years after establishment of a BHC. after the establishment of a BHC, while government bonds (JGBs) are reduced. This result suggests a bank can extend its reach to potential customers through a group bank and respond to their potential demands by redirecting funds from less-profitable government bonds to riskier local loans.

We also find that financial soundness, measured by leverage ratio, is somewhat improved after a BHC establishment.

All in all, the cost reduction effect of BHCs does exist but it is less significant than that of full-spec mergers. Pass-through of the cost reduction to loan interest rates is limited in BHCs relative to full-spec mergers. A stark contrast from full-spec merger is that BHC promotes the portfolio shifts from government bonds to loans.

5.3 In-market mergers versus cross-market mergers

Among full-spec mergers, we examine the difference in impacts between in-market mergers and cross-market mergers (see Figure 1 (b) and Panels (c) (d), Table 4). The figures show that the numbers of branches and bank employees are reduced significantly to the same extent in both in-market and cross-market mergers. Marginal costs are reduced significantly to the same extent in both in-market mergers and cross-market mergers. The benefit of cost reduction penetrates to lower loan interest rate (*interest rate*) to a more extent in cross-market mergers than in-market mergers. This is consistent with the intuition that anti-competitive effect is smaller for cross-market mergers, in which plausibly pre-merger clienteles are less overlapped. *leverage ratio* (lower part of panel (d) in Tables 4) is increased more significantly in cross-market mergers.

5.4 Impact of additional monitoring by the regulator after a merger.

In response to the 2020 merger dispute in Nagasaki prefecture mentioned above, FSA announced that it will monitor the bank's behavior after a merger to prevent it from doing harm for their users by exploiting its strengthened market power. This additional monitoring might drive our pass-through result. To see the significance of this additional monitoring, we conducted a subsample analysis. One includes full-spec merger incidences before 2020 and the control group only. The other one includes full-spec merger incidences after 2020 and the control group only. We run the same regressions with each of these subsamples. The result is listed in Table 5.

Panel (a), Table 5 is the results from the mergers before 2020. Panel (b) is those after 2020. We find the interest rate reduction is statistically significant only in the former, before the introduction of additional monitoring in 2020, possibly because of the smaller cost reduction effect in the mergers after 2020. Thus, we can safely conclude that our results about the reduced interest rate is not driven by the FSA's additional monitoring.

6 Discussion

Our analysis gives consistent evidence for the following five points

- i Any type of merger contributes to cost reduction.
- ii The cost reduction is passed through to the reduction in lending interest rates in any type of merger.
- iii The cost reduction effect exceeds the anti-competitive effect in any type of merger.
- iv The cost reduction effect is greater in full-spec mergers than BHC. Among

full-spec mergers, there is no significant difference between in-market mergers and cross-market mergers.

All in all, the mergers of regional banks improved the users' surplus by the full pass through of cost reduction to lending interest rate and improved bank financial soundness.

In the context of the policy controversy mentioned in Section 2.1, our results are more supportive for the merger promotion policy taken by Japanese FSA than the concern appealed by Japanese FTC. The subsample analysis shows that the full pass-through of the cost reduction to lending interest rate is not driven by regulator's post-merger monitoring to avoid harmful conducts against users. Besides, there is a plausible reason for this user-friendly conduct of merged banks. As is reported in the existing studies, the local credit markets in Japan have become increasingly competitive and is almost perfectly competitive in the 2010s due to the diminished demand for loans resulting from the diminishing working-age population (Ogura 2020). Related to this point, establishing a BHC has an interesting benefit for banks located in a diminishing local market to extend their reach to potential customers in the area where the other group bank is located.

7 Concluding Remarks

The result that any type of mergers reduces operating costs effectively and exceeds anti-competitive effect implies that mergers of Japanese regional banks are more beneficial for users and regional economies. The results are clear and robust, but several limitations are noteworthy.

First, a theoretical analysis of horizontal mergers (e.g. Farrell and Shapiro 1990) shows that, to detect the sign of the welfare impact of a merger, it is useful to see the impact on competitors against a merging bank. In this study, we do not examine the

response of competitors because of the difficulty in identifying a true competitor in our bank-level data. We guess that a bank-firm matched data enables us to identify competitors' response at least in the loan market. Second, the findings in this study imply the positive impact of bank mergers on users' welfare, but we cannot tell anything about the quantity of the benefit. Quantification of the user's welfare impact is useful as a guideline for budgeting the government subsidies for promoting mergers. These directions of research remain future research subjects.

References

- Baker, A.C., D.F. Larcker, C.C.Y. Wang, 2022, "How much should we trust staggered difference-in-differences estimates?" *Journal of Financial Economics*, 144:370-395
- Borusyak, K., X. Jaravel, and J. Spiess 2024, "Revisiting Event Study Designs: Robust and Efficient Estimation," *Review of Economic Studies* 91: 3253–3285
- DeYoung, R., D. D. Evanoff, and P. Molyneux, (2009) "Mergers and Acquisitions of Financial Institutions: A Review of the post-2000 Literature," *Journal of Financial Services Research* 36: 87-110.
- Farrell, J., and C. Shapiro, (1990), "Horizontal Mergers: An Equilibrium Analysis," *American Economic Review* 80(1):107-126.
- Financial Services Agency, (2014), *Financial Monitoring Report*, (in Japanese)
<https://www.fsa.go.jp/news/26/20140704-5.html>
- Harada, K., and H. Kitamura, (2016), "Shinyou Kinko Saihengo No Keieikaizen Kouka-Gappei Kouka No Suikei," (Management improvement after consolidations of shinkin banks-estimation of consolidation effects), *TCER Working Paper Series J-*

14.

Hosono, K., K. Sakai, and K. Tsuru, (2009), “Consolidation of Banks in Japan: Causes and Consequences” Chapter 8 in *Financial Sector Development in the Pacific Rim, East Asia Seminar on Economics*, Volume 18, Takatoshi Ito and Andrew K. Rose (eds), National Bureau of Economic Research, University of Chicago Press. Pp. 265-309.

Mayordomo, S., N. Pavanini, and E. Tarantino, (2026), “The Impact of Bank Consolidation on Credit Supply and Performance,” *Review of Financial Studies*.

Montgomery, H., and Y. Takahashi, (2018), “The Effect of Bank Mergers on Client Firms: Evidence from the Credit Supply Channel,” *Japanese Economic Review* 69(4): 438-449.

Nakasato, T., (2025), “Do Mergers Increase Cost and Profit Efficiency More Than Integration under a BHC? An Empirical Investigation Using Data on Regional Banks in Japan” *Keizai Bunseki* (Economic and Social Research Institute, Cabinet Office) 210: 175-196.

Ogura, Y., and H. Uchida, (2014), “Bank Consolidation and Soft Information Acquisition in Small Business Lending,” *Journal of Financial Services Research* 45:173-200.

Ogura, Y., (2020), “Intensified Lending Competition and Search-for-Yield under Prolonged Monetary Easing,” *Journal of the Japanese and International Economies* 56:101076.

Ogura, Y., (2021) “Consolidations of Regional Financial Institutions,” Ch. 6 in *Chiiki Kin'yu No Keizaigaku* (Economics of regional finance), pp.165-201.

Sapienza, P., (2002), “The Effects of Banking Mergers on Loan Contracts,” *Journal of Finance* 57(1): 329-367.

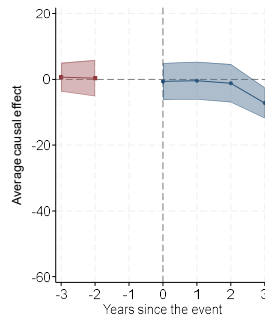
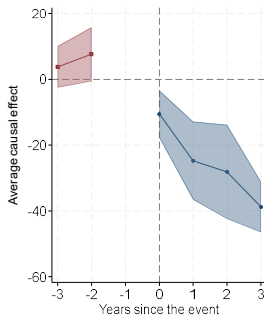
- Sun, L., and S. Abraham, (2021), “Estimating dynamic treatment effects in event studies with heterogeneous treatment effects,” *Journal of Econometrics* 225(2): 175–199.
- Uchino, T., and I. Uesugi (2022), “The effects of a megabank merger on firm-bank relationships and loan availability,” *Journal of the Japanese and International Economies* 63: 101189-101189

Figure 1 Results of Sun-Abraham regressions

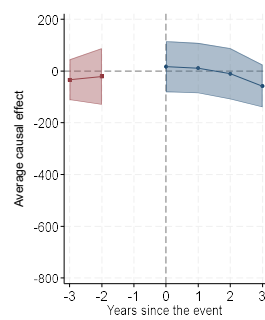
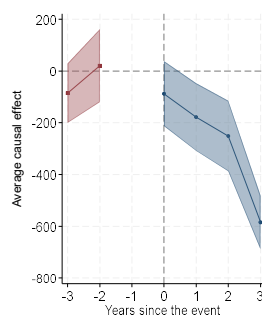
Note: The figures are the plot of estimated coefficients listed in Table 4. The horizontal axis indicates the years elapsed since a consolidation. Solid line indicates the point estimate of the average impact of merger events in each year elapsed since an event estimated by the method of Sun and Abraham(2021). Shadow indicates the 95% confidence interval. Depicted by the command event_plot developed by Borusyak et al (2024) for STATA.

(a) Full-spec mergers vs. BHC (Left: full-spec mergers, Right: BHC).

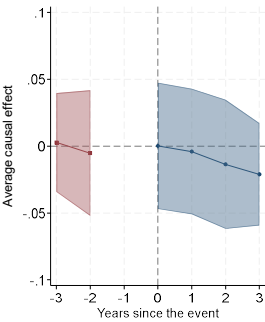
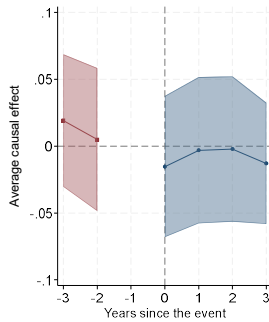
i) branch_adj



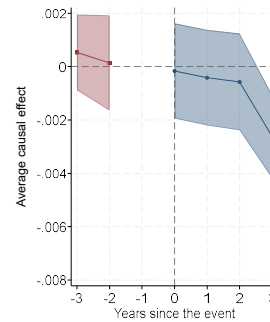
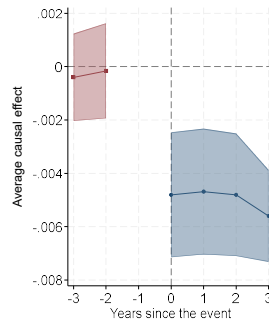
ii) n_banker



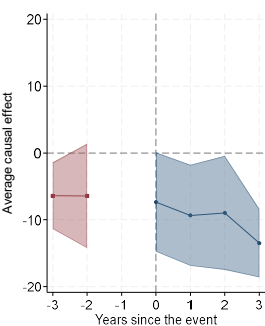
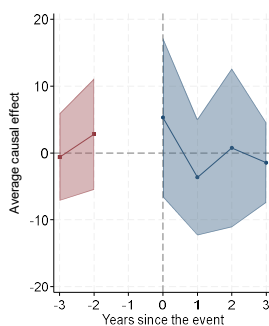
iii) funding rate



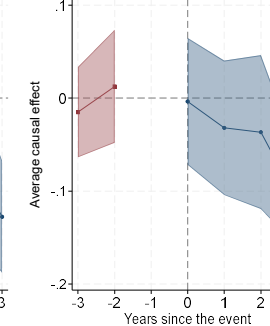
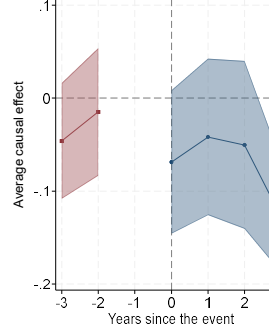
iv) mc



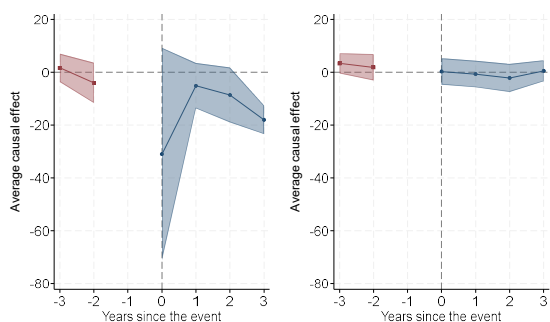
v) overhead/income



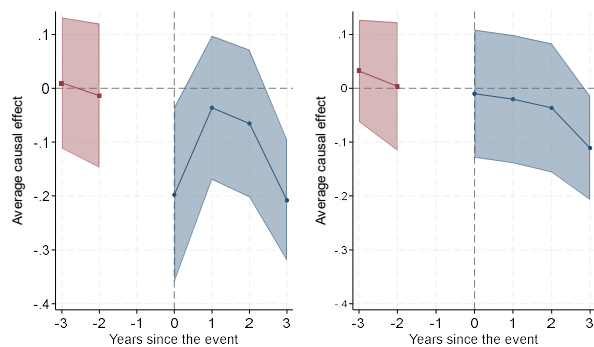
vi) overhead/asset



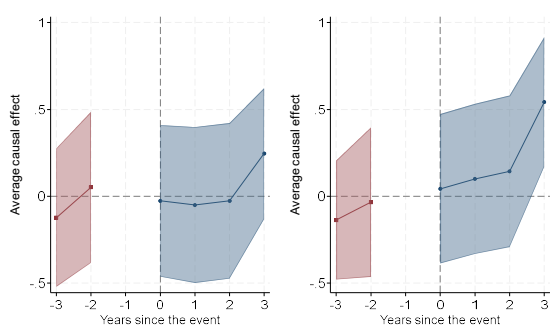
vii) gross income



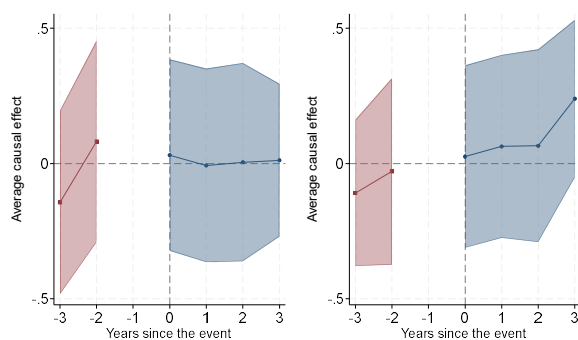
viii) interest rate



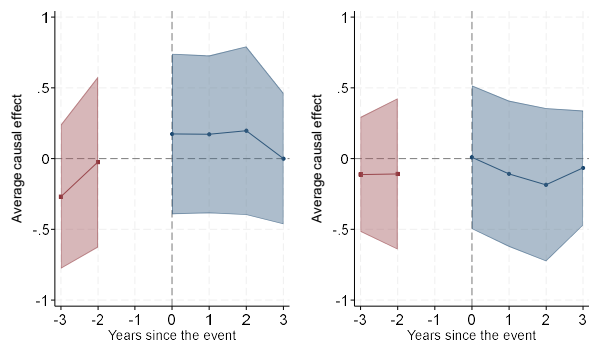
ix) loan



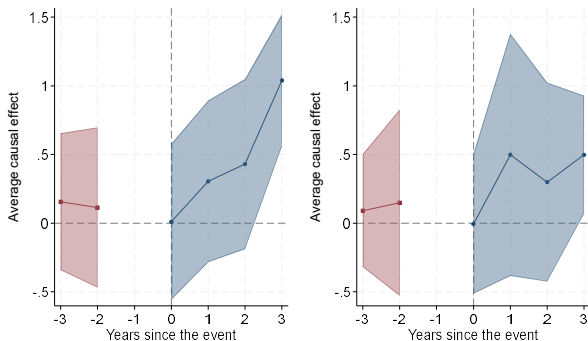
x) SME loan



xi) provision rate



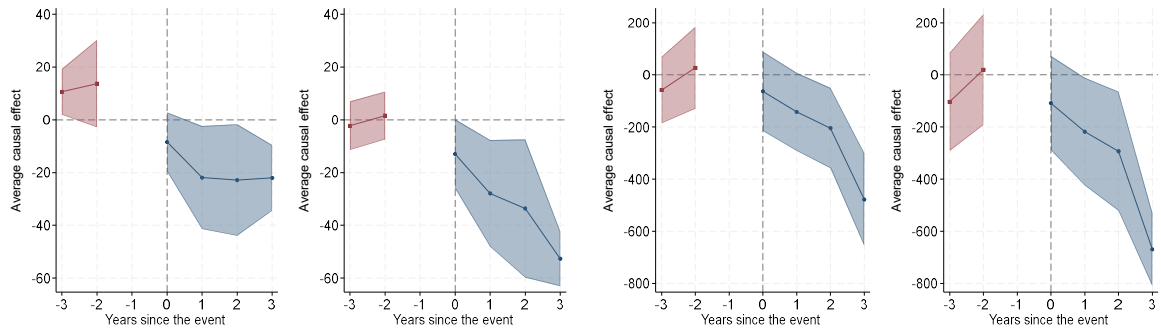
xii) leverage ratio



(b) In-market vs. cross market (Left: in-market mergers, Right: cross-market mergers).

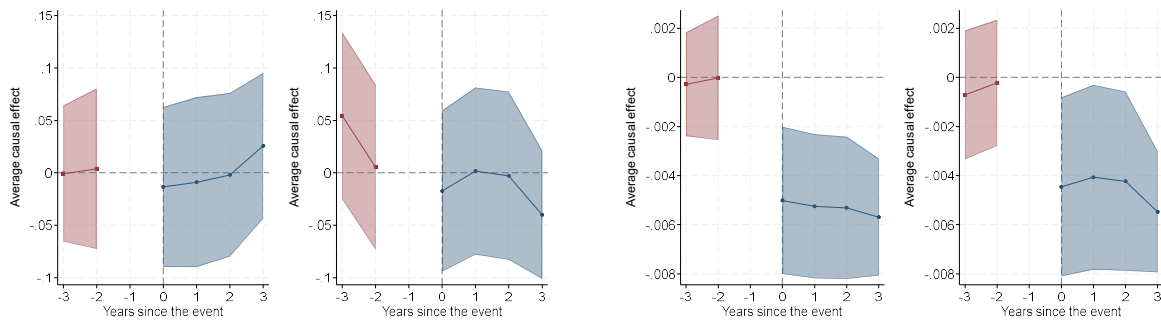
i) branch_adj

ii) n_banker



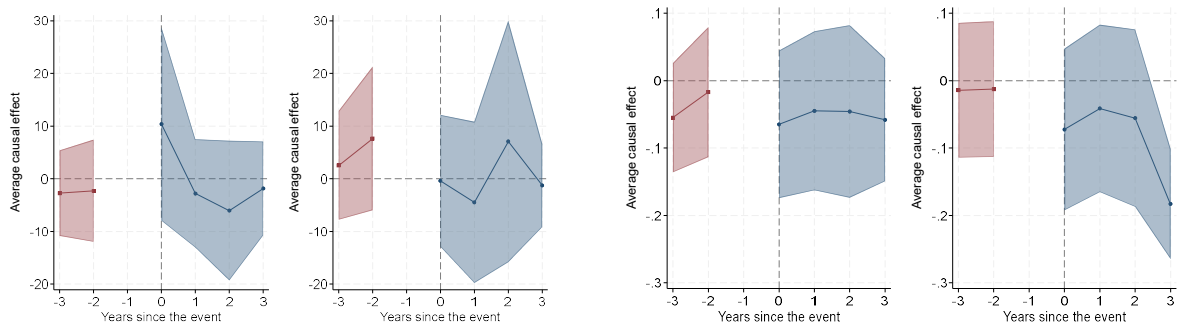
iii) funding rate

iv) mc

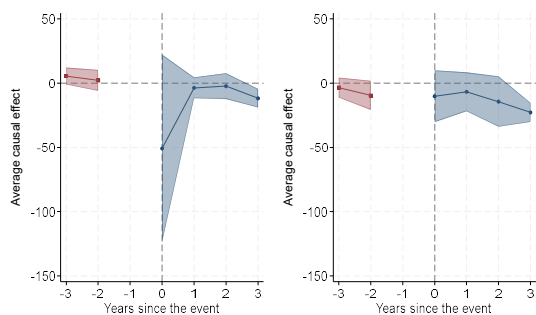


v) overhead cost / income

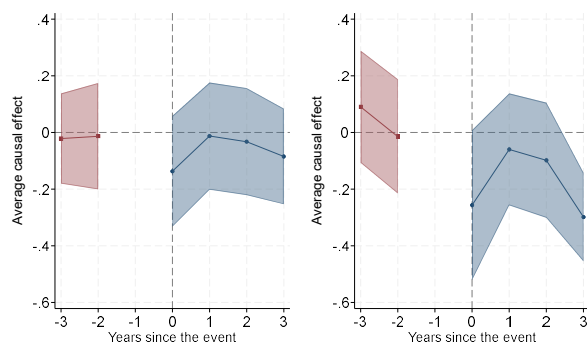
vi) overhead cost/ asset



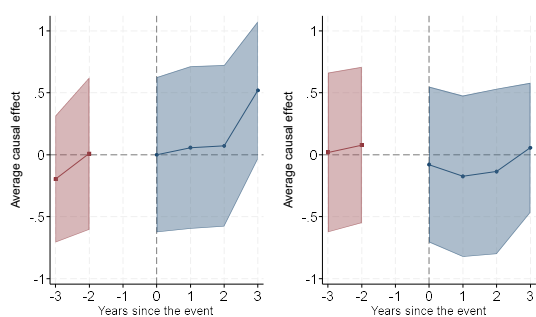
vii) gross income



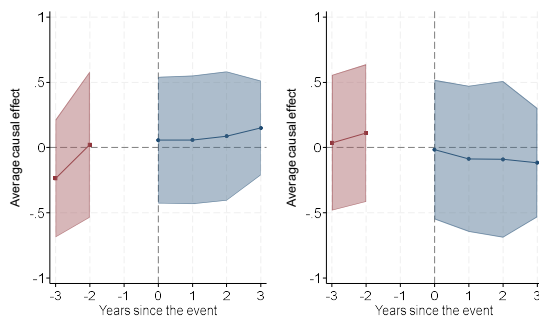
viii) interest rate



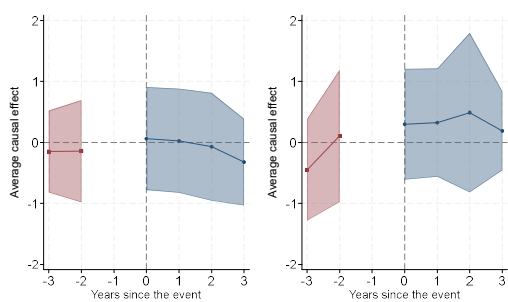
ix) loan



x) SME loan



xi) provision rate



xii) leverage ratio

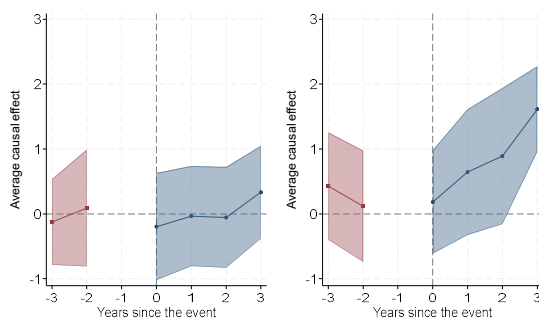


Table 1 List of consolidations involving a regional bank in Japan since April 2001.

(Notes) The numbers in parenthesis is Financial Institution code. The column of similarity is defined in equation (1) in the main text.

The column of included indicates whether the consolidation is included in our dataset.

(a) Full-spec mergers

		merging banks	bank name after merger	similarity	included
2003	March	Sumitomo-Mitsui Banking Corporation (9), Wakashio Bank (524)	Sumitomo-Mitsui Banking Corporation (9)		No
2003	April	Shinwa Bank(181), Kyushu Bank(586)	Shinwa Bank(181)		no
2003	April	Kanto Bank (131), Tsukuba Bank (520)	Kanto Tsukuba Bank (131)		no
2004	February	Kansai Bank(554), Kansai Sawayaka Bank(552)	Kansai Urban Bank (554)		no
2004	May	Setouchi Bank (568), Hiroshima Sougou Bank (569)	Momiji Bank (569)	0.513	no
2004	October	Nishinohon Bank(190), Fukuoka City Bank (581)	Nishinohon City Bank (190)	0.887	yes
2006	October	Kiyou Bank(163), Wakayama Bank(558)	Kiyou Bank(163)	0.880	yes
2007	May	Shokusan Bank (508), Yamagata Shiawase Bank(507)	Kirayaka Bank (508)	0.960	yes
2008	October	Hokuyou Bank (501), Sapporo Bank (502)	Hokuyou Bank (501)	0.824	yes
2010	March	Kanto-Tsukuba Bank (131), Ibaragi Bank (519)	Tsukuba Bank (131)	0.298	yes
2010	March	Kansai Urban Bank (554), Biwako Bank (557)	Kansai Urban Bank (554)	-0.448	no
2010	May	Ikeda Bank(161), Senshu Bank(160)	Ikeda Senshu Bank (161)	-0.333	yes
2012	September	Juroku Bank(153), Gifu Bank (541)	Juroku Bank (153)	0.807	yes
2018	May	Tokyo Tomin Bank(137), Yachiyo Bank (597), Shin-ginko Tokyo (322)	Kiraboshi Bank (137)		no
2019	April	Kinki Osaka Bank(159), Kansai Urban Bank (554)	Kansai Mirai Bank (159)	-0.060	no
2020	January	Taisho Bank(555), Tokushima Bank (572)	Tokushima Taisho Bank (572)	-0.231	yes
2020	October	Juhachi Bank(180), Shinwa Bank(181)	Juhachi Shinwa Bank (181)	0.866	yes
2021	January	Daishi Bank(140), Hokuetsu Bank(141)	Daishi Hokuetsu Bank (140)	0.605	yes
2021	May	Mie Bank(154), Daisan Bank(546)	Sanjusan Bank (546)	0.559	yes
2023	June	Hachijuni Bank (143), Nagano Bank (533)	Hachijuni Bank (143)		no
2025	January	Aichi Bank(542), Chukyo Bank(544)	Aichi Bank (542)		no
2025	January	Aomori Bank(117), Michinoku Bank(118)	Aomori Michinoku Bank (117)		no

(b) Establishment of Bank Holding companies

		participating banks	bhc name	similarity	included
2001	April	Hokuyou Bank (501), Sapporo Bank (502)	Sapporo-Hokuyo HD		no
2001	September	Setouchi Bank (568), Hiroshima Sogo Bank (569)	Momiji HD		no
2001	December	Daiwa Bank (10), Kinki Osaka Bank (159), Nara Bank(557)	Daiwagin HD		no
2002	April	Shinwa (181), Kyushu (586)	Kyushu-Shinwa HD		no
2004	September	Hokkaido Bank (116), Hokuriku Bank (144)	Hokuhoku FG	-0.088	no
2005	October	Shokusan Bank (508), Yamagata Shiawase Bank(507)	Kirayaka HD		no
2006	February	Kiyooka Bank (163), Wakayama Bank(558)	Kiyooka HD	0.88	no
2006	October	Yamaguchi Bank (170), Momiji Bank (569)	Yamaguchi FG	-0.065	yes ¹
2007	April	Kumamoto Family Bank (587), Fukuoka Bank(177)	Fukuoka FG	-0.122	yes
2007	October	Shinwa Bank (181), Fukuoka FG	Fukuoka FG		no
2008	July	Ashikaga Bank(129)	Ashikaga HD		no
2009	October	Hokuto Bank (120), Shonai Bank (121)	Fidea FG	-0.119	yes
2009	October	Senshu Bank (160), Ikeda Bank (161)	Ikeda-Senshu HD	-0.333	no
2010	April	Tokushima Bank (572), Kagawa Bank(573)	Tomoni HD		no
2012	October	Kirayaka Bank (508), Sendai Bank (512)	Jimoto HD	-0.148	yes
2014	October	Tokyo Tomin Bank (137), Yachiyo Bank (597)	Tokyo TY HD	-0.136	no
2015	October	Higo Bank (182), Kagoshima Bank (185)	Kyushu FG	-0.081	yes
2016	April	Yokohama Bank (138), Higashi Nihon Bank (525)	Concordia FG	-0.322	yes
2016	April	Tomoni HD, Taisho Bank (555)	Tomoni HD		no
2016	October	Ashikaga Bank(130), Jouyou Bank(129)	Mebuki FG	-0.115	yes
2016	October	Nishinihon City Bank(190), Nagasaki Bank (585)	Nishinihon FHD	-0.145	yes
2017	November	Kinki-Osaka Bank(159)	Kansai-Mirai HD		no
2018	April	Mie Bank (154), Daisan Bank(546)	Daisanjusan FG	0.548	no
2018	October	Daishi Bank(140), Hokuetsu Bank (141)	Daishi Hokuetsu FG	0.605	no
2022	October	Aichi Bank (542), Chukyo Bank(544)	Aichi FG	0.45	no
2022	April	Aomori Bank (117), Michinoku Bank (118)	Prokurea HD	0.969	no

¹ Yamaguchi bank is excluded because of 2009 spin-off of Kitakyushu bank.

Table 2 Definitions of variables

variables	definition
asset	total asset (tril.jpy)
loan	total outstanding loan (tril.jpy)
branch_adj	number of branches. Count as one if multiple branches have an identical address.
n_banker	number of full-time bank employees (persons).
SME loan	Total outstanding loan to small and medium-sized enterprises (tril.jpy).
deposit	total deposit (tril.jpy)
securities	total securities in asset (tril.jpy)
JGBs	Japanese government bonds in asset (tril.jpy)
stocks	Stocks in asset (tril.jpy)
leverage_ratio	book equity / book asset (%).
funding rate	total funding costs / funds (%).
gross income	net income (業務純益)+ overhead cost (営業経費) (bil JPY).
overhead/asset	overhead costs/total asset (%).
provision rate	stock of provisions for non-performing loans /total loan (%).
interest rate	interest income / average loan. Average loan is the average of outstanding loans at the beginning and the end of each accounting year (%).
mc	Marginal cost (%).
npl ratio	non-performing loans / total loans. Non-performing loans is the total of Financial Reconstruction Act Disclosure Claims: 要管理債権 “Special attention loans”、危険債権“Doubtful loans”、破綻更生債権 “Bankrupt/de facto bankrupt loans”.(%)
overhead/income	overhead costs/gross income (%).
ROA	gross income / asset (%).

Table 3 Descriptive statistics

(a) banks with full-spec mergers and clean controls

Variable	N	Mean	SD	Min	p10	p25	p50	p75	p90	Max
asset	1,680	3.37	2.98	0.22	0.57	1.04	2.60	4.66	7.39	21.53
loan	1,680	2.13	1.86	0.16	0.40	0.72	1.62	2.87	4.55	13.23
SME loan	1,477	1.62	1.41	0.13	0.35	0.62	1.24	2.12	3.40	10.71
branch_adj	1,680	96.76	45.81	15	41	62	92	128	163	300
n_banker	1,680	1584	935	232	516	744	1407	2208	2970	5078
deposit	1,680	2.94	2.47	0.21	0.53	0.94	2.35	4.09	6.31	16.79
JGBs	1,680	0.27	0.28	0.00	0.03	0.06	0.17	0.38	0.66	2.15
stocks	1,680	0.07	0.11	0.00	0.01	0.01	0.04	0.10	0.17	1.18
leverage ratio	1,680	5.02	1.18	0.93	3.65	4.23	4.90	5.71	6.56	9.72
funding rate	1,680	0.14	0.12	0.00	0.02	0.06	0.11	0.20	0.32	0.80
gross income	1,602	44.05	33.49	-98.50	10.07	16.79	36.10	59.40	89.14	184.37
overhead/asset	1,680	1.04	0.30	0.40	0.62	0.81	1.04	1.24	1.42	2.15
provision rate	1,680	1.29	0.98	-1.02	0.42	0.58	1.02	1.69	2.48	7.91
interest rate	1,680	1.74	0.61	0.68	0.99	1.21	1.74	2.14	2.53	5.71
mc	1,680	1.01	0.01	0.97	1.00	1.01	1.01	1.02	1.02	1.02
npl ratio	1,680	3.71	2.43	0.56	1.42	2.02	2.98	4.64	7.14	18.85
overhead/income	1,602	72.40	11.41	42.72	59.03	64.92	71.95	78.46	85.02	115.29
ROA	1,602	1.45	0.48	-1.37	0.83	1.07	1.46	1.78	2.08	3.03

(b) Banks with BHC establishment and clean controls										
Variable	N	Mean	SD	Min	p10	p25	p50	p75	p90	Max
asset	1,752	3.39	3.42	0.22	0.55	0.97	2.42	4.47	7.59	23.70
loan	1,752	2.14	2.14	0.16	0.39	0.67	1.55	2.74	4.65	14.78
SME loan	1,549	1.64	1.65	0.13	0.35	0.53	1.18	2.00	3.42	11.72
branch_adj	1,745	92.10	42.65	15.00	38.00	59.00	86.00	122.00	160.00	216.00
n_banker	1,752	1526.84	935.39	201	507	716	1354	2112	2987	4297
deposit	1,752	2.92	2.75	0.21	0.51	0.88	2.16	3.92	6.41	18.68
JGBs	1,752	0.26	0.29	0.00	0.03	0.05	0.16	0.36	0.68	2.15
stocks	1,752	0.07	0.11	0.00	0.00	0.01	0.03	0.09	0.18	1.18
leverage ratio	1,752	5.04	1.23	0.38	3.56	4.23	4.96	5.81	6.61	9.72
funding rate	1,752	0.15	0.12	0.00	0.02	0.06	0.11	0.20	0.32	0.80
gross income	1,673	44.31	38.27	-0.80	9.74	15.41	34.06	57.32	91.39	222.64
overhead/asset	1,752	1.04	0.31	0.31	0.62	0.80	1.05	1.25	1.45	2.15
provision rate	1,752	1.28	0.99	-1.02	0.43	0.61	1.02	1.63	2.46	7.91
interest rate	1,752	1.75	0.61	0.68	1.00	1.22	1.75	2.15	2.53	5.71
mc	1,752	1.01	0.01	0.96	1.00	1.01	1.01	1.02	1.02	1.02
npl_ratio	1,752	3.70	2.47	0.56	1.43	2.05	2.95	4.51	7.17	19.00
overhead/income	1,673	72.18	11.71	40.32	57.89	64.70	71.97	78.62	85.39	113.67
ROA	1,673	1.46	0.48	-0.02	0.86	1.09	1.46	1.79	2.10	3.03

Table 4 Results by Sun-Abraham regressions

(a) Full-spec mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Sun- Abraham (2021) regression for the dependent variable indicated in the first column. Sample consists of banks who never experienced any types of consolidation and those experienced a single full-spec merger of two banks only once. *, **, *** indicate the statistical significance at a level of 10, 5, and 1 percent level of two-sided t-test for the null-hypothesis that the coefficient is zero, respectively.

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
branch_adj	3.802 (3.225)	7.619 (4.193)	-10.58** (3.689)	-24.74*** (6.067)	-28.13*** (7.307)	-38.79*** (3.944)	1680
n_banker	-85.70 (58.47)	20.75 (71.84)	-87.46 (64.04)	-178.2** (66.71)	-251.2*** (69.56)	-584.7*** (53.39)	1680
funding rate	0.0192 (0.0253)	0.00493 (0.0273)	-0.0153 (0.0270)	-0.00303 (0.0279)	-0.00213 (0.0278)	-0.0128 (0.0231)	1680
overhead/asset	-0.0461 (0.0317)	-0.0149 (0.0350)	-0.0688 (0.0393)	-0.0418 (0.0429)	-0.0504 (0.0461)	-0.128*** (0.0307)	1680
mc	-0.000401 (0.000836)	-0.000159 (0.000910)	-0.00481*** (0.00119)	-0.00469*** (0.00120)	-0.00481*** (0.00117)	-0.00560*** (0.000881)	1680
overhead/income	-0.620 (3.332)	2.820 (4.251)	5.320 (6.089)	-3.635 (4.445)	0.766 (6.063)	-1.449 (3.065)	1602
gross income	0.00978 (0.0620)	-0.0138 (0.0682)	-0.198* (0.0829)	-0.0363 (0.0682)	-0.0655 (0.0699)	-0.208*** (0.0575)	1680
interest rate	1.701 (2.731)	-4.003 (3.895)	-30.97 (20.53)	-5.060 (4.378)	-8.557 (5.298)	-17.96*** (2.765)	1602
ROA	-0.0466 (0.0733)	-0.115 (0.103)	-0.390 (0.279)	-0.00895 (0.100)	-0.137 (0.144)	-0.181** (0.0695)	1602

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
asset	-0.146 (0.343)	0.0499 (0.374)	0.0313 (0.371)	-0.0167 (0.372)	-0.0197 (0.377)	0.331 (0.322)	1680
loan	-0.123 (0.203)	0.0514 (0.222)	-0.0266 (0.223)	-0.0507 (0.229)	-0.0267 (0.228)	0.246 (0.192)	1680
SME loan	-0.144 (0.173)	0.0814 (0.190)	0.0311 (0.181)	-0.00709 (0.183)	0.00487 (0.187)	0.0122 (0.144)	1477
deposit	0.0455 (0.0532)	0.0145 (0.0589)	-0.0350 (0.0623)	-0.0327 (0.0623)	-0.0435 (0.0634)	-0.120* (0.0488)	1680
JGBs	0.0257 (0.0173)	0.0113 (0.0197)	-0.00508 (0.0198)	-0.00738 (0.0206)	-0.00337 (0.0212)	-0.0262 (0.0160)	1680
stocks	-0.147 (0.244)	0.0389 (0.264)	0.0662 (0.264)	-0.0103 (0.266)	0.0174 (0.266)	0.241 (0.230)	1680
leverage ratio	0.155 (0.254)	0.113 (0.298)	0.00958 (0.289)	0.304 (0.300)	0.429 (0.316)	1.039*** (0.245)	1680
provision rate	-0.269 (0.260)	-0.0243 (0.308)	0.174 (0.289)	0.172 (0.284)	0.197 (0.304)	0.0000106 (0.237)	1680
npl ratio	-0.496 (0.536)	0.199 (0.702)	0.645 (0.614)	0.342 (0.586)	-0.117 (0.598)	-0.807 (0.491)	1680

(b) BHC establishment

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each regression for the dependent variable indicated in the first column. Sample consists of banks who never experienced any types of consolidations and those experienced a single BHC establishment only once. *, **, *** indicate the statistical significance at a level of 10, 5, and 1 percent level of two-sided t-test for the null-hypothesis that the coefficient is zero, respectively.

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
branch_adj	0.637 (2.238)	0.343 (2.818)	-0.637 (2.847)	-0.425 (2.933)	-1.203 (2.964)	-7.183** (2.402)	1745
n_banker	-33.61 (40.07)	-21.17 (55.78)	17.09 (50.18)	11.34 (49.55)	-10.67 (50.46)	-57.77 (41.99)	1752
funding rate	0.00274 (0.0189)	-0.00524 (0.0240)	0.000231 (0.0241)	-0.00400 (0.0240)	-0.0136 (0.0246)	-0.0211 (0.0195)	1752
overhead/asset	-0.0152 (0.0248)	0.0126 (0.0310)	-0.00362 (0.0348)	-0.0320 (0.0369)	-0.0366 (0.0422)	-0.111*** (0.0256)	1752
mc	0.000531 (0.000724)	0.000134 (0.000910)	-0.000163 (0.000909)	-0.000416 (0.000914)	-0.000573 (0.000925)	-0.00263*** (0.000796)	1752
overhead/income	-6.405* (2.542)	-6.423 (3.987)	-7.349 (3.789)	-9.334* (3.855)	-8.967* (4.350)	-13.50*** (2.616)	1673
gross income	0.0323 (0.0483)	0.00320 (0.0608)	-0.0102 (0.0606)	-0.0203 (0.0606)	-0.0366 (0.0610)	-0.111* (0.0492)	1752
interest rate	3.421 (1.942)	1.914 (2.538)	0.337 (2.544)	-0.635 (2.555)	-2.120 (2.702)	0.586 (2.035)	1673
ROA	0.114* (0.0557)	0.138 (0.0832)	0.130 (0.0798)	0.125 (0.0852)	0.102 (0.0783)	0.0890 (0.0558)	1673

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
asset	-0.273 (0.319)	-0.00553 (0.400)	0.0730 (0.402)	0.143 (0.401)	0.197 (0.406)	0.993** (0.351)	1752
loan	-0.137 (0.175)	-0.0341 (0.219)	0.0431 (0.219)	0.0998 (0.220)	0.144 (0.222)	0.542** (0.190)	1752
SME loan	-0.109 (0.138)	-0.0291 (0.176)	0.0257 (0.172)	0.0631 (0.173)	0.0659 (0.182)	0.240 (0.149)	1549
deposit	0.0333 (0.0408)	0.00227 (0.0518)	-0.0416 (0.0538)	-0.0762 (0.0552)	-0.0718 (0.0540)	0.0417 (0.0437)	1752
JGBs	-0.00146 (0.0130)	-0.00548 (0.0167)	-0.00711 (0.0164)	-0.0264 (0.0181)	-0.0301 (0.0176)	-0.0291* (0.0132)	1752
stocks	-0.202 (0.213)	-0.0711 (0.268)	0.0167 (0.267)	0.0795 (0.268)	0.127 (0.273)	0.383 (0.225)	1752
leverage ratio	0.0907 (0.210)	0.148 (0.346)	-0.00636 (0.259)	0.497 (0.450)	0.298 (0.369)	0.497* (0.220)	1752
provision rate	-0.111 (0.207)	-0.108 (0.273)	0.0101 (0.259)	-0.107 (0.263)	-0.185 (0.276)	-0.0659 (0.207)	1752
npl ratio	-0.136 (0.434)	0.0485 (0.565)	-0.179 (0.549)	-0.402 (0.561)	-0.430 (0.559)	-0.280 (0.434)	1752

(c) In-market mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each regression for the dependent variable indicated in the first column. Post5 dummy is included in the model but omitted from the report. Sample consists of banks who never experienced any types of consolidations and those experienced a single full-spec in-market merger of two banks only once. *, **, *** indicate the statistical significance at a level of 10, 5, and 1 percent level of two-sided t-test for the null-hypothesis that the coefficient is zero, respectively.

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
branch_adj	10.60* (4.436)	13.66 (8.447)	-8.418 (5.712)	-21.93* (9.956)	-22.84* (10.79)	-22.01*** (6.345)	1560
n_banker	-58.26 (65.16)	27.20 (80.17)	-63.03 (77.57)	-142.0 (76.25)	-204.2** (78.65)	-477.9*** (90.75)	1560
funding rate	-0.000756 (0.0331)	0.00383 (0.0390)	-0.0135 (0.0389)	-0.00895 (0.0413)	-0.00197 (0.0398)	0.0258 (0.0354)	1560
overhead/asset	-0.0549 (0.0414)	-0.0169 (0.0493)	-0.0648 (0.0559)	-0.0448 (0.0602)	-0.0458 (0.0653)	-0.0580 (0.0466)	1560
mc	-0.000280 (0.00108)	-0.0000169 (0.00129)	-0.00501** (0.00153)	-0.00525*** (0.00150)	-0.00531*** (0.00148)	-0.00569*** (0.00122)	1560
overhead/income	-2.729 (4.142)	-2.282 (4.949)	10.39 (9.364)	-2.781 (5.247)	-6.043 (6.767)	-1.832 (4.542)	1482
gross income	5.407 (3.361)	2.028 (4.166)	-50.84 (37.23)	-3.733 (4.138)	-2.394 (5.112)	-11.89** (3.690)	1482
interest rate	-0.0213 (0.0811)	-0.0130 (0.0959)	-0.137 (0.0998)	-0.0126 (0.0965)	-0.0323 (0.0964)	-0.0847 (0.0862)	1560
ROA	-0.0337 (0.0930)	0.0213 (0.113)	-0.666 (0.486)	-0.0197 (0.113)	0.0175 (0.118)	-0.0418 (0.0985)	1482

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
asset	-0.257 (0.446)	0.0172 (0.535)	0.120 (0.526)	0.209 (0.528)	0.208 (0.527)	0.842 (0.480)	1560
loan	-0.196 (0.261)	0.00944 (0.313)	-0.000376 (0.319)	0.0576 (0.335)	0.0715 (0.332)	0.519 (0.284)	1560
SME loan	-0.237 (0.230)	0.0230 (0.286)	0.0562 (0.247)	0.0582 (0.251)	0.0876 (0.253)	0.150 (0.185)	1357
deposit	0.0930 (0.0707)	0.00215 (0.0878)	-0.0659 (0.0856)	-0.0707 (0.0840)	-0.0799 (0.0895)	-0.187* (0.0752)	1560
JGBs	0.0327 (0.0230)	0.0262 (0.0279)	-0.0108 (0.0294)	-0.0129 (0.0305)	-0.00855 (0.0318)	-0.0225 (0.0248)	1560
stocks	-0.198 (0.320)	0.0148 (0.380)	0.154 (0.377)	0.172 (0.382)	0.185 (0.379)	0.673 (0.349)	1560
leverage ratio	-0.126 (0.338)	0.0887 (0.460)	-0.196 (0.421)	-0.0346 (0.394)	-0.0554 (0.396)	0.333 (0.365)	1560
provision rate	-0.151 (0.343)	-0.145 (0.428)	0.0623 (0.431)	0.0262 (0.436)	-0.0718 (0.451)	-0.324 (0.363)	1560
npl ratio	-0.489 (0.695)	-0.273 (0.840)	0.0278 (0.873)	-0.0409 (0.956)	-0.183 (1.008)	-1.023 (0.756)	1560

(d) cross-market mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each regression for the dependent variable indicated in the first column. Post5 dummy is included in the model but omitted from the report. Sample consists of banks who never experienced any types of consolidations and those experienced a single full-spec cross-market merger of two banks only once. *, **, *** indicate the statistical significance at a level of 10, 5, and 1 percent level of two-sided t-test for the null-hypothesis that the coefficient is zero, respectively.

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
branch_adj	-2.271 (4.698)	1.579 (4.634)	-12.97 (6.688)	-27.92** (10.31)	-33.64* (13.36)	-52.65*** (5.312)	1560
n_banker	-103.7 (96.16)	20.16 (108.6)	-108.1 (92.15)	-217.9* (105.5)	-292.8* (116.5)	-669.1*** (71.93)	1560
funding rate	0.0544 (0.0407)	0.00539 (0.0401)	-0.0174 (0.0392)	0.00165 (0.0407)	-0.00283 (0.0409)	-0.0401 (0.0312)	1560
overhead/asset	-0.0143 (0.0510)	-0.0126 (0.0514)	-0.0724 (0.0612)	-0.0412 (0.0633)	-0.0556 (0.0671)	-0.183*** (0.0418)	1560
mc	-0.000713 (0.00134)	-0.000221 (0.00131)	-0.00446* (0.00186)	-0.00407* (0.00192)	-0.00423* (0.00186)	-0.00548*** (0.00126)	1560
overhead/income	2.544 (5.269)	7.645 (6.950)	-0.391 (6.383)	-4.473 (7.808)	7.081 (11.69)	-1.257 (4.037)	1482
gross income	-3.525 (3.952)	-9.591 (5.776)	-10.27 (10.26)	-6.808 (7.712)	-14.41 (9.992)	-22.85*** (3.796)	1482
interest rate	0.0907 (0.101)	-0.0139 (0.103)	-0.257 (0.135)	-0.0595 (0.101)	-0.0980 (0.104)	-0.299*** (0.0799)	1560
ROA2	-0.0377 (0.115)	-0.241 (0.184)	-0.0998 (0.204)	-0.00213 (0.185)	-0.290 (0.319)	-0.284** (0.0968)	1482

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
asset	0.0830 (0.542)	0.0568 (0.529)	-0.104 (0.527)	-0.253 (0.532)	-0.262 (0.537)	-0.00810 (0.437)	1560
loan	0.0183 (0.328)	0.0783 (0.322)	-0.0793 (0.320)	-0.174 (0.332)	-0.136 (0.340)	0.0564 (0.267)	1560
SME loan	0.0360 (0.265)	0.111 (0.269)	-0.0162 (0.273)	-0.0869 (0.285)	-0.0908 (0.306)	-0.116 (0.214)	1363
deposit	-0.0563 (0.0804)	0.0234 (0.0801)	-0.00699 (0.0918)	0.0118 (0.0982)	-0.00522 (0.101)	-0.0643 (0.0647)	1560
JGBs	0.0143 (0.0278)	-0.00298 (0.0283)	0.00175 (0.0277)	-0.000384 (0.0292)	0.00281 (0.0292)	-0.0294 (0.0219)	1560
stocks	-0.0232 (0.388)	0.0454 (0.377)	-0.0514 (0.376)	-0.203 (0.379)	-0.163 (0.382)	-0.0501 (0.309)	1560
leverage ratio	0.428 (0.422)	0.118 (0.438)	0.182 (0.406)	0.644 (0.495)	0.891 (0.535)	1.614*** (0.338)	1560
provision rate	-0.452 (0.425)	0.106 (0.553)	0.298 (0.464)	0.323 (0.453)	0.489 (0.667)	0.190 (0.332)	1560
npl ratio	-0.358 (0.898)	0.700 (1.283)	1.263 (1.195)	0.749 (1.053)	-0.0363 (0.900)	-0.713 (0.680)	1560

Table 5 before 2020 and after 2020

(a) full-spec mergers before 2020

Dependent Variables	pre3	post2	post0	post1	post2	post3	N
branch_adj	5.835 (3.648)	9.074* (4.458)	-9.821* (3.863)	-21.84** (6.818)	-25.24** (8.476)	-38.07*** (4.161)	1428
n_banker	-102.8 (69.98)	26.27 (81.56)	-97.89 (70.09)	-188.0* (74.10)	-260.4*** (77.47)	-553.7*** (54.41)	1428
interest rate	0.0378 (0.0721)	-0.00786 (0.0770)	-0.221* (0.0951)	-0.0490 (0.0761)	-0.0782 (0.0784)	-0.208*** (0.0617)	1428

(b) full-spec mergers after 2020

Dependent Variables	pre3	pre2	post0	post1	post2	post3	N
branch_adj	-0.0180 (3.843)	1.450 (4.235)	-11.01* (5.067)	-28.15** (9.727)	-29.72** (11.32)	-24.73* (9.584)	567
n_banker	11.82 (48.03)	7.248 (52.90)	-25.78 (53.26)	-109.2 (61.45)	-153.9* (75.68)	-137.3 (77.37)	567
interest rate	-0.0183 (0.0684)	-0.00996 (0.0738)	-0.188 (0.104)	0.000617 (0.0873)	-0.0240 (0.0856)	-0.0156 (0.0694)	567