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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 mergers in Japan since the 2000s by applying the DID-event study design. From the estimation we find the following tendency. First, any type of merger reduces costs. Second, no competition reduction effects are found both in loan markets and deposit markets in any type of merger. Third, the cost reduction effect is passed through to users by reducing borrowing costs in any type of merger. Fourth, the cost reduction effect is larger in full-spec mergers than BHC establishments. These findings imply that the regional bank consolidations in Japan reduced operating costs of the regional banking sector without reducing competition. This implies that the regional bank consolidations were beneficial mainly for users.

JEL Classification: G21, G34, L22

Keywords: regional banks, bank consolidations, bank holding companies

1 Introduction

We have witnessed a wave of regional bank consolidation 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 for them 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 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 in-market mergers, 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 the present study is to empirically reveal which force is dominant in Japan's regional loan market after the consolidations of regional banks in Japan.

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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 area[1]. 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. 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 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 at users of shinkin banks, which experienced a merger. 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 short-coming of the existing studies, we do not have clear and robust evidence useful for the above policy debate.

To obtain robust evidence, we apply the DID event-study design such as fully saturated two-way fixed effect model, and more sophisticated methods such as Sun and Abraham (2021) method, and Callaway and Sant'Anna (2021) method, which are free from the forbidden comparison problem. Our dataset is the panel data of regional banks from 2004 to 2024, which include several in-market mergers since the late 2010s. In the estimation, we control 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

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

[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).

participating bank remains a stand-alone entity, with those by a full-spec merger, in which participating banks are united into one 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 consistent through all the three methods are as follows. First, any type of merger significantly reduces operating costs. Second, no competition reduction effects are found both in loan markets and deposit markets in any type of mergers. Third, the cost reduction effect is passed through to the reduction in lending interest rates in any type of merger. 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 identification strategy. 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 for regional bank consolidations

A report in 2014 by Financial Services Agency (FSA), in charge of bank supervision in Japan, published the prediction that loan demand in Japan will diminish rapidly, especially in rural areas, where the working-age population is rapidly diminishing[3] (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 powerfully in 2021, the government started to provide subsidies for information and communication technology (ICT) related expenses in a merger of regional banks, and to exempt regional bank mergers from the merger reviews by Fair Trade Commission for mergers resulting in concentration higher than a regulatory threshold. Besides, the Bank of Japan, the central bank, introduced iii) additional interest on reserve for banks who plan a consolidation to improve cost

[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.

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 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 is harmful for these bank users in general. The increase in in-market mergers cast another question: are there any difference between in-market mergers and cross-market mergers, which is a merger between banks whose branch network is not overlapped? 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 the risk-adjusted profitability. To know which of these competing forces was more influential in the context regional banks in Japan, we must resort to statistical tests.

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 acquisition by BHC, whereas the latter is a more thorough version of consolidations 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,

[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.

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 banks[6] from fiscal year 2002 to 2023, 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 "y" in Table. 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.

These data are compiled into a consolidated bank and year panel data. Pre-merger financial data for eventually merged banks is the total 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 fiscal year 2004-2020. Those merged before fiscal year 2004 or after 2020 are deleted from our dataset to secure the observations for 2 years before and 3 years after a merger.

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[5] The relevant ones for our dataset of reginal 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.

Those experienced mergers or BHC establishment multiple times in 2004-2020 are deleted from our dataset to assure the clear identification of the consolidation impact. We also dropped those banks who were involved in a merger of three or more banks, for which measuring the branch network overlapping is difficult. The control group is the banks who never experienced full-spec merger nor BHC in 2002-2023. 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 in the control group without any consolidation until the fiscal year of 2010 or 61 banks after 2010[7], 9 banks who experienced a single full-spec merger and 17 banks who joined a BHC once.

3.2 Definition of key variables

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

Cost measures include the number of branches, the number of bank full-time employees, funding rate, the ratio of overhead cost over assets, the ratio of overhead cost over gross income (overhead ratio, OHR)[8], and the marginal cost. 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, good expenses, and tax expenses except for corporate tax. Gross income (業務粗利益), in the denominator of OHR, is measured by the sum of net income (業務純益) and overhead cost. 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, regional banks in1980-2023.[9] For the pre-merger

[7] The increase in the number of the observations in the control group is due to a new entry of Kitakyushu bank in FY 2010, which is a spin-off from Yamaguchi Bank,which was a core bank of Yamaguch Financial Group, a BHC.

[8] OHR 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.

[9] The linear model is as follows.

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

observations, we use the loan-weighted average of marginal 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, total loan, small and medium-sized enterprise (SME) loan, securities including government bonds, and stocks, loan-to-deposit ratio, capital ratio, provision rate, and non-performing loan 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 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.[10]

To identify in-market mergers and cross-market mergers[11], we introduce a novel measure. We define the similarity of branch locations between merging banks as follows:

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

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

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

$$mc_{bt} = 0.01 - (4.24E-11) * loan_{bt}$$

[10] 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)

[11] 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 operates in the same province as an in-market merger, and an acquisition by a bank who operate in the other provinces as out-of-market merger. Clearly, our measure of the branch overlapping, which is defined on the municipality basis, is finer and more precise.

of full-spec mergers is 0.036, and that of BHC is 0.021. The similarity of BHC incidents 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 two-way fixed effect regressions:

$$y_{bt} = \beta_0 + \sum_{l=-5}^{-2} \beta_l time_l \times merge_b + \sum_{l=0}^{5} \beta_l time_l \times merge_b + \gamma \cdot \text{capinject}_{\text{bt}} + \text{f}_{\text{b}} + \text{y}_{\text{t}} + \epsilon_{bt}, \quad (2)$$

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. To avoid forbidden comparison due to the confounding of those never merged and those merged earlier, $time_5$ is set to one if 5 years or more had elapsed since merger, $time_{-5}$ is set to one if 5 years or more before merger. $merge_b$ is the dummy equals to one if a bank eventually merged in the period from 2004 to 2020, or zero otherwise. $Capinject_{bt}$ 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 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 grope 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 grope who have experienced only one full-spec cross-market merger.

We also estimate the treatment effects with more recently developed methods by Abraham and Sun (2021), and Callaway and Sant'anna (2021). We focus on the results commonly found in the fixed effect model and these methods.

5 Results

5.1 Mergers of regional banks

Panel (a) in Table 4 shows the estimation results of the two-way fixed effect model

(2) with the dataset consisting of the treatment group with a single full-spec merger and the control group without any types of consolidations. 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, *bankers*, both are negative and statistically significant at a 1% significance level since the year of a merger. The coefficient indicates that, on average, about 30 branches are shut down or consolidated with another branch by the fourth year after a merger, which is economically significant for the sample median branch number of each bank is 85. As for the full-time employees, the number is reduced by about 305 persons on average by the fourth year after a merger, which is also economically significant for the sample median number of full-time employees, 1372. Besides, we also find the post-merger reduction in marginal cost, *mc*, which is also statistically significant at a 1% significance level. Marginal cost is reduced by 0.5 percent in four years after a merger, which is economically significant for the sample median of marginal cost 1.02 percent. This reduction is driven by the concavity of the estimated cost function (see footnote 9), i.e., the economy of scale.

Despite these drastic cost-cuts, their impacts to the cost indicators, such as the ratio of overhead cost over asset, *overhead/asset*, and the ratio of overhead cost over gross income, *OHR*, are statistically insignificant. These results indicate that merged banks cut down on not only costs but also assets and gross income.

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 several years after a merger. The reduction is about 13 basis points in the fourth year after a merger. It is economically significant for the sample median interest rate 173 basis points. Consistent with the reduction in interest rate, the gross income also reduced after a merger although the statistical significance is marginal. We do not find any significant impact on ROA.

Lower part of the panel shows the merger impact on portfolio and risk-taking. A clearer post-merger impact is a positive impact on capital ratio, which is statistically significant at 5 or 1 % significance levels. The ratio increases by about 0.9 percentage points by the fourth year after a merger. This is economically significant for the sample median 4.96 percent. A merger improves financial soundness.

Regarding the findings so far, the other methods also give results somewhat weaker in statistical significance but loosely consistent with the fixed effect model (Panel (a) in Tables 5 and 6).

To sum up, 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 capital 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)

Panel (b) in Table 4 is the TWFE estimation results of the impact of BHC establishments. The upper part of the panel is the list of impacts on items related to operating costs. The extent of cost reduction, such as branches and bank employees, is smaller in BHC than in full-spec mergers and statistically insignificant. Despite the smaller extent of reduction in the number of employees, personnel expences over asset (personnel ex./asset) and overhead ratio (OHR) are reduced significantly right after a BHC establishment. This significant impact on OHR 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, all methods consistently show that gross income is reduced after a full-spec merger, whereas the extent of its reduction is smaller for an establishment of BHC due to the smaller reduction in loan interest rate. Assets tend to reduce after a full-spec merger but increase after establishment of a BHC. Regarding portfolio, after the establishment of a BHC, a bank increases loans while reducing stock holding. This result suggests a bank can extend its reach to potential customers through a group bank and responds to their potential demands by redirecting funds from less-profitable listed stocks and government bonds to riskier local loans. These tendencies are consistently found in all methods although their statistical significance varies by methods (Panel (b) in Tables 5 and 6).[12]

We do not find any consistently significant impact on financial soundness, such as capital ratio and the NPL ratio, after a BHC establishment.

All in all, a 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.

5.3 In-market mergers versus cross-market mergers

Among full-spec mergers, we examine the difference in impacts between in-market mergers (see Panel (c) in Tables 4-6) and cross-market mergers (see Panel (d) in Tables

[12] In the estimations by Callaway and Sant'Anna (2021) method in Table 5, the base category includes all observations for banks who never experienced any consolidations and those not yet been consolidated. In Table 6, the base category includes all observations for banks who never experienced any consolidations and the previous year of a consolidation, the same as that in the TWFE estimations in Table 4.

4-6). Panel (c) in each table shows that the numbers of branches and bank employees are reduced significantly in both in-market and cross-market mergers. The extent of reduction of branches is somewhat larger in in-market mergers than cross-market mergers in any estimation methods presumably because the former mergers can consolidate more duplicated branches. However, surprisingly the extent of reduction of bank employees is larger and statistically more significant in cross-market mergers than in-market mergers. The extent of the reduction in overhead costs is somewhat larger in in-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 largely penetrates to lower loan interest rate (interest rate) in both types of mergers. Capital ratio (lower part of panel (d) in Tables 4-6) is increased more significantly in cross-market mergers. This comes from the downsizing of the balance sheet, i.e., reduction in assets and deposits after cross-market mergers. We obtain no evidence of reduced competition in either type of merger. Cross-market mergers reduce bank size, such as number of employees, assets and deposits significantly, thus this type of merger seems to be used as an orderly exit from the market.

5.4 Effect of the pre-emptive public capital injection

Our TWFE regressions in Table 4 include a dummy variable indicating whether a bank received a pre-emptive public capital injection as a control variable. The estimated coefficients indicate that banks who received a public capital injection significantly reduced overhead costs and increased gross income and reduced the overhead cost ratio significantly. They also reduced the balance sheet size by cutting down on loans and deposits. This result indicates that the reform plan and regulatory monitoring required for receiving public capital were effective.

6 Discussion

Our analysis gives consistent evidence for the following five points

i Any type of merger contributes to cost reduction.

ii No competition reduction effects are found both in loan markets and deposit markets in any type of mergers.

iii The cost reduction is passed through to the reduction in lending interest rates in any type of merger.

iv The cost reduction effect is larger in full-spec mergers than BHC establishments.

v The cost reduction effect does not differ by whether a merger is in-market or cross-market.

All in all, the mergers of regional banks improved the users' surplus by the full pass through of cost reduction to lending interest rate. Besides, full-spec mergers improve financial soundness by increasing the capital ratio.

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 full pass-through of the cost reduction to lending interest rate might be a bank's preemptive reaction to regulator's post-merger monitoring to avoid harmful conducts against users. However, 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 full-spec mergers reduce operating costs more effectively without harming competition implies that this type of merger is 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 the competitors around 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.

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Table 1　List of regional bank consolidations in Japan since 2004.

(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
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	yes
2004	October	Nishinihon Bank(190), Fukuoka City Bank (581)	Nishinihon 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	yes
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	yes
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	no
2021	May	Mie Bank(154), Daisan Bank(546)	Sanjusan Bank (546)	0.559	no
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
2026	May (expected)	Fukui Bank (147), Fukuhou Bank(537)			no

(b) Establishment of Bank Holding companies

		participating banks	bhc name	similarity	included
2004	September	Hokkaido Bank (116), Hokuriku Bank (144)	Hokuhoku FG	-0.088	yes
2005	October	Shokusan Bank (508), Yamagata Shiawase Bank(507)	Kirayaka HD		no
2006	February	Kiyou Bank (163), Wakayama Bank(558)	Kiyou HD	0.88	no
2006	October	Yamaguchi Bank (170), Momiji Bank (569)	Yamaguchi FG	-0.065	yes
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

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)
l_d	loan/deposit (%).
capital ratio	book equity / book asset (%).
funding rate	total funding costs /funds (%).
gross income	net income (業務純益)+ overhead cost (bil JPY).
overhead_a	overhead costs/total asset (%).
good_a	material expenses / asset (%)
personnel_a	personnel expenses / 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”.(%)
OHR	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	1,509	3.26	2.91	0.22	0.57	1.01	2.49	4.55	7.20	21.23
loan	1,509	2.07	1.83	0.16	0.40	0.70	1.57	2.78	4.47	12.77
branch_adj	1,508	86.68	38.32	14.00	38.00	58.00	85.00	109.00	143.00	269.00
banker	1,507	1529.39	908.86	241.00	507.00	716.00	1372.00	2104.00	2874.00	4735.00
sme_loan	1,509	1.39	1.41	0.00	0.00	0.39	1.01	1.89	3.19	10.34
deposit	1,509	2.85	2.42	0.21	0.53	0.91	2.26	3.98	6.14	16.39
securities	1,509	0.78	0.72	0.00	0.10	0.20	0.57	1.17	1.80	3.72
JGBs	1,509	0.26	0.28	0.00	0.03	0.06	0.17	0.37	0.65	2.15
stocks	1,509	0.07	0.10	0.00	0.01	0.01	0.04	0.09	0.17	1.18
l_d	1,509	73.33	7.55	47.95	63.14	69.02	73.91	78.39	81.72	107.65
capital ratio	1,509	5.08	1.21	0.93	3.70	4.25	4.96	5.80	6.65	9.72
funding rate	1,509	0.14	0.12	0.00	0.02	0.05	0.10	0.18	0.31	0.80
gross income	1,509	41.42	33.10	-98.50	9.55	14.62	32.84	57.03	86.33	175.18
overhead_a	1,509	1.03	0.29	0.40	0.63	0.81	1.04	1.23	1.42	1.85
good_a	1,436	0.50	0.15	0.10	0.32	0.40	0.49	0.59	0.70	0.99
personnel_a	1,452	0.49	0.19	0.09	0.26	0.34	0.46	0.60	0.72	1.70
provision rate	1,509	1.27	0.95	-0.98	0.43	0.60	1.02	1.67	2.39	7.91
interest rate	1,508	1.73	0.60	0.68	0.99	1.22	1.74	2.12	2.51	5.71
mc	1,509	1.02	0.01	0.97	1.01	1.01	1.02	1.02	1.02	1.03
npl ratio	1,509	3.59	2.27	0.56	1.43	2.02	2.96	4.42	6.70	18.85
OHR	1,509	73.04	13.44	42.72	59.01	64.97	72.17	79.20	85.52	168.34
ROA	1,509	1.45	0.47	-1.37	0.86	1.09	1.45	1.76	2.06	3.03

(b) Banks with BHC establishment and clean controls

	N	Mean	SD	Min	p10	p25	Med	p75	p90	Max
asset	1,663	3.40	3.33	0.22	0.56	1.00	2.45	4.54	7.43	23.70
loan	1,663	2.15	2.08	0.16	0.40	0.69	1.56	2.87	4.53	14.61
branch_adj	1,656	85.74	37.21	14.00	38.00	58.00	82.00	111.00	143.00	195.00
banker	1,661	1529.26	930.61	201.00	502.00	716.00	1367.00	2125.00	2957.00	4297.00
sme_loan	1,663	1.45	1.59	0.00	0.00	0.40	1.02	1.92	3.11	11.40
deposit	1,663	2.93	2.69	0.21	0.52	0.91	2.22	4.05	6.27	18.18
securities	1,663	0.79	0.75	0.00	0.10	0.20	0.56	1.16	1.94	3.72
JGBs	1,663	0.27	0.29	0.00	0.03	0.06	0.17	0.37	0.69	2.15
stocks	1,663	0.07	0.10	0.00	0.01	0.01	0.03	0.09	0.18	1.18
l_d	1,663	73.82	8.55	47.95	63.29	68.89	73.91	79.00	82.81	143.67
capital ratio	1,663	5.09	1.26	0.38	3.58	4.24	5.00	5.88	6.69	9.72
funding rate	1,663	0.14	0.12	0.00	0.02	0.06	0.10	0.18	0.31	0.80
gross income	1,663	43.19	37.53	2.35	9.52	14.47	33.14	57.10	88.30	222.64
overhead_a	1,663	1.03	0.30	0.31	0.62	0.80	1.04	1.24	1.43	1.88
good_a	1,585	0.50	0.16	0.14	0.31	0.40	0.49	0.60	0.71	1.09
personnel_a	1,600	0.48	0.19	0.13	0.26	0.34	0.46	0.60	0.72	1.40
provision rate	1,663	1.25	0.94	-0.98	0.44	0.62	1.01	1.60	2.35	7.91
interest rate	1,662	1.73	0.60	0.68	1.00	1.22	1.73	2.11	2.50	5.71
mc	1,663	1.02	0.01	0.96	1.01	1.01	1.02	1.02	1.02	1.03
npl ratio	1,663	3.56	2.28	0.56	1.45	2.05	2.90	4.31	6.65	19.00
OHR	1,663	72.47	12.97	40.32	57.65	64.60	72.02	79.15	85.65	168.34
ROA	1,663	1.45	0.46	0.37	0.86	1.09	1.45	1.76	2.06	3.03

Table 4 TWFE results

(a) Full-spec 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. 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	pre2	post0	post1	post2	post3	post4	cap_inject	N	Adj. R-sq.
branch_adj	2.362	-23.588*	-15.797***	-26.924***	-28.818***	-29.612***	-0.201	1,508	0.969
	(1.548)	(12.568)	(3.505)	(7.087)	(8.883)	(9.137)	(2.050)		
banker	23.441	-107.214***	-186.507***	-267.420***	-306.236***	-305.327***	-27.499	1,507	0.979
	(51.126)	(32.038)	(44.815)	(57.533)	(68.539)	(72.259)	(32.975)		
funding_rate	0.011	-0.010*	0.002	0.006	0.005	0.000	0.009	1,509	0.794
	(0.008)	(0.006)	(0.012)	(0.012)	(0.015)	(0.019)	(0.009)		
overhead/asset	-0.013	-0.091***	-0.042	-0.055	-0.067*	-0.072*	-0.031	1,509	0.935
	(0.011)	(0.030)	(0.034)	(0.041)	(0.038)	(0.038)	(0.021)		
personnel ex./asset	0.013	-0.028	-0.005	-0.003	-0.006	-0.014	-0.020	1,436	0.902
	(0.011)	(0.020)	(0.022)	(0.020)	(0.016)	(0.027)	(0.013)		
good ex./asset	-0.130	-0.124	-0.129	-0.146	-0.151	-0.157	-0.008	1,452	0.797
	(0.094)	(0.089)	(0.100)	(0.111)	(0.108)	(0.110)	(0.031)		
mc	-0.000	-0.004***	-0.004***	-0.004***	-0.004***	-0.005***	0.001**	1,509	0.936
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		
OHR	3.600	10.475	-3.400	8.107	-1.805	-2.874	-3.291**	1,509	0.433
	(3.423)	(11.469)	(4.192)	(12.174)	(2.722)	(2.021)	(1.625)		
interest rate	-0.009	-0.214***	-0.050**	-0.075**	-0.118***	-0.134***	0.022	1,508	0.941
	(0.023)	(0.064)	(0.022)	(0.029)	(0.042)	(0.046)	(0.023)		
gross income	-4.838	-29.190	-2.999	-6.398	-5.101	-5.171*	3.753***	1,509	0.782
	(4.179)	(24.731)	(4.254)	(5.666)	(3.935)	(2.665)	(1.319)		
ROA	-0.141	-0.445	-0.023	-0.179	-0.104	-0.080	0.078*	1,509	0.847
	(0.104)	(0.326)	(0.092)	(0.185)	(0.076)	(0.051)	(0.044)		

Dependent Variables	pre2	post0	post1	post2	post3	post4	cap_inject	N	Adj. R-sq.
asset	0.048	-0.158***	-0.059	-0.172	-0.024	-0.050	-0.523***	1,509	0.931
	(0.087)	(0.055)	(0.083)	(0.120)	(0.144)	(0.146)	(0.173)		
loan	0.061	-0.097**	0.005	-0.037	0.029	0.067	-0.321***	1,509	0.940
	(0.057)	(0.048)	(0.096)	(0.121)	(0.136)	(0.147)	(0.108)		
sme loan	0.093	0.415	0.452	0.448	0.481	0.534	-0.170	1,509	0.844
	(0.073)	(0.409)	(0.418)	(0.429)	(0.428)	(0.420)	(0.125)		
deposit	0.061	-0.064	-0.003	-0.059	0.013	0.023	-0.375***	1,509	0.949
	(0.054)	(0.044)	(0.081)	(0.103)	(0.119)	(0.120)	(0.128)		
securities	-0.028	-0.092	0.016	-0.026	0.025	-0.086	-0.062	1,509	0.944
	(0.021)	(0.072)	(0.080)	(0.085)	(0.091)	(0.100)	(0.048)		
JGBs	-0.000	-0.034	-0.032	-0.045	-0.070	-0.147**	0.012	1,509	0.807
	(0.024)	(0.038)	(0.042)	(0.048)	(0.059)	(0.064)	(0.047)		
stocks	0.008	-0.007	-0.010	-0.006	-0.010	-0.010	-0.002	1,509	0.851
	(0.009)	(0.009)	(0.012)	(0.013)	(0.012)	(0.012)	(0.005)		
loan/deposit	0.255	-1.010	0.393	0.651	0.882	1.617	-0.573	1,509	0.730
	(0.715)	(1.488)	(1.626)	(1.898)	(1.809)	(1.919)	(1.170)		
capital ratio	0.163	0.238	0.393**	0.715**	0.722**	0.930***	0.512**	1,509	0.754
	(0.199)	(0.162)	(0.185)	(0.311)	(0.296)	(0.301)	(0.208)		
provision rate	0.039	0.243	0.212	0.259	0.118	0.061	-0.078	1,509	0.598
	(0.258)	(0.181)	(0.175)	(0.348)	(0.279)	(0.273)	(0.130)		
npl ratio	0.354	0.943	0.295	-0.203	-0.370	-0.691*	0.260	1,509	0.720
	(0.629)	(0.591)	(0.439)	(0.329)	(0.330)	(0.355)	(0.329)		

(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	pre2	post0	post1	post2	post3	post4	cap_inject	N	Adj. R-sq.
branch_adj	0.407	-0.087	-0.183	0.339	0.426	-0.777	-3.453**	1,656	0.978
	(0.277)	(0.471)	(0.724)	(0.980)	(1.190)	(1.603)	(1.547)		
banker	-4.366	-4.192	-11.975	-28.121	-27.083	-55.428	-91.736*	1,661	0.976
	(37.230)	(21.301)	(31.469)	(32.476)	(51.223)	(53.487)	(49.034)		
funding_rate	-0.004	-0.001	-0.003	-0.012	-0.012	-0.008	0.013	1,663	0.787
	(0.005)	(0.007)	(0.011)	(0.012)	(0.013)	(0.012)	(0.009)		
overhead/asset	0.013	-0.010	-0.032*	-0.039	-0.051*	-0.050*	-0.079***	1,663	0.937
	(0.011)	(0.016)	(0.018)	(0.027)	(0.027)	(0.025)	(0.018)		
personnel ex./asset	0.008	-0.013**	-0.025***	-0.029***	-0.039***	-0.047***	-0.040***	1,585	0.912
	(0.012)	(0.006)	(0.006)	(0.011)	(0.014)	(0.015)	(0.012)		
good ex./asset	0.011	0.003	0.000	-0.001	-0.005	0.000	-0.030	1,600	0.819
	(0.014)	(0.010)	(0.013)	(0.024)	(0.023)	(0.022)	(0.024)		
mc	0.000	-0.000	-0.000	-0.001	-0.001	-0.002**	0.001**	1,663	0.938
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)		
OHR	-5.286*	-7.198**	-9.599***	-8.898***	-8.040**	-9.106**	-4.730***	1,663	0.516
	(3.142)	(2.952)	(3.121)	(3.226)	(3.669)	(3.640)	(1.455)		
interest rate	0.005	-0.007	-0.015	-0.029	-0.052**	-0.064**	0.022	1,662	0.938
	(0.014)	(0.010)	(0.013)	(0.019)	(0.022)	(0.025)	(0.033)		
gross income	1.972	-0.478	-1.234	-1.272	-0.311	-0.007	0.916	1,132	0.978
	(1.343)	(1.436)	(1.828)	(2.797)	(2.761)	(4.000)	(1.212)		
ROA	0.099	0.111*	0.117*	0.087	0.077	0.083	0.036	1,663	0.873
	(0.062)	(0.059)	(0.069)	(0.056)	(0.062)	(0.059)	(0.032)		

Dependent Variables	pre2	post0	post1	post2	post3	post4	cap_inject	N	Adj. R-sq.
asset	-0.025	0.082	0.167	0.228	0.287*	0.571	-0.384	1,663	0.917
	(0.025)	(0.088)	(0.104)	(0.144)	(0.171)	(0.353)	(0.244)		
loan	-0.035	0.047	0.113	0.166*	0.217*	0.277*	-0.253**	1,663	0.939
	(0.026)	(0.041)	(0.077)	(0.098)	(0.124)	(0.153)	(0.125)		
sme loan	-0.084**	0.056	0.108*	-0.021	-0.006	0.048	-0.198**	1,663	0.880
	(0.038)	(0.034)	(0.059)	(0.177)	(0.194)	(0.209)	(0.090)		
deposit	-0.075*	0.030	0.108	0.167	0.201	0.290	-0.300*	1,663	0.945
	(0.044)	(0.045)	(0.083)	(0.120)	(0.152)	(0.232)	(0.171)		
securities	-0.017	-0.036	-0.050	-0.030	-0.022	0.032	-0.010	1,663	0.946
	(0.016)	(0.034)	(0.050)	(0.055)	(0.037)	(0.044)	(0.043)		
JGBs	0.010	-0.036	-0.060	-0.056	-0.041	0.013	0.032	1,663	0.798
	(0.013)	(0.031)	(0.049)	(0.048)	(0.054)	(0.046)	(0.043)		
stocks	-0.010	-0.009*	-0.029*	-0.034**	-0.034**	-0.025***	-0.001	1,663	0.851
	(0.006)	(0.005)	(0.015)	(0.015)	(0.014)	(0.009)	(0.003)		
loan/deposit	0.958	0.704	1.142	0.945	2.117	2.419*	-0.910	1,663	0.707
	(0.709)	(0.581)	(1.022)	(1.062)	(1.386)	(1.437)	(1.166)		
capital ratio	0.129	0.062	0.418	0.266	0.378	0.401	0.619***	1,663	0.744
	(0.369)	(0.131)	(0.405)	(0.381)	(0.474)	(0.488)	(0.192)		
provision rate	-0.067	-0.082	-0.168	-0.183	-0.283	-0.215	-0.145	1,663	0.581
	(0.128)	(0.073)	(0.147)	(0.132)	(0.176)	(0.198)	(0.160)		
npl ratio	0.232	-0.263**	-0.458	-0.506*	-0.490*	-0.278	0.092	1,663	0.698
	(0.256)	(0.129)	(0.335)	(0.277)	(0.284)	(0.326)	(0.386)		

(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	pre2	post0	post1	post2	post3	post4	cap_inject	N	Adj. R-sq.
branch_adj	1.705	-18.705**	-21.962***	-28.628***	-27.628***	-29.962***	-2.115	1,398	0.963
	(3.864)	(8.363)	(7.327)	(5.157)	(5.895)	(7.478)	(1.321)		
banker	45.872	-120.206	-119.461	-162.794*	-166.794**	-180.128	-67.617**	1,397	0.979
	(95.945)	(102.858)	(141.338)	(81.059)	(77.690)	(120.518)	(23.954)		
funding rate	-0.018	0.003	0.038	0.015	-0.014	-0.039	-0.022	1,399	0.198
	(0.048)	(0.043)	(0.062)	(0.090)	(0.075)	(0.065)	(0.032)		
overhead/asset	0.042	-0.175**	-0.079	-0.082	-0.116	-0.116	-0.126	1,399	0.454
	(0.065)	(0.084)	(0.098)	(0.107)	(0.100)	(0.080)	(0.092)		
personnel ex./asset	0.021	-0.046	-0.014	0.017	-0.002	0.002	-0.056	1,327	0.554
	(0.024)	(0.059)	(0.045)	(0.020)	(0.020)	(0.013)	(0.037)		
material ex./asset	-0.043	-0.093	-0.068	-0.109	-0.131	-0.137	-0.062	1,342	0.395
	(0.047)	(0.072)	(0.086)	(0.093)	(0.092)	(0.080)	(0.071)		
mc	0.001	-0.003***	-0.004***	-0.005***	-0.005***	-0.006***	0.000	1,399	0.893
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)		
OHR	-4.608*	32.612	-0.482	1.340	-0.330	4.820	-2.266	1,399	0.299
	(2.624)	(30.951)	(2.963)	(7.728)	(4.393)	(3.819)	(2.263)		
interest rate	0.107	-0.285**	-0.051	-0.153	-0.294**	-0.426***	-0.229	1,398	0.393
	(0.134)	(0.109)	(0.122)	(0.120)	(0.112)	(0.089)	(0.195)		
gross income	4.566	-104.147	-1.947	-5.986	-4.505	-9.221	4.630	950	0.944
	(6.526)	(78.006)	(7.970)	(11.992)	(9.002)	(5.613)	(3.117)		
ROA	0.172**	-1.181	-0.114	-0.173	-0.180	-0.241**	-0.114	1,399	0.253
	(0.083)	(0.758)	(0.111)	(0.134)	(0.111)	(0.109)	(0.158)		

Dependent Variables	pre2	post0	post1	post2	post3	post4	cap_inject	N	Adj. R-sq.
asset	-0.179	-0.021	0.179	0.272	0.494***	0.506***	-0.093	1,399	0.875
	(0.180)	(0.168)	(0.230)	(0.184)	(0.154)	(0.127)	(0.145)		
loan	-0.085	0.023	0.242	0.313***	0.427***	0.545***	-0.073	1,399	0.895
	(0.121)	(0.095)	(0.165)	(0.106)	(0.140)	(0.153)	(0.079)		
sme loan	0.011	1.181	1.293	1.341	1.413	1.492	-0.073	1,399	0.820
	(0.374)	(0.949)	(0.887)	(0.898)	(0.845)	(0.868)	(0.131)		
deposit	-0.076	0.102	0.273	0.344**	0.494***	0.570***	-0.050	1,399	0.904
	(0.142)	(0.149)	(0.203)	(0.124)	(0.152)	(0.117)	(0.125)		
securities	-0.112	-0.187	-0.030	-0.108	-0.005	-0.168	0.029	1,399	0.924
	(0.085)	(0.184)	(0.211)	(0.177)	(0.205)	(0.125)	(0.070)		
JGBs	-0.072	-0.062	-0.094	-0.108**	-0.102	-0.187***	0.055	1,399	0.718
	(0.061)	(0.058)	(0.064)	(0.050)	(0.068)	(0.057)	(0.067)		
stocks	0.026	-0.028	-0.029	-0.028	-0.035	-0.032	-0.008**	1,399	0.826
	(0.028)	(0.027)	(0.023)	(0.035)	(0.029)	(0.031)	(0.003)		
loan/deposit	-0.234	-1.596	0.752	1.691	1.437	2.418	-1.315	1,399	0.691
	(0.908)	(2.281)	(2.209)	(2.739)	(1.721)	(2.229)	(1.451)		
capital ratio	0.204	0.360	0.127	0.038	0.278	0.605***	0.710**	1,399	0.670
	(0.720)	(0.636)	(0.338)	(0.431)	(0.337)	(0.189)	(0.251)		
provision rate	0.216	-0.076	0.025	-0.205	-0.392	-0.522	-0.442	1,399	0.277
	(0.313)	(0.431)	(0.454)	(0.489)	(0.455)	(0.434)	(0.272)		
npl ratio	0.537	-0.372	-0.503	-1.122	-1.332	-1.676	-0.847	1,399	0.209
	(0.518)	(0.792)	(0.879)	(1.102)	(1.146)	(0.997)	(0.794)		

(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	pre2	post0	post1	post2	post3	post4	cap_inject	N	Adj. R-sq.
branch_adj	3.495*	-27.362	-12.068***	-26.122**	-29.926**	-29.508**	-0.465	1,442	0.969
	(2.061)	(20.065)	(4.456)	(10.590)	(13.725)	(13.546)	(2.251)		
banker	19.686	-105.833**	-201.129***	-294.187***	-344.859***	-333.686***	-23.481	1,441	0.981
	(76.236)	(47.875)	(65.537)	(83.390)	(94.657)	(92.281)	(34.492)		
funding rate	0.006	-0.017***	-0.002	-0.000	-0.013	-0.027	0.015	1,443	0.793
	(0.011)	(0.006)	(0.014)	(0.017)	(0.017)	(0.018)	(0.010)		
overhead/asset	-0.013	-0.072*	-0.028	-0.065	-0.086**	-0.111***	-0.049**	1,443	0.936
	(0.016)	(0.037)	(0.037)	(0.050)	(0.038)	(0.041)	(0.019)		
personnel ex./asset	0.019	-0.028	-0.004	-0.020	-0.025	-0.046	-0.024*	1,370	0.906
	(0.015)	(0.020)	(0.031)	(0.033)	(0.024)	(0.039)	(0.014)		
material ex./asset	-0.168	-0.183	-0.193	-0.217	-0.223	-0.238	-0.030	1,386	0.804
	(0.148)	(0.120)	(0.149)	(0.158)	(0.151)	(0.153)	(0.031)		
mc	-0.000*	-0.005***	-0.004***	-0.004***	-0.004***	-0.004***	0.002***	1,443	0.934
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		
OHR	7.537	0.420	-3.841	15.791	-1.340	-5.599**	-2.705	1,443	0.452
	(4.719)	(3.460)	(6.123)	(18.261)	(2.880)	(2.178)	(1.773)		
interest rate	-0.012	-0.254**	-0.061*	-0.090**	-0.148**	-0.157**	0.032	1,442	0.940
	(0.036)	(0.096)	(0.032)	(0.043)	(0.059)	(0.067)	(0.026)		
gross income	-9.700**	-10.516	-6.902	-13.992	-11.939*	-12.339**	1.749	1,443	0.970
	(4.189)	(9.496)	(6.589)	(8.844)	(6.790)	(6.032)	(1.108)		
ROA	-0.253*	-0.117	-0.016	-0.292	-0.161	-0.126	0.049	1,443	0.865
	(0.142)	(0.165)	(0.140)	(0.287)	(0.118)	(0.084)	(0.040)		

Dependent Variables	pre2	post0	post1	post2	post3	post4	cap_inject	N	Adj. R-sq.
asset	0.054	-0.115***	-0.194***	-0.375***	-0.215	-0.194	-0.548***	1,443	0.929
	(0.047)	(0.029)	(0.057)	(0.102)	(0.166)	(0.174)	(0.205)		
loan	0.075	-0.088*	-0.125**	-0.213*	-0.136	-0.110	-0.389***	1,443	0.937
	(0.059)	(0.049)	(0.055)	(0.126)	(0.149)	(0.145)	(0.123)		
sme loan	0.133	-0.020	-0.044	-0.161	-0.103	-0.026	-0.307***	1,443	0.855
	(0.092)	(0.100)	(0.108)	(0.161)	(0.207)	(0.214)	(0.090)		
deposit	0.042	-0.060***	-0.153***	-0.247***	-0.161	-0.143	-0.415***	1,443	0.947
	(0.036)	(0.014)	(0.027)	(0.084)	(0.117)	(0.123)	(0.144)		
securities	-0.018	-0.015	0.044	0.040	0.076	0.007	-0.021	1,443	0.945
	(0.022)	(0.046)	(0.071)	(0.090)	(0.074)	(0.115)	(0.052)		
JGBs	0.023	-0.007	0.006	-0.001	-0.035	-0.110	0.026	1,443	0.802
	(0.017)	(0.049)	(0.058)	(0.065)	(0.073)	(0.087)	(0.056)		
stocks	-0.003	0.002	-0.000	0.003	0.000	-0.000	0.001	1,443	0.850
	(0.008)	(0.006)	(0.011)	(0.011)	(0.010)	(0.012)	(0.005)		
loan/deposit	0.752	-0.665	0.266	0.074	0.232	0.694	-1.162	1,443	0.734
	(0.894)	(2.183)	(2.330)	(2.733)	(2.584)	(2.428)	(1.357)		
capital ratio	0.124	0.189**	0.488*	1.009**	0.970**	1.119***	0.619**	1,443	0.754
	(0.191)	(0.089)	(0.246)	(0.436)	(0.377)	(0.401)	(0.238)		
provision rate	0.107	0.299	0.298	0.444	0.287	0.239	-0.126	1,443	0.593
	(0.375)	(0.230)	(0.192)	(0.479)	(0.356)	(0.330)	(0.145)		
npl ratio	0.700	1.272	0.635	-0.021	-0.227	-0.593	0.221	1,443	0.713
	(0.974)	(0.863)	(0.562)	(0.283)	(0.306)	(0.410)	(0.396)		

Table 5 Callaway-Sant'Anna results

(a) Full-spec mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Callaway-Sant'Anna estimation with respect to the variable indicated in the first column. Sample consists of banks who never experienced any types of consolidations 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	pre2	post0	post1	post2	post3	post4	N
branch_adj	0.213	-4.992	-7.120	-9.193	-8.425	-14.19*	1,508
	(0.872)	(4.896)	(4.814)	(6.195)	(6.193)	(6.279)	
banker	14.32	-65.81**	-102.7**	-97.70*	-121.9*	-142.1	1,507
	(34.78)	(24.90)	(35.73)	(42.61)	(52.08)	(81.30)	
funding rate	-0.0259	0.00519	0.00645	0.00458	0.00969	0.00873	1,509
	(0.0226)	(0.00667)	(0.0124)	(0.00931)	(0.0134)	(0.0172)	
overhead_a	0.0107	-0.0433	-0.0202	-0.0233	-0.0363	-0.0304	1,509
	(0.0163)	(0.0320)	(0.0348)	(0.0360)	(0.0342)	(0.0277)	
mc	-0.000353	-0.00228*	-0.00256**	-0.00269**	-0.00282**	-0.00384**	1,509
	(0.000253)	(0.000921)	(0.000957)	(0.000946)	(0.000991)	(0.00123)	
OHR	-11.95	21.24	-2.400	-6.362*	-3.210	1.660	1,509
	(10.62)	(15.48)	(2.136)	(2.857)	(2.538)	(1.293)	
gross income	7.991	-33.32	-2.253	-1.329	-2.866	-6.479**	1,509
	(6.453)	(24.88)	(2.176)	(2.817)	(2.023)	(2.017)	
interest rate	-0.00811	-0.0598	-0.0187	-0.0309	-0.0477	-0.131**	1,508
	(0.0103)	(0.0478)	(0.0489)	(0.0570)	(0.0645)	(0.0485)	
ROA	0.186	-0.512	-0.000133	0.0538	-0.00663	-0.0693	1,509
	(0.157)	(0.348)	(0.0683)	(0.0714)	(0.0676)	(0.0620)	

Dependent Variables	pre2	post0	post1	post2	post3	post4	N
asset	-0.0223	-0.0625	-0.0182	0.0223	0.150	0.264	1,509
	(0.0765)	(0.0635)	(0.109)	(0.164)	(0.191)	(0.301)	
loan	0.00326	0.0215	0.0900	0.119	0.152	0.319	1,509
	(0.0499)	(0.0413)	(0.0685)	(0.0889)	(0.113)	(0.234)	
SME loans	-0.00832	0.462	0.473	0.566	0.573	0.767	1,509
	(0.0954)	(0.387)	(0.403)	(0.391)	(0.397)	(0.435)	
deoposit	-0.00398	-0.0623*	-0.0763**	-0.0978**	-0.127*	-0.171*	1,509
	(0.0488)	(0.0299)	(0.0286)	(0.0336)	(0.0550)	(0.0691)	
JGBs	0.000989	-0.00920	-0.00936	-0.00846	-0.0163	-0.0130	1,509
	(0.00388)	(0.00784)	(0.00988)	(0.0132)	(0.0127)	(0.0134)	
stocks	0.0514	0.0200	0.0606	0.0666	0.138	0.230	1,509
	(0.0401)	(0.0384)	(0.0670)	(0.0834)	(0.113)	(0.167)	
l_d	-1.472	-0.505	0.383	1.090	0.638	1.908	1,509
	(1.147)	(0.837)	(0.856)	(1.072)	(1.046)	(1.684)	
capital_ratio	0.0720	0.231*	0.296**	0.363*	0.370	0.591	1,509
	(0.0858)	(0.105)	(0.104)	(0.172)	(0.221)	(0.377)	
provision rate	0.184	0.171	0.0822	-0.00204	-0.109	-0.181	1,509
	(0.170)	(0.256)	(0.192)	(0.188)	(0.158)	(0.182)	
npl_ratio	0.771	-0.395	-0.712	-0.953	-1.033	-1.342*	1,509
	(0.573)	(0.378)	(0.501)	(0.611)	(0.601)	(0.680)	

(b) BHC establishment

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Callaway-Sant'Anna estimation with respect to the 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	pre2	post0	post1	post2	post3	post4	N
branch_adj	0.434	-0.0921	-0.358	0.228	0.262	-1.116	1,656
	(0.274)	(0.524)	(0.790)	(0.996)	(1.208)	(1.672)	
banker	-15.63	-4.195	-17.27	-34.52	-33.94	-63.52	1,661
	(12.04)	(16.88)	(26.41)	(26.04)	(45.92)	(48.74)	
funding rate	0.00796	-0.00137	-0.00238	-0.0116	-0.0118	-0.00688	1,663
	(0.00421)	(0.00641)	(0.0107)	(0.0116)	(0.0129)	(0.0121)	
overhead_a	0.00482	-0.00973	-0.0364	-0.0438	-0.0555	-0.0546*	1,663
	(0.00799)	(0.0196)	(0.0227)	(0.0314)	(0.0288)	(0.0274)	
mc	-0.0000800	-0.000195	-0.000412	-0.000643	-0.000876	-0.00164*	1,663
	(0.0000952)	(0.000128)	(0.000285)	(0.000379)	(0.000512)	(0.000741)	
OHR	1.433	-7.155*	-9.833**	-9.151**	-7.888*	-9.003*	1,663
	(1.592)	(2.833)	(3.159)	(3.479)	(3.777)	(3.829)	
interest rate	0.00389	-0.00588	-0.0119	-0.0258	-0.0495*	-0.0626*	1,662
	(0.0146)	(0.00929)	(0.0125)	(0.0179)	(0.0221)	(0.0247)	
gross income	0.141	0.357	-0.0987	-2.097	-0.438	-1.325	1,663
	(0.846)	(1.238)	(1.561)	(2.205)	(2.163)	(3.384)	
ROA	-0.0306	0.110*	0.119	0.0879	0.0734	0.0777	1,663
	(0.0338)	(0.0562)	(0.0679)	(0.0563)	(0.0599)	(0.0587)	

Dependent Variables	pre2	post0	post1	post2	post3	post4	N
asset	0.110	0.0841	0.152	0.219	0.286	0.583	1,663
	(0.103)	(0.0753)	(0.0846)	(0.129)	(0.164)	(0.351)	
loan	0.0215	0.0471	0.100	0.156	0.213	0.278	1,663
	(0.0222)	(0.0298)	(0.0665)	(0.0883)	(0.119)	(0.150)	
SME loans	0.116*	0.0558*	0.0946	-0.0310	-0.0173	0.0325	1,663
	(0.0566)	(0.0263)	(0.0498)	(0.167)	(0.186)	(0.206)	
deoposit	-0.00823	-0.0355	-0.0575	-0.0551	-0.0409	0.0138	1,663
	(0.0245)	(0.0302)	(0.0494)	(0.0495)	(0.0560)	(0.0471)	
JGBs	0.00435	-0.00914	-0.0294	-0.0345*	-0.0349*	-0.0256**	1,663
	(0.00485)	(0.00489)	(0.0156)	(0.0152)	(0.0148)	(0.00872)	
stocks	0.0135	0.0283	0.0878	0.148	0.187	0.283	1,663
	(0.0278)	(0.0273)	(0.0644)	(0.106)	(0.141)	(0.224)	
l_d	0.395	0.723	1.178	1.071	2.252	2.579	1,663
	(0.541)	(0.594)	(1.014)	(1.014)	(1.345)	(1.380)	
capital_ratio	-0.240**	0.0588	0.454	0.306	0.408	0.429	1,663
	(0.0922)	(0.103)	(0.363)	(0.330)	(0.415)	(0.437)	
provision rate	0.0661	-0.0790	-0.173	-0.190	-0.286	-0.215	1,663
	(0.0591)	(0.0787)	(0.139)	(0.128)	(0.173)	(0.198)	
npl_ratio	0.0259	-0.258*	-0.442	-0.502	-0.497	-0.280	1,663
	(0.122)	(0.129)	(0.323)	(0.272)	(0.284)	(0.326)	

(c) In-market mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Callaway-Sant'Anna estimation with respect to the variable indicated in the first column. 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	pre2	post0	post1	post2	post3	post4	N
branch_adj	-0.706	-17.96**	-22.26***	-28.84***	-27.70***	-29.87***	1,386
	(2.357)	(6.577)	(2.653)	(5.447)	(6.271)	(7.973)	
banker	10.32	-106.6***	-166.5***	-227.1***	-243.3***	-257.5**	1,397
	(45.10)	(23.22)	(19.25)	(37.06)	(65.90)	(96.49)	
funding rate	-0.00673	-0.00197	0.0103	0.0204	0.0380*	0.0481*	1,399
	(0.0112)	(0.00823)	(0.0263)	(0.0199)	(0.0191)	(0.0233)	
overhead_a	0.0267	-0.116**	-0.0747	-0.0548	-0.0457	-0.0133	1,399
	(0.0282)	(0.0390)	(0.0557)	(0.0653)	(0.0693)	(0.0530)	
mc	0.0000115	-0.00333***	-0.00389***	-0.00395***	-0.00425***	-0.00453***	1,399
	(0.000119)	(0.000795)	(0.000970)	(0.000872)	(0.00101)	(0.00117)	
OHR	-0.342	28.39	-3.331	-5.502	-3.409	1.155	1,399
	(3.972)	(26.30)	(2.384)	(6.281)	(4.136)	(1.611)	
interest rate	3.781	-75.99	-4.411***	-4.147	-3.985*	-6.841	1,399
	(7.444)	(56.83)	(0.793)	(4.330)	(1.609)	(3.492)	
gross income	0.0138	-0.157***	-0.0239	-0.0410**	-0.0640**	-0.0897***	1,386
	(0.00874)	(0.0375)	(0.0153)	(0.0158)	(0.0228)	(0.0236)	
ROA	0.0491	-1.025	-0.0288	0.0105	0.00769	-0.00301	1,399
	(0.161)	(0.708)	(0.0342)	(0.0654)	(0.0303)	(0.0555)	

Dependent Variables	pre2	post0	post1	post2	post3	post4	N
asset	0.0370	-0.0699	-0.0344	0.0291	0.157	0.427	1,399
	(0.0889)	(0.0895)	(0.164)	(0.256)	(0.301)	(0.503)	
loan	0.0104	0.0401	0.0723	0.110	0.120	0.351	1,399
	(0.0784)	(0.0543)	(0.0876)	(0.131)	(0.161)	(0.391)	
SME loans	-0.145	1.183	1.230	1.368	1.410	1.458	1,399
	(0.0851)	(0.884)	(0.907)	(0.838)	(0.831)	(0.815)	
deposit	-0.102	-0.0832*	-0.0909**	-0.115*	-0.129	-0.209**	1,399
	(0.0969)	(0.0407)	(0.0333)	(0.0507)	(0.0889)	(0.0811)	
JGBs	0.00256	-0.0204	-0.0244	-0.0207	-0.0260	-0.0261	1,399
	(0.00924)	(0.0182)	(0.0224)	(0.0269)	(0.0262)	(0.0239)	
stocks	0.0215	0.0555	0.127**	0.132***	0.194***	0.195***	1,399
	(0.0415)	(0.0525)	(0.0387)	(0.0387)	(0.0523)	(0.0507)	
l_d	-0.367	-1.431	0.522	1.243	1.875	3.136	1,399
	(0.307)	(1.570)	(1.748)	(2.358)	(2.449)	(3.102)	
capital_ratio	0.226	0.160	0.403*	0.452	0.491	0.774	1,399
	(0.124)	(0.244)	(0.159)	(0.251)	(0.330)	(0.407)	
provision rate	0.0814	0.194	0.0697	-0.0848	-0.176	-0.256	1,399
	(0.215)	(0.281)	(0.295)	(0.339)	(0.337)	(0.360)	
npl_ratio	0.294	0.306	-0.166	-0.473	-0.529	-0.799	1,399
	(0.249)	(0.480)	(0.675)	(0.744)	(0.732)	(0.674)	

(d) cross-market mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Callaway-Sant'Anna estimation with respect to the variable indicated in the first column. Sample consists of banks who never experienced any types of consolidations and those have 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	pre2	post0	post1	post2	post3	post4	N
branch_adj	0.257	2.618	1.655	2.222	2.680	-2.816*	1,442
	(0.505)	(3.794)	(3.748)	(3.946)	(3.756)	(1.242)	
banker	15.35	-41.34	-64.33	-21.73	-50.89	-59.61	1,441
	(49.38)	(32.19)	(47.01)	(26.90)	(47.08)	(97.22)	
funding rate	-0.0378	0.00880	0.00366	-0.00497	-0.00748	-0.0206*	1,443
	(0.0345)	(0.00934)	(0.0116)	(0.00692)	(0.0136)	(0.00879)	
overhead_a	0.000533	0.0000178	0.0126	-0.00500	-0.0313	-0.0437	1,443
	(0.0189)	(0.0323)	(0.0374)	(0.0400)	(0.0351)	(0.0257)	
mc	-0.000598	-0.00165	-0.00178	-0.00194	-0.00198	-0.00333	1,443
	(0.000359)	(0.00132)	(0.00129)	(0.00131)	(0.00132)	(0.00192)	
OHR	-18.88	16.56	-1.840	-6.946**	-3.083	2.021	1,443
	(16.08)	(18.54)	(2.833)	(2.439)	(3.157)	(1.862)	
interest rate	-0.0230*	-0.00120	-0.0166	-0.0254	-0.0392	-0.163*	1,442
	(0.00947)	(0.0590)	(0.0770)	(0.0900)	(0.102)	(0.0780)	
gross income	10.34	-7.483	-1.005	0.243	-2.299	-6.255**	1,443
	(9.242)	(7.295)	(3.183)	(3.449)	(3.034)	(2.301)	
ROA	0.266	-0.198	0.0175	0.0797	-0.0161	-0.119	1,443
	(0.225)	(0.269)	(0.106)	(0.103)	(0.106)	(0.0918)	

Dependent Variables	pre2	post0	post1	post2	post3	post4	N
asset	-0.120	-0.0524	0.00993	0.0130	0.142	0.0474	1,443
	(0.118)	(0.0789)	(0.0920)	(0.107)	(0.0978)	(0.112)	
loan	-0.00802	-0.00784	0.125	0.140	0.212	0.277	1,443
	(0.0237)	(0.0578)	(0.107)	(0.0917)	(0.127)	(0.160)	
SME loans	-0.145	1.183	1.230	1.368	1.410	1.458	1,443
	(0.0851)	(0.884)	(0.907)	(0.838)	(0.831)	(0.815)	
deposit	-0.102	-0.0832*	-0.0909**	-0.115*	-0.129	-0.209**	1,443
	(0.0969)	(0.0407)	(0.0333)	(0.0507)	(0.0889)	(0.0811)	
JGBs	0.00256	-0.0204	-0.0244	-0.0207	-0.0260	-0.0261	1,443
	(0.00924)	(0.0182)	(0.0224)	(0.0269)	(0.0262)	(0.0239)	
stocks	0.0215	0.0555	0.127**	0.132***	0.194***	0.195***	1,443
	(0.0415)	(0.0525)	(0.0387)	(0.0387)	(0.0523)	(0.0507)	
l_d	-0.367	-1.431	0.522	1.243	1.875	3.136	1,443
	(0.307)	(1.570)	(1.748)	(2.358)	(2.449)	(3.102)	
capital_ratio	0.226	0.160	0.403*	0.452	0.491	0.774	1,443
	(0.124)	(0.244)	(0.159)	(0.251)	(0.330)	(0.407)	
provision rate	0.251	0.164	0.0965	0.0570	-0.0609	-0.120	1,443
	(0.233)	(0.369)	(0.244)	(0.206)	(0.133)	(0.144)	
npl_ratio	1.069	-0.811	-1.034	-1.242	-1.338	-1.756	1,443
	(0.876)	(0.430)	(0.641)	(0.833)	(0.816)	(1.022)	

Table 6 Sun-Abraham results

(a) Full-spec mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Sun-Abraham estimation with respect to the variable indicated in the first column. The public capital injection is not controlled. Sample consists of banks who never experienced any types of consolidations 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.

	pre2	post0	post1	post2	post3	post4	N
branch_adj	2.354	-23.95	-16.05***	-27.13***	-29.14**	-29.84**	1508
	(3.005)	(12.79)	(4.176)	(7.543)	(9.181)	(9.359)	
banker	20.97	-103.4	-189.8**	-266.4***	-308.6***	-307.1***	1507
	(80.44)	(68.55)	(72.60)	(77.12)	(81.14)	(91.54)	
funding rate	0.0116	-0.0114	0.00244	0.00542	0.00593	0.00107	1509
	(0.0273)	(0.0272)	(0.0291)	(0.0290)	(0.0296)	(0.0314)	
overhead_a	-0.0175	-0.0877*	-0.0454	-0.0539	-0.0693	-0.0743	1509
	(0.0391)	(0.0432)	(0.0486)	(0.0527)	(0.0517)	(0.0497)	
mc	0.0000508	-0.00411**	-0.00423**	-0.00424**	-0.00438**	-0.00454**	1509
	(0.000970)	(0.00133)	(0.00133)	(0.00131)	(0.00134)	(0.00138)	
OHR	3.312	11.07	-3.436	8.283	-1.789	-2.800	1509
	(5.400)	(12.25)	(5.771)	(9.550)	(5.355)	(4.958)	
interest rate	-0.00668	-0.218*	-0.0475	-0.0769	-0.117	-0.132	1508
	(0.0771)	(0.0952)	(0.0762)	(0.0785)	(0.0823)	(0.0841)	
gross income	-4.452	-35.15	-6.177	-10.61	-9.366	-10.51*	1509
	(4.238)	(24.94)	(4.925)	(5.914)	(5.165)	(4.741)	
ROA	-0.136	-0.460	-0.0240	-0.186	-0.104	-0.0848	1509
	(0.113)	(0.332)	(0.113)	(0.168)	(0.110)	(0.0996)	

	pre2	post0	post1	post2	post3	post4	N
asset	-0.0209	-0.0838	-0.108	-0.148	-0.0555	-0.0852	1509
	(0.393)	(0.389)	(0.390)	(0.393)	(0.391)	(0.394)	
loan	0.0177	-0.0527	-0.0256	-0.0225	0.00975	0.0471	1509
	(0.231)	(0.228)	(0.232)	(0.232)	(0.234)	(0.240)	
SME loans	0.0708	0.430	0.430	0.453	0.467	0.528	1509
	(0.275)	(0.479)	(0.492)	(0.490)	(0.491)	(0.486)	
deposit	0.000849	-0.0349	-0.0293	-0.0449	-0.0683	-0.145	1509
	(0.0648)	(0.0703)	(0.0703)	(0.0715)	(0.0803)	(0.0836)	
jgbs	0.00788	-0.00648	-0.00965	-0.00623	-0.0101	-0.0103	1509
	(0.0219)	(0.0221)	(0.0232)	(0.0239)	(0.0238)	(0.0237)	
stocks	0.0115	-0.0111	-0.0403	-0.0435	-0.0112	-0.00395	1509
	(0.279)	(0.277)	(0.279)	(0.278)	(0.280)	(0.280)	
l_d	0.174	-0.929	0.346	0.690	0.859	1.610	1509
	(2.033)	(2.281)	(2.370)	(2.304)	(2.334)	(2.379)	
capital_ratio	0.224	0.172	0.450	0.712*	0.770*	0.981**	1509
	(0.338)	(0.313)	(0.328)	(0.346)	(0.356)	(0.365)	
provision rate	0.0328	0.257	0.205	0.264	0.114	0.0588	1509
	(0.346)	(0.323)	(0.315)	(0.338)	(0.318)	(0.315)	
npl_ratio	0.398	0.907	0.320	-0.211	-0.348	-0.673	1509
	(0.795)	(0.679)	(0.636)	(0.633)	(0.658)	(0.688)	

(b) BHC establishment

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Sun-Abraham estimation with respect to the variable indicated in the first column. The public capital injection is not controlled. 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.

	pre2	post0	post1	post2	post3	post4	N
branch_adj	0.447	-0.0237	-0.323	0.205	0.381	-0.974	1656
	(2.014)	(2.023)	(2.072)	(2.154)	(2.217)	(2.382)	
banker	-4.585	-2.924	-15.85	-31.70	-28.14	-56.70	1661
	(53.84)	(47.71)	(49.11)	(48.53)	(57.66)	(61.06)	
funding rate	-0.00367	-0.00131	-0.00197	-0.0110	-0.0115	-0.00661	1663
	(0.0202)	(0.0205)	(0.0203)	(0.0210)	(0.0214)	(0.0223)	
overhead_a	0.0123	-0.00921	-0.0357	-0.0419	-0.0534	-0.0520	1663
	(0.0286)	(0.0319)	(0.0336)	(0.0383)	(0.0371)	(0.0356)	
mc	0.000117	-0.000197	-0.000385	-0.000598	-0.000841	-0.00158	1663
	(0.000789)	(0.000789)	(0.000795)	(0.000806)	(0.000826)	(0.000904)	
OHR	-5.225	-7.124	-9.802*	-9.003	-8.089	-9.039	1663
	(4.229)	(4.099)	(4.190)	(4.611)	(4.589)	(4.726)	
interest rate	0.00390	-0.00699	-0.0128	-0.0259	-0.0498	-0.0613	1662
	(0.0557)	(0.0555)	(0.0558)	(0.0561)	(0.0560)	(0.0562)	
gross income	0.919	0.251	-0.0678	-2.186	-0.294	-1.250	1663
	(2.438)	(2.203)	(2.267)	(2.350)	(2.508)	(3.008)	
ROA	0.0983	0.110	0.119	0.0885	0.0782	0.0820	1663
	(0.0796)	(0.0721)	(0.0761)	(0.0720)	(0.0721)	(0.0745)	

	pre2	post0	post1	post2	post3	post4	N
asset	-0.0158	0.0844	0.137	0.195	0.264	0.554	1663
	(0.344)	(0.345)	(0.345)	(0.348)	(0.352)	(0.374)	
loan	-0.0304	0.0476	0.0940	0.145	0.205	0.265	1663
	(0.186)	(0.186)	(0.187)	(0.189)	(0.194)	(0.195)	
SME loans	-0.0838	0.0586	0.0950	-0.0317	-0.0121	0.0329	1663
	(0.202)	(0.200)	(0.200)	(0.252)	(0.259)	(0.266)	
deposit	0.00967	-0.0348	-0.0577	-0.0553	-0.0407	0.0136	1663
	(0.0482)	(0.0510)	(0.0546)	(0.0526)	(0.0542)	(0.0517)	
jgbs	-0.00954	-0.00898	-0.0290	-0.0341*	-0.0347*	-0.0252	1663
	(0.0158)	(0.0151)	(0.0168)	(0.0167)	(0.0167)	(0.0161)	
stocks	-0.0702	0.0326	0.0879	0.146	0.187	0.278	1663
	(0.232)	(0.231)	(0.232)	(0.236)	(0.243)	(0.253)	
l_d	0.981	0.701	1.096	0.883	2.125	2.379	1663
	(1.715)	(1.715)	(1.726)	(1.734)	(1.808)	(1.852)	
capital_ratio	0.119	0.0523	0.449	0.303	0.403	0.429	1663
	(0.348)	(0.243)	(0.402)	(0.330)	(0.362)	(0.384)	
provision rate	-0.0663	-0.0792	-0.175	-0.186	-0.286	-0.213	1663
	(0.243)	(0.237)	(0.239)	(0.240)	(0.259)	(0.267)	
npl_ratio	0.227	-0.265	-0.452	-0.496	-0.492	-0.269	1663
	(0.517)	(0.480)	(0.486)	(0.488)	(0.493)	(0.493)	

(c) In-market mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Sun-Abraham estimation with respect to the variable indicated in the first column. The public capital injection is not controlled. 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	pre2	post0	post1	post2	post3	post4	N
branch_adj	0.590	-17.91*	-22.27***	-28.91***	-27.81***	-29.93***	1398
	(4.601)	(7.841)	(5.085)	(6.951)	(7.618)	(9.024)	
banker	22.76	-104.8	-167.6	-226.0*	-241.4*	-255.9	1397
	(104.8)	(93.16)	(91.92)	(96.85)	(110.7)	(131.9)	
funding rate	0.0216	-0.00199	0.0102	0.0208	0.0385	0.0484	1399
	(0.0448)	(0.0450)	(0.0512)	(0.0482)	(0.0476)	(0.0495)	
overhead_a	-0.0245	-0.115	-0.0746	-0.0547	-0.0435	-0.0140	1399
	(0.0635)	(0.0730)	(0.0832)	(0.0898)	(0.0936)	(0.0802)	
mc	0.000440	-0.00333	-0.00391*	-0.00398*	-0.00428*	-0.00455*	1399
	(0.00157)	(0.00175)	(0.00183)	(0.00178)	(0.00185)	(0.00194)	
OHR	-3.620	28.33	-3.235	-5.560	-3.433	1.077	1399
	(7.630)	(27.31)	(7.895)	(9.847)	(8.575)	(7.702)	
interest rate	0.00412	-0.157	-0.0235	-0.0407	-0.0643	-0.0891	1398
	(0.124)	(0.129)	(0.124)	(0.124)	(0.125)	(0.125)	
gross income	4.141	-75.91	-4.728	-4.165	-4.019	-6.835	1399
	(4.980)	(56.98)	(4.743)	(6.347)	(4.883)	(5.747)	
ROA	0.0582	-1.023	-0.0316	0.0116	0.0108	-0.00290	1399
	(0.141)	(0.719)	(0.140)	(0.151)	(0.139)	(0.146)	

Dependent Variables	pre2	post0	post1	post2	post3	post4	N
asset	-0.132	-0.0542	0.0206	0.0233	0.151	0.0517	1399
	(0.644)	(0.638)	(0.638)	(0.642)	(0.638)	(0.641)	
loan	-0.0684	-0.00652	0.130	0.146	0.217	0.281	1399
	(0.372)	(0.372)	(0.381)	(0.377)	(0.386)	(0.398)	
SME loans	0.00501	1.184	1.232	1.366	1.411	1.459	1399
	(0.452)	(0.993)	(1.012)	(0.950)	(0.945)	(0.933)	
deposit	-0.0382	-0.0842	-0.0916	-0.114	-0.127	-0.208	1399
	(0.112)	(0.110)	(0.106)	(0.113)	(0.134)	(0.129)	
jgbs	0.0252	-0.0206	-0.0246	-0.0207	-0.0265	-0.0263	1399
	(0.0368)	(0.0388)	(0.0409)	(0.0434)	(0.0431)	(0.0418)	
stocks	-0.0279	0.0559	0.136	0.139	0.200	0.200	1399
	(0.459)	(0.459)	(0.455)	(0.457)	(0.456)	(0.456)	
l_d	-0.782	-1.411	0.511	1.270	1.877	3.120	1399
	(3.446)	(3.666)	(3.742)	(4.057)	(4.082)	(4.509)	
capital_ratio	0.376	0.163	0.399	0.453	0.479	0.769	1399
	(0.592)	(0.564)	(0.531)	(0.567)	(0.603)	(0.647)	
provision rate	-0.0899	0.192	0.0634	-0.0888	-0.185	-0.262	1399
	(0.554)	(0.574)	(0.579)	(0.601)	(0.597)	(0.612)	
npl_ratio	-0.0874	0.311	-0.164	-0.472	-0.534	-0.795	1399
	(1.022)	(1.111)	(1.205)	(1.242)	(1.230)	(1.202)	

(e) cross-market mergers

(Notes) Each row lists the estimated coefficient and bank-year clustered standard errors (in parentheses) of each Sun-Abraham estimation with respect to the variable indicated in the first column. The public capital injection is not controlled. Sample consists of banks who never experienced any types of consolidations and those have 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	pre2	post0	post1	post2	post3	post4	N
branch_adj	3.647	-27.58	-12.34*	-26.34*	-30.01*	-29.91*	1442
	(3.895)	(20.30)	(5.649)	(11.33)	(14.07)	(14.10)	
banker	22.12	-105.8	-203.7*	-291.1*	-346.5**	-336.1**	1441
	(105.0)	(87.75)	(99.59)	(113.3)	(121.3)	(120.6)	
funding rate	0.00567	-0.0169	-0.00197	-0.00329	-0.0129	-0.0269	1443
	(0.0360)	(0.0349)	(0.0368)	(0.0378)	(0.0395)	(0.0393)	
overhead_a	-0.0126	-0.0713	-0.0278	-0.0548	-0.0840	-0.110	1443
	(0.0502)	(0.0603)	(0.0600)	(0.0657)	(0.0620)	(0.0637)	
mc	-0.000194	-0.00457*	-0.00441*	-0.00438*	-0.00441*	-0.00450*	1443
	(0.00124)	(0.00184)	(0.00183)	(0.00182)	(0.00185)	(0.00189)	
OHR	7.454	0.396	-3.891	16.58	-0.847	-5.686	1443
	(7.576)	(6.941)	(8.580)	(19.82)	(7.064)	(6.437)	
interest rate	-0.0127	-0.255	-0.0616	-0.0990	-0.149	-0.159	1442
	(0.102)	(0.134)	(0.0996)	(0.104)	(0.114)	(0.118)	
gross income	-9.691	-10.61	-6.997	-14.55	-12.33	-12.49	1443
	(5.399)	(10.01)	(7.445)	(9.819)	(7.806)	(7.116)	
ROA	-0.254	-0.118	-0.0165	-0.307	-0.169	-0.127	1443
	(0.177)	(0.195)	(0.175)	(0.316)	(0.166)	(0.139)	

Dependent Variables	pre2	post0	post1	post2	post3	post4	N
asset	0.0463	-0.108	-0.190	-0.252	-0.193	-0.180	1443
	(0.494)	(0.492)	(0.494)	(0.493)	(0.494)	(0.499)	
loan	0.0698	-0.0828	-0.123	-0.128	-0.122	-0.101	1443
	(0.296)	(0.294)	(0.295)	(0.296)	(0.295)	(0.294)	
SME loans	0.131	-0.0170	-0.0456	-0.0996	-0.0954	-0.0248	1443
	(0.356)	(0.358)	(0.361)	(0.364)	(0.366)	(0.369)	
deposit	0.0235	-0.00704	0.00694	-0.00464	-0.0350	-0.109	1443
	(0.0802)	(0.0920)	(0.0966)	(0.0988)	(0.104)	(0.113)	
jgbs	-0.00267	0.00191	-0.000134	0.00284	0.000201	-0.0000178	1443
	(0.0277)	(0.0270)	(0.0286)	(0.0285)	(0.0283)	(0.0289)	
stocks	0.0374	-0.0540	-0.150	-0.155	-0.146	-0.133	1443
	(0.354)	(0.352)	(0.352)	(0.350)	(0.353)	(0.357)	
l_d	0.708	-0.672	0.234	0.291	0.258	0.691	1443
	(2.694)	(3.360)	(3.467)	(3.611)	(3.435)	(3.319)	
capital_ratio	0.126	0.179	0.485	0.873	0.949	1.117*	1443
	(0.437)	(0.404)	(0.466)	(0.566)	(0.571)	(0.561)	
provision rate	0.108	0.304	0.299	0.485	0.302	0.250	1443
	(0.542)	(0.451)	(0.431)	(0.637)	(0.547)	(0.524)	
npl_ratio	0.710	1.283	0.632	-0.0485	-0.224	-0.599	1443
	(1.249)	(1.161)	(0.956)	(0.801)	(0.818)	(0.863)	