The Real Effects of Bank Taxation

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Abstract

Official policy interventions in the banking industry are likely to have implications for funding conditions facing corporates and their resultant strategic investment decisions. In this paper, we investigate whether bank taxation matters for the real economic outcomes of corporate borrowers. Using a large sample of banks matched with listed corporates, we find that banks with a greater tax exposure reduce lending proportionately more than less exposed counterparts. The imposition of bank taxes reduces credit supply, and leads corporates to reduce levels of investment. Moreover, corporate borrowers attempt to hedge against the adverse impact of bank taxes by obtaining funding from other sources. Competitor banks assist corporates in this hedging effort, but this does not alleviate the detrimental impact of bank taxes on corporate investment. Overall, these results suggest that by altering the environment in which corporates operate, taxation of the banking industry has a negative effect on the real economy.

Keywords: Bank taxation, Tokyo bank tax, bank lending, real economy, corporate investment

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1. Introduction

In this paper we investigate the impact of a sudden introduction of a bank tax on the banking sector and real economy in Japan. We assess how banks adjust their balance sheets in response to the higher costs resulting from the tax, and how these adjustments affect the investment decisions of corporate borrowers. To the best of our knowledge, our study is the first to investigate the effects of bank taxation on real economic outcomes.

The recent financial crisis and subsequent slow economic recovery have underlined the importance of analysing how sudden regulatory changes in the banking sector propagate to the real economy. In many countries, there has been a proliferation of new and enhanced bank regulations. These have included tax schemes that are targeted specifically at the banking industry. Aside from representing an important source of government revenue, bank taxes may also be used as a means of altering the behaviour of financial institutions (Devereux et al. 2013).

The net effect of taxes depends crucially on the extent to which banks internalise the increased costs (arising from the taxes) rather than pass these through to customers. For example, if banks pass through costs by reducing the availability of credit or increasing interest rates on borrowed funds, then this is likely to have implications for the ability of borrowing firms to access external finance and execute real investments. As a consequence, understanding how banks respond to changes in taxes, and whether this has implications for corporate-level investment in the corporate sector is of substantive interest to policymakers charged with overseeing developments in the banking industry and real economy.

Assessing the impact of bank taxation on corporate borrowers and the real economy faces two significant challenges. First, tax changes typically lack exogenous cross-sectional variation as they tend to affect all banks within a given jurisdiction at the same time. In this study, we overcome this challenge via an empirical setting where a change in taxation affects some banks but leaves other banks unaffected. Specifically, we focus on the imposition of a local tax which affects banks differently depending on resources deployed in the geographic area where the tax applies. Second, in order to assess the effects of bank taxation on real economic decisions of firms, it is crucial that supply-side factors which impact on the availability of credit can be disentangled from demand-side effects. Rather than using aggregate loan balances recorded on statements of financial position, we instead utilise loan-level data on the individual corporate customers of banks. In our sample (discussed in more detail below) we observe the borrowing activity of approximately 2400 corporates which borrow from an average of seven banks. We exploit the presence of multiple bank-corporate relationships and control for credit demand of corporates by including fixed effects (a strategy pioneered by Khwaja and Mian, 2008). The use of fixed effects allows us to absorb individual demand conditions for credit that may influence bank lending behaviour. By controlling demand conditions using fixed effects, we are able to isolate supply- from demand-side effects.

As an empirical setting we exploit the so-called Tokyo bank tax as a quasi-natural experiment. At the beginning of the fiscal year 2000, large Japanese banks with operations in Tokyo and deposits exceeding ¥5 trillion unexpectedly became liable to pay a tax to the Tokyo government. Under the terms of the Tokyo bank tax, the tax base shifted from net to gross profit, resulting in a considerable widening of the tax base. The Tokyo bank tax was not part of a broader or widely anticipated set of fiscalorms, but was instead specifically targeted at large banks, which represented an important source of funding for corporates. There was considerable variation in the individual tax liabilities of banks subject to the Tokyo bank tax, since the amount payable to the local (Tokyo) government was related directly to the number of employees based in Tokyo.

Our empirical analysis comprises two stages. In the first stage, we investigate the impact of the bank tax on the availability of credit and the likely implications for the investment activity of borrowing firms. In the second stage, we investigate if firms hedge against a decline in credit by borrowing funds from other sources. We complement this via an investigation of how competitor banks adjust their credit supply in response to the Tokyo bank tax. To execute the first stage of our analysis, we use a loan-level dataset to investigate if banks that are more affected by the Tokyo bank tax supply less credit to large corporate borrowers. A priori, we expect that banks with a higher exposure to the Tokyo area (and thus a high Tokyo bank tax liability) tighten credit supply relatively more than less exposed counterparts.¹ We investigate changes in both the likelihood that a new loan is granted, and the amount of credit extended. By means of a corporate-fixed effects estimation strategy, we show that banks more exposed to the Tokyo bank tax reduce lending to corporates. More precisely, the within-corporate comparison reveals that a 10-percentage point increase in a bank's exposure to the tax, reduces lending by 7.95 percentage points.

To finalise the first stage of our empirical analysis, we investigate the implications of changes in the lending patterns of banks for corporate-level investments. In theory, when financing frictions are present, a negative shock to the supply of external finance will impede corporate investment (Holmstroem and Tirole 1997). The effects of such a shock should be more severe for corporates that depend on external finance to fund investment opportunities, and for corporates that face higher costs in acquiring external finance. Using corporate-level data, we quantify the extent to which corporate-level investment is affected by a reduction in credit supplied by banks liable to pay the Tokyo bank tax. We find that a 10-percentage-point increase in corporate exposure to the bank tax results in a reduction in corporate-level investment rate of 0.7 percentage points. This suggests that the imposition of the Tokyo bank tax had a relatively mild impact on corporate investment.

The second stage of our analysis focuses on the impact of the Tokyo bank tax on the hedging behaviour of corporates and related developments in local loan markets. Given that our sample comprises large publically listed corporates, the relatively small effect of the Tokyo bank

¹ Using bank-level data, Banerji et al. (2018 **REF**) find that the imposition of the Tokyo bank tax resulted in additional costs on banks, hampering their ability to function as financial intermediaries, with the resultant negative effect of a rationing in credit quantities.

tax on corporate investment may be in part attributable to the availability of alternative sources of funding. Corporates may make up for any reduction in credit from banks affected by the tax by using internally generated funds, borrowing from other banks, or issuing equity or bonds. Using our corporate-level dataset which we complement with data on corporate equity and bond issuance, we quantify the extent to which corporates compensate for any decline in credit by borrowing funds from elsewhere. We find that corporates do not compensate fully for the decline in credit by using alternative funding sources, and thus experience a mild decline in overall credit.

To finalise the second stage of our analysis, we investigate if competitor banks (which compete in local loan markets with banks liable to the bank tax) assist corporates affected by a decline in credit with their hedging efforts. Exploiting spatial segmentation in local loan markets, we investigate the extent to which regionally operating banks which were exempt from the Tokyo bank tax respond to the bank tax by increasing lending to affected corporates. Our findings suggest that regional banks which compete in local loan markets with banks liable for the bank tax, expand their supply of short-term credit. Overall, the findings from the second stage of the analysis suggest that the increase in the supply of credit from competitor banks is insufficient to alleviate the adverse impact of the Tokyo bank tax on corporate investment.

We undertake a number of additional tests to verify the validity of our main findings. In order to check the plausibility of our common trends assumption, we perform placebo tests in the pre-shock and post-shock period. We also undertake further tests to disentangle credit supply- from demand-side effects. For example, we conduct a sub-sample analysis excluding corporates located in the Tokyo prefecture. This allows us to tackle the problem that demandside factors specific to the Tokyo prefecture are driving the results from our original analysis. Overall, the results of these tests provide support for our main findings. The common trend analysis reveals no systematic differences across corporates in the pre-shock or post-shock period lending strong support to our common trend assumption. The exclusion of non-Tokyo corporates from the sample also produces estimates in line with our original findings that demand-side factors are not driving the results.

Our paper is closely related to the literature which examines the real effects of the taxation of non-financial corporates. The results emanating from this literature suggest that taxation influences: mergers and acquisitions (Auerbach and Reishus 1988); the repatriation of profits (Blouin and Krull 2009; Graham et al. 2011); location decisions (Voget 2010; Barrios et al. 2012); and corporate risk-taking (Ljungqvist et al. 2017). We contribute to this literature via an examination of the effects of bank taxation on non-financial corporates. To the best of our knowledge, the findings presented in our study are the first to document the propagation of bank taxation to the real economy. Specifically, we show that an increase in bank taxation is associated with a reduction in bank lending leading to a decline in corporate-level investment activity.

We also contribute to a growing literature that investigates changes in bank lending to corporates following a regulatory change. A number of studies investigate the impact of bank capital injections for the real economy. For example, in a cross-country study, Laeven and Valencia (2013) show that the recapitalization of banks has a significantly positive effect on the growth of corporates. Giannetti and Simonov (2013) show that the re-capitalisation of Japanese banks in the late 1990s led to an increase in bank lending, followed by an increase in investments by borrowing corporates. Berger and Roman (2017) provide evidence that the purchase of toxic bank assets by the US Treasury (under the terms of the Troubled Asset Relief Programme) improved employment conditions and reduced the rate of corporate bankruptcies. Gropp et al. (2017) investigate the effects of higher capital requirements (by exploiting the 2011 capital exercise by the European Banking Authority) on bank lending to corporate and retail borrowers. The authors provide evidence of a strong link between bank capital and lending. This is particularly evident for corporates that have a high dependence on external finance. Focusing on the international transmission of changes in UK banks capital requirements, Aiyar et al. (2014) find a substantial impact on the supply of cross-border capital. UK banks are found

to reduce cross-border credit in particular to other banks. Finally, Jiménez et al. (2017) investigate the impact of macro-prudential policy measures (introduced in Spain in 2000) on real economic outcomes. The authors provide evidence that dynamic loan loss provisioning smoothes credit cycles, which in turn impacts positively on corporate performance. We augment these aforementioned studies in two ways. First, by using a unique shock that emanates from a sudden imposition of a local tax exclusively targeted at banks, we adopt a research design which allows us to identify the impact of fiscal policy changes on real economic outcomes. Second, by using a sample of large listed corporates from various industries (to investigate the lending decisions of banks following a tax shock) we can rule out the possibility that our empirical results are driven by small bank-dependent borrowers, or by industries where levels of investment are particularly sensitive to a contraction in bank credit. Overall, the findings of this study suggest that bank taxation impacts corporate-level investment via a decline in the availability of credit.

The rest of the paper is structured as follows. Section 2 provides a background to the present study. In Section 3, we present the first stage of the empirical analysis focusing on the impact of bank taxation on credit supply, and how this affects the investment activity of borrowing corporates. Section 4 discusses the second stage of our analysis focusing on the hedging behaviour of corporates and related developments in local loan markets. Section 5 presents the results of various robustness tests. Section 6 provides a summary.

2. The Tokyo Bank Tax

Japanese banks reported large losses for several consecutive years following the banking crisis of 1997. This led to a large decline in the income of the Tokyo prefecture, which

was highly dependent on the tax revenue generated by the financial sector.² To address the decline in tax revenue, the Tokyo Government introduced a new tax targeted at commercial banks operating in Tokyo.

Banks were selected by the Tokyo government based on the amount of deposits held (at the end of fiscal year 1999). Banks with deposits exceeding ¥5 trillion and operations in Tokyo (branches or headquarters) were deemed liable to pay the Tokyo bank tax. The tax was levied on gross profitability (before personnel expense, operating expense and loan write-off deductions) weighted by the scale of respective presence in the Tokyo prefecture. According to the Handbook of Japanese Taxes, the tax amount payable to the Tokyo government is calculated based on the ratio of employees in Tokyo relative to the total number of domestic employees (Japanese Ministry of Finance, 2006). This ratio varied across banks liable to pay the Tokyo bank tax ranging from a 0.01 to 0.72. Figure 1 shows the variation of this ratio across the banks that were affected by the Tokyo bank tax.

[Insert Figure 1 about here]

At the time when the tax was introduced, the gross profitability of banks was relatively high (caused by the implementation of large-scale restructuring programs which reduced high administrative expenses). However, aggressive loan loss provisioning and write-offs policies led banks to report small net profits during this period (Ota 2001). Thus, higher tax rates on net profit were unlikely to yield extra tax revenues. Taxing gross rather than net profits removed the possibility that banks could minimise their respective tax exposure by inflating expenses, and thus ensured a stable stream of tax revenue for the Tokyo government.

The tax became effective on 1st April 2000, but was declared void two years later by the Tokyo District Court on the grounds that it violated the right to equal treatment (Article 14 of the Japanese Constitution).³ Figure 2 provides a chronology of key events of the Tokyo bank tax.

² In fiscal year 1999, Tokyo's estimated revenue shortfall amounted to ¥700 billion.

[Insert Figure 2 about here]

3. Impact of Bank Taxation on Bank Lending and Firm Investment

In the first stage of our empirical investigation, we exploit the imposition of the Tokyo bank tax to identify the impact of bank taxation on lending and corporate level investment. Our empirical strategy is outlined in Section 3.1. In Section 3.2, we present the data. Section 3.3 discusses the findings.

3.1 Empirical Strategy

To identify the impact of taxation on the supply of credit to corporates, we follow Khwaja and Mian (2008) and compare changes in credit across banks for each corporate.⁴ Specifically, we test whether banks with a relatively greater exposure to the Tokyo bank tax reduce lending to the *same* corporate by more than banks less exposed to the tax. Furthermore, we use a loan-level dataset to exploit the fact that Japanese corporates typically hold credit relationships with multiple banks. By focusing on a sample of corporates that borrow from multiple banks, corporate-specific credit demand shocks can be absorbed through introducing corporate-fixed effects to the following model:

$$\Delta Credit_{ij} = a_i + \beta BEX_j + \delta X_j + \epsilon_{ij} \tag{1}$$

where $\Delta Credit_{ij}$, is the change in credit granted to corporate *i* by bank *j* after the imposition of the Tokyo bank tax. a_i is the corporate-fixed effect that absorbs a credit demand shock specific to an individual corporate. BEX_j is the bank's exposure to the Tokyo bank tax, measured as the number of employees based in Tokyo relative to total number of employees in fiscal year 2000.

³ The right to equal treatment ensures that firms are treated equally. Thus a tax that affects some firms, but excludes others is unlawful.

⁴Khwaja and Mian (2008) provide the theoretical and empirical foundations underlying empirical studies on the bank lending channel and its impact on the real economy. By exploiting the presence of multiple corporate relationships in loan-level dataset, their proposed estimation strategy allows for the control of demand-side effects.

The vector of bank-specific control variables, X_j , include: capital-to-assets, return on equity, liquidity-to-assets, bank size and loan loss provisions-to-total-loans.

To capture both changes in credit granted and the likelihood that a new loan is granted we employ different credit growth measures. *Credit growth* is defined as the change in the total outstanding credit granted to each corporate in the sample between fiscal year 1999 and fiscal year 2001 over total credit outstanding in fiscal year 1999 (pre-shock period). We also add the two components of credit: short-term and long-term credit. Finally, we add two additional indicator variables. *Entry* takes the value of one if the corporate receives credit from a new bank in the second year of the Tokyo bank tax but had no outstanding credit from that bank in the year before the imposition of the tax, and zero if otherwise. *Exit* takes the value of one if the bank-corporate relationship terminated in the second year of the Tokyo bank tax, and zero otherwise.

As a next step, we exploit the imposition of the Tokyo bank tax to identify how corporate investment responds to bank taxation. Specifically, we examine if corporates affected by the tax via their banks, change their investment activity following the imposition of the Tokyo bank tax.

To identify the impact of bank taxation on corporate-level investment, we compare the changes in the investment rate across corporates. We classify corporates as affected by the Tokyo bank tax based upon their relative exposure to banks that are liable to pay the tax. Firm exposure is calculated for the fiscal year prior to the introduction of the Tokyo bank tax as follows:

$$FEX_i = \sum_j w_{ij,1999} * BEX_{j,1999}$$
(2)

where corporate exposure FEX_i depends upon BEX_j , which is defined as bank exposure to the Tokyo bank tax (measured as the number of employees based in Tokyo relative to total number of employees). w_{ij} is the share of credit the corporate borrows from each bank relative to total debt (as reported in the balance sheet). Using *FEX* as a measure to determine the corporate-level exposure to the tax via its borrowing relationships, we then estimate the following:

$$INV_i = a + \beta FEX_i + \gamma X_i + \epsilon_i \tag{3}$$

where *INV_i* is the sum of investment flows after the shock, normalised by the beginning-ofperiod assets. The vector of control variables X_i includes industry fixed effects, a set of corporate-specific credit demand parameters, and a set of proxies for corporate growth opportunities and frictions to capital accumulation prior to the imposition of the Tokyo bank tax. Conditional on corporate exposure being exogenous to corporate investment decisions, estimates of β are used to infer the aggregate influence of the tax shock on the capital accumulation of corporates in the sample.

3.2 Data

We obtain loan-level data from the Nikkei NEEDS Financial Quest database for the period fiscal year 1999 to 2002. This period comprises one pre-treatment year, two treatment years, and one post-treatment year. The loan-level dataset comprises detailed annual information on the credit granted to Japanese listed corporates by each of their banks. Corporates report total bank debt, which can be decomposed into short-term (due within less than one year) and long-term components.⁵ We match this loan-level dataset with two further datasets. This first dataset contains bank-level balance sheet, income statement items and other attributes (location of corporate headquarter). The second dataset contains corporate-level balance sheet, income statement, and other attributes (associated industry and location of corporate headquarters). Finally, we hand-collect data on the number of Tokyo-based employees from the annual reports of banks liable for the Tokyo bank tax.

To obtain our baseline sample, we select all listed non-financial corporates and banks for which information on total assets are available for the year prior to the introduction of the Tokyo bank tax. Following Khwaja and Mian (2008), we restrict the analysis to corporates that

⁵ The credit reported is actually drawn credit in year *t*; undrawn credit is not reported.

borrowed from at least two banks and drop all corporates with a single bank relationship.⁶ This yields a baseline sample of 2368 non-financial publically listed corporates active in fiscal year 2000, which receive loans from 140 different banks. We observe that corporates on average borrow from 7 banks. 26 out of 140 banks in the baseline sample are liable to pay the Tokyo bank tax.

For our analysis of the impact of the Tokyo bank tax on corporate investment outcomes, we first use our baseline sample to calculate *corporate exposure*. We then amend the baseline sample by collapsing multiple bank relationships to corporate *i* into a single "average" bank relationship to corporate *i*. To construct this "average" bank, we sum all loans issued to corporate *i* by each of its banks in a given year and take the average of those banks' characteristics. This yields a cross-sectional time series dataset with the corporate as the cross-sectional unit borrowing from a single, synthetically created bank. The sample consists of the original 2368 corporates from our baseline sample. In a final step, we add to this dataset the estimates of the fixed effects from the first part of our analysis. Table 1 provides detailed definitions of both our outcome and control variables. Table 2 reports descriptive statistics. In the Appendix we provide an overview of the samples used in Stage I of our empirical analysis.

[Insert Table 1 about here]

[Insert Table 2 about here]

3.3 Findings

Table 3 reports the results of estimating Equation (1). We find that the coefficient on Bank Exposure (BEX_j reported in Column 1 is negative and statistically significant at the 10% level. The point estimate of 0.795 in Column 1 implies that a 10-percentage-point increase in tax exposure reduces credit growth by about 7.95 percentage points during the second year the tax

⁶ Multiple banking is very common in Japan. A mere 4.7% of firms in our sample borrow from a single bank in FY1999.

was in place. With the average bank supplying approximately ¥274bn of credit to the corporates in the sample, this finding translates to a reduction in credit supply of approximately ¥21.81bn in fiscal year 2001.⁷ Thus the effect of the tax on credit supply is both statistically and economically significant. Columns 2 and 3 report the coefficient on Bank Exposure for short-term and long-term credit growth. The coefficient in Column 3 is negative and statistically significant at the 5% level. A 10-percentage-point increase in tax exposure reduces long-term credit growth by 9.14 percentage points. The coefficient in Column 2 is not statistically significant. These findings provide evidence that the Tokyo bank tax impacts on the supply of long-term, but not short-term credit. Columns 4 and 5 summarise the effect of bank exposure to the tax on corporate's exiting or entering bank relationships. The coefficients on *bank exposure* are not statistically significant. In other words, we do not find evidence that corporates exit or to enter a relationship with banks that are exposed to the Tokyo bank tax.

[Insert Table 3 about here]

Column 1 in Panel B of Table 3 reports the results of estimating Equation (3), controlling for a number of factors that could influence corporate-level investments. At corporate-level we include Tobin's Q (market-value-to-book-value of equity), the liquidity ratio (cash-to-total assets), the leverage ratio (debt-to-equity), corporate size (and its quadratic), the number of banks that are lending to corporate *i*, and the corporate's credit demand derived from the estimates of Equation (1), as well as industry and prefecture fixed effects. The various definitions of corporate-specific control variables are presented in Table 1. The financial ratios (liquidity and leverage) are included to capture a corporates' ability to service debt obligations. Tobin's Q is included to control for corporate profitability. The quadratic of corporate size is included alongside corporate size to control for potential non-linear effects. To control for a

⁷ Expressed in US dollar, this amounts to \$2.5bn and \$200m respectively

corporate's use of multiple banking relationships and demand for credit, the number of bank relationships and the estimated fixed effects from Equation (1) are included.

The coefficients on *Firm Exposure* in Column 1 is negative and statistically significant at the 5% level. This suggests that the imposition of the Tokyo bank tax has an adverse effect on corporate-level investment during the two-year period of the Tokyo bank tax. The effect is economically significant, given that a one-percentage point increase in *Firm Exposure* results in a reduction in the investment rate of seven percentage points between FY 1999 and FY 2001.

4. Impact of Bank Taxation on Firm Hedging and Local Loan Markets

In the second stage of our analysis, we exploit the imposition of the Tokyo bank tax in order to identify if corporates hedge against the adverse impact of the Tokyo bank tax by obtaining funding from alternative sources. These sources include: other (non-affected) banks, financial markets, as well as internal cash reserves. We complement our analysis with an investigation of the impact of bank taxation on local loan markets. Our empirical strategy is outlined in Section 4.1. In Section 4.2, we present the data. Section 4.3 discusses the findings.

4.1 Empirical Strategy

Our empirical results suggest that a sudden increase in bank taxation leads to a decline in lending to existing corporates. The degree to which the decline in lending affects corporatelevel investment depends crucially on the extent to which other banks fill the void left by increasing lending to the corporates affected by the decline in lending. We therefore investigate if corporates compensate for the reduction in credit by borrowing more from banks that are not liable to the Tokyo bank tax. To do so, we look at lending activity of all 140 banks in our sample and assume that banks not liable to the Tokyo bank tax have experienced no other changes in their respective tax burdens.⁸ In addition, we augment our analysis by investigating if corporates compensate for the reduction in loans by issuing new equity or bonds in financial markets, or by drawing upon internal cash reserves. To test the extent of substitution, we estimate the following cross-sectional regression:

$$\Delta Funds_i = a + \beta FEX_i + \gamma X_i + \epsilon_i \tag{4}$$

where $\Delta Funds_i$ represents the change in credit of corporate *i* from banks liable to pay the Tokyo bank tax and from those banks not liable. We add to the change in credit any new equity and bonds issued by the corporate, as well as changes in cash reserves. For our statistical inference, we calculate $\Delta Funds_i$ as follows: $\Delta Funds_i = \frac{\Delta Credit + \Delta Equity + \Delta Bonds + \Delta Cash}{Credit_{1999} + Equity_{1999} + Bond_{1999} + Cash_{1999}}$. *FEX_i* in Equation (4) is the loan-size weighted average of corporate's exposure to the Tokyo bank tax, calculated for the fiscal year prior to the introduction of the tax. The vector of loan-size weighted averages of bank control variables, *X_i*, include the: capital-to-assets ratio, return on equity, liquidity-to-assets ratio, size (measured by total assets) and the ratio of loan loss provisions-to-total loans. We control for corporate-level loan demand using the estimated fixed-effects from Equation (1). β in Equation (4) captures the extent to which corporates compensate for the decline in loans through a combination of loans from other banks, funds raised in financial markets, and internal cash reserves. A coefficient of zero implies that corporates are able to fully compensate for any decline in loans.

A priori, one would expect that corporates' reliance on other banks as alternative providers of funds should be reflected in an increase of credit supplied by those banks. To verify whether banks not liable to pay the Tokyo bank tax increase their credit portfolio, we also investigate whether there are any spill-over effects arising from the introduction of the Tokyo bank tax. Specifically, we examine whether the imposition of the Tokyo bank tax resulted in a

⁸ This assumption is reasonable as Tokyo remained the only prefecture to impose the bank tax. Osaka prefecture considered the imposition of a tax similar to the Tokyo bank tax but this was never enacted.

change in the competitive conditions of regional loan markets where affected and unaffected banks compete with one another. Imposing a tax on some banks, while exempting others may worsen the relative competitive position of affected banks.

Our identification strategy exploits the fact that loan markets of smaller banks in Japan are characterised by spatial segmentation. Until the early 2000s, the lending activity of these banks was largely confined within the prefecture of the banks' headquarters (Kano & Tsutsui 2003; Ishikawa & Tsutsui 2013).⁹ Therefore, we hypothesise that unaffected regional banks (competitor banks) which compete with at least one affected bank in the same loan market, will increase lending in response to the tax.¹⁰ We do not expect the same spill-over effect for unaffected, regional banks that operate in loan markets without the presence of banks liable to pay the Tokyo bank tax.

We estimate a regression of the form:

$$\Delta Credit_{ij} = a + \beta TAX_j + \delta X_j + \epsilon_{ij}$$
(5)

where $\Delta Credit_{ij}$, is the change in short-term and long-term credit granted to corporate *i* by bank *j* after the imposition of the Tokyo bank tax. *TAX_j* is a dummy variable which takes the value of one if a bank (exempt from the Tokyo bank tax) is headquartered in the same prefecture in which a bank liable to pay the Tokyo bank tax is headquartered; zero otherwise. The vector of bank-specific control variables, *X_j*, include: capital-to-assets, return on equity, liquidity-to-assets, bank size and loan loss provisions-to-total loans. A detailed definition of the variables is provided in Table 1. β in Equation (5) captures the extent to which competitors of banks that are liable to pay the Tokyo bank tax increase credit supply to corporates, and therefore facilitate the hedging efforts of corporates.¹¹

⁹ An amendment of the Bank Law in 2002 lifted restrictions applied to the opening of new branches.

¹⁰ Several banks affected by the Tokyo bank tax were headquartered in other prefecture than the Tokyo prefecture. ¹¹ We do not control for credit demand by including corporate-fixed effects this time as an increase in the demand for credit of firms facing a decline in credit elsewhere is likely to drive our results.

If competitor banks increase the supply of credit to corporates, then an important question is whether these banks expand their credit portfolio or alternatively adjust the composition of their loan portfolios. To grasp the full dimension of the spill-over effects emanating from the Tokyo bank tax, we additionally investigate developments in the loan volume of competitor banks. We use a difference-in-differences estimation strategy, and estimate a regression of the following form:

$$\Delta loanvol_{jt} = \delta \underbrace{Bank_i^{Taxed} * Post_t}_{TAX_{j,t}} + \beta X_{j,t-1} + \alpha_i + \gamma_t + \epsilon_{jt}$$
(6)

where *j* denotes bank and *t* denotes time. *loanvol*_{jt} represents the loan volume as measured by the logarithm of loans (alternative: loans to total assets). *Bank*_j^{Taxed} is an indicator variable which captures whether a regional bank competes in a loan market with a bank affected by the Tokyo bank tax or not. The indicator variable *Post*_t equals one after the Tokyo bank tax is introduced and zero otherwise. $X_{j,t-1}$ is a vector of bank-level control variables that vary over time and across banks. Bank control variables include: bank capital, return on equity, loan loss provisions to total loans, liquidity, and bank size. A detailed definition of the variables is provided in Table 1. To avoid simultaneity, each of these controls enters the model lagged by one period. The model also includes time dummies, γ_t , to capture time effects common to all banks, as well as, bank specific fixed effects, α_i , to control for unobserved bank-level heterogeneity. ϵ_{it} is a stochastic error term.

4.2 Data

To investigate if corporates compensate for the decline in bank credit by using other sources of funding, we rely on our baseline sample which comprises borrowing activity of 2368 corporates from a total of 140 banks. We obtain detailed data on equity and bond issuance of those corporates from Thomson Reuter. In a final step, we amend the baseline sample following the steps described in Section 3.2 to obtain a panel dataset with the corporate as the cross-sectional unit.

To investigate if smaller regional banks increase credit supply to corporates, we again use our baseline sample comprising loan-level data of 2368 corporates. We amend the sample by excluding all banks that are liable to the Tokyo bank tax, and those that are not classified as regional banks. This yields a sample of 112 regional banks which were exempt from the Tokyo bank tax. 26 banks of these 112 banks are competing in local loan markets (as proxied by the presence of the bank's headquarter) with at least one bank liable to pay the Tokyo bank tax (as proxied by the presence of the bank's headquarter). The remaining 86 banks operate in loan markets without the immediate presence of a bank liable to the bank tax. Figure 3 shows a map depicting the headquarter locations of banks subject to the Tokyo bank tax. We obtain the area code of bank headquarters from Nikkei NEEDS Financial Quest.

[Insert Figure 3 about here]

Finally, for our analysis of developments in loan volumes of smaller regional banks, we obtain semi-annual data on bank balance sheets of the 112 regional banks from Nikkei NEEDS Financial Quest for the period from fiscal year 1999 to 2001. In the Appendix we provide an overview of the sample construction for stage two of the analysis.

4.3 Findings

Column 1 of Panel A in Table 4 reports the estimates of Equation (4) for the change in credit augmented by the change in newly issued equity, bonds and cash in fiscal year 2001. The coefficient is statistically significant at the 1% level and is negative and closer to zero. This implies that corporates hedge against the adverse impact of the Tokyo bank tax by: borrowing more from banks exempt from the Tokyo bank tax; equity and bond issuance; and drawing upon internal cash reserves.

Columns 1 and 2 of Panel B in Table 4 report the estimates of Equation (5) for the change in short-term and long-term credit. The coefficient in Column 1 is statistically significant at the 1% level and is positive. This implies that competitor banks (exempt from the Tokyo bank

tax) which compete in local loan markets with banks liable to pay the Tokyo bank tax, on average increase their supply of short-term credit to corporates.

Columns 1 and 2 of Panel C in Table 4 report the estimates of Equation (6) for the change in the loan volume of competitor banks. The coefficients are positive and statistically significant at the 10% and 5% level. This implies that regional banks which compete in loan markets with affected banks increase their loan portfolio relative to their counterparts. When comparing the coefficients reported in Panel B with those reported in Panel C, we observe that the magnitude of the expansion of the loan portfolio relative to the increase in short-term credit is lower by a factor of 8. This suggests that competitor banks may adjust both, the volume of the loan portfolio as well as its composition in response to the Tokyo bank tax.

Overall, our findings point to corporate hedging behaviour. To some extent, corporates compensate for any decline in credit by borrowing more from alternative sources of funding including capital markets and other banks exempt from the Tokyo bank tax. We observe that competitor banks assist corporates in their hedging efforts. However, the supplied credit is insufficient to allow corporates to fully compensate for the reduction in credit supply.

[Insert Table 4 about here]

5. Robustness of Main Findings

This section presents a set of robustness tests. These comprise placebo tests to test the common trend assumption as well as further tests to disentangle credit supply- from demandside effects using different subsamples of our baseline sample and alternative estimation methods.

5.1 Common Trend Analysis

First, we show that *Firm Exposure* is not correlated with credit growth across corporates before and after the Tokyo bank tax. Credit growth is measured on a year-by-year basis

normalised by the stock of credit outstanding in fiscal year 1999. Columns 1 and 4 in Panel A of Table 5 report the coefficients for the pre- and the post-Tokyo bank tax period. The coefficients for these years are not statistically significant. This suggests that there are no systematic differences in the growth of credit to corporates with differential exposure to banks liable to pay the Tokyo bank tax.

Second, we repeat the common trend analysis for corporate investment. The yearly investment rate is measured as the cumulative net investment divided by the value of total assets as of fiscal year 1999. The results are reported in Table 5 Panel B. The coefficients in Column 1 are not statistically significant suggesting that there are no systematic differences in investment behaviour of corporates with differential exposure to banks liable to pay the Tokyo bank tax. The coefficient in Column 4 is statistically significant, suggesting a sustained impact of the Tokyo bank tax on corporate investment beyond the two-year period during which the Tokyo bank tax was operational.

Finally, we perform the common trend analysis of short-term credit growth using the sample of 112 banks that were exempt from the Tokyo bank tax. The results are reported in Table 5 Panel C. The coefficients in Columns 1 and 4 are not statistically significant. This concorporates that the credit supply of banks with and without competition from tax-affected banks in local loan markets follow a common trend in the pre-tax and post-tax period.

[Insert Table 5 about here]

5.2 Loan Supply versus Demand Effects

One possible identification limitation of testing whether the Tokyo bank tax does affect bank lending is that, in principle, local economic conditions in the Tokyo prefecture (unrelated to the Tokyo bank tax) could impact bank credit supply. For example, suppose an adverse change in local economic conditions renders investments in the area less profitable for corporates. Then there is less demand for loans, leading to a reduction in lending by banks. This argument is particularly relevant for small or medium-sized corporates and banks with operations confined to a single geographic area.

To mitigate concerns that local economic effects specific to the Tokyo area are biasing our results, our baseline sample contains large listed corporates (most of which are exporting corporates and operate throughout Japan) and large unspecialised banks with an extensive domestic branch network. To address further concerns, we exclude from our baseline sample those corporates that are headquartered in Tokyo and are therefore more likely to invest locally. Column 1 in Panel A of Table 6 reports the results from these robustness tests. Our estimation is based on the baseline sample without Tokyo-based corporates for fiscal year 2001. The coefficients are statistically significant at the 5% level. This supports our interpretation that the results from the loan-level analysis are driven by loan supply (and not loan demand) effects.

Moreover, we also correct for the bias from loan demand effects in the corporate-level analysis by using a simple strategy proposed by Jiménez et al. (2010). We replace corporatefixed effects with corporate characteristics in Equation (1) and estimate the resultant model using OLS. If credit supply and demand shocks are highly correlated, the estimated coefficient in the model with corporate characteristics would be significantly different from the coefficient in the model with fixed-effects. Column 1 in Panel B of Table 6 reports the coefficients for the model with corporate characteristics for fiscal year 2001. Importantly, the coefficient is very similar to the coefficient in the fixed-effects model supporting our interpretation that loan supply effects are driving the results from our corporate-level analysis.

[Insert Table 6 about here]

6. Summary

Exploiting the Tokyo bank tax shock and a unique loan-level dataset, we investigate the economic impact of bank taxation on corporate-level investment. By means of a corporate-fixed effects estimation strategy (which accounts for changes in corporate-specific loan demand), we show that an increase in bank exposure to the tax leads to a reduction in the supply of credit. In other words, banks affected by the tax did pass on the costs to their respective client corporates.

Using corporate-level data, we find that the reduction in bank lending impacts on corporate level investment. Consistent with the view that corporates cannot easily substitute between loan sources, the investment activity of corporates borrowing from banks liable to pay the Tokyo bank tax is affected. The effect however is relatively mild reflecting the ability of corporates to compensate for the decline in credit supply via the increased use of funds obtained from other banks, capital markets as well as internal cash reserves. Although competitor banks are found to assist corporates in their hedging effort, the additional credit provided is not sufficient to alleviate entirely the adverse impact of the Tokyo bank tax on corporate investment.

The negative impact of bank taxes on corporate investment has important implications for the efficacy of tax policy given that reduced corporate investment is likely to have consequences for production and labour. In light of the increasing reforms to bank taxation worldwide, our study makes an important contribution to the debate on the relative merits of taxing banks and sheds further light on the importance of banks for the real economy.

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Tables & Figures





This figure measures the relative exposure of the 26 banks affected by the Tokyon bank tax. Exposure is measured as the ratio of Tokyo-based employees to domestic employees.

Figure 2 Timeline of Events

FY 1999	FY2000	FY2001	FY2002
8 February 2000	1 April 2000	6 th July 2001	30 th January 2003
Announcement of the Tokyo bank tax	Tokyo bank tax comes into force	Tokyo Government announces collection of tax revenue associated with the Tokyo	Supreme Court rejects appeal by Tokyo Government and rules against the Tokyo bank tax
	18 th October 2000	bank tax in the amount of	
30th March 2000	Banks file lawsuit against the	90 billion yen for FY 2000	
Tokyo Metropolitan Assembly	Tokyo bank tax		
passes bank tax legislation		26 th March 2002	
		Tokyo District Court rules against the Tokyo bank tax	

29th March 2002

Tokyo Government files appeal with the Tokyo High Court



This figure shows a map of 47 prefectures in Japan. Dark-grey shaded areas indicate presence of headquarters of both, banks liable to pay the Tokyo bank tax and competitor banks that are exempt from paying the Tokyo bank tax.

Table 1 | Variable Definitions

Shock	
Pre-shock period	FY 1999
Shock period	FY 2000 and FY 2001
Post-shock period	FY 2002
Loan-level analysis	Definition
Credit growth	Change in credit granted within a bank-corporate pair between FY1999 and FY2001 relative to credit measured in pre- shock period
Short-term credit growth	Change in short-term credit (maturity < 1 year) granted within a bank-corporate pair between FY1999 and FY2001 relative to credit measured in pre-shock period
Long-term credit growth	Change in long-term credit (maturity > 1 year) granted within a bank-corporate pair between FY1999 and FY2001 relative to credit measured in pre-shock period
Entry	Dummy variable equals one if corporate has credit granted from bank during shock period but not in pre-shock period; zero otherwise.
Exit	Dummy variable equals one if bank-corporate relationships are terminated; zero otherwise.
BEX (Bank exposure)	Ratio of the number of employees based in Tokyo relative to total number of employees (measured in the pre-shock period) if bank is liable to Tokyo bank tax; zero otherwise.
TAX	Dummy variable equals one if a bank (exempt from the Tokyo bank tax) is headquartered in the same prefecture in which bank liable to pay the Tokyo bank tax is headquartered; zero otherwise
Capital to total assets	Bank equity capital over total assets measured in the pre-shock period
Return on equity	Bank income before income taxes over equity capital measured in the pre-shock period
Provisions to total loans	Bank provision for loan losses over total loans and bills discounted measured in the pre-shock period
Liquidity	Bank cash and due from banks over total assets measured in the pre-shock period
Size	Bank total assets measured in the pre-shock period
Firm-level analysis	Definition
Capital investment rate	Cumulative net investment, obtained as the sum of investment expenditure in FY2000, normalised by the value of total assets as of FY1999 (pre-shock).
Funds	Sum of change in credit granted plus new equity issued plus new bonds plus change in cash (between FY1999 and FY2001) over sum of credit plus equity plus bonds plus cash (all measured in pre-shock period
FEX (Firm exposure)	Average exposure of corporates to the Tokyo bank tax measured as weighted average of <i>Bank Exposure</i> of all banks that are lending to the corporate. Weights are bank share of total credit to corporate.
Credit demand	Firm credit demand is the fixed effects from estimation of Equation (1)
Liquidity	Firm cash to total assets measured in the pre-shock period
Tobin's Q	Firm market value to book value measured in the pre-shock period
Bank-relationships	Number of lenders a corporate borrows from measured in the pre-shock period
Leverage	Firm debt to equity measured in the pre-shock period
Size	Firm total assets (logarithm) measured in the pre-shock period

Table 2 | Descriptive Statistics

	Mean	St. dev.	Min	Max	Obs
Loan-level Dataset					
Bank Exposure	0.35	0.27	0	0.71	15830
TAX	0.22	0.41	0	1	4129
Credit growth	0.1	0.86	-0.86	7.14	15830
Short-term credit growth	0.09	0.71	-0.83	5.78	12332
Long-term credit growth	0.12	1.16	-0.92	9.59	8736
Exit	0.05	0.22	0	1	17284
Entry	0.05	0.22	0	1	13826
<u>Bank Control Variables</u>					
Size	16.6	1.28	13.5	18.18	15830
Capital	0.05	0.01	0	0.08	15830
Liquidity	0.04	0.02	0.01	0.08	15830
Loan loss provisioning	0.03	0.05	0	0.41	15830
Return on equity	0.02	0.1	-0.71	0.09	15251
Firm-level Dataset			-		
Firm Exposure	0.24	0.18	0	0.68	2368
Investment rate	0.18	0.21	-0.08	1.91	2368
Credit demand	-0.07	0.7	-0.86	4.42	2368
Liquidity	0.12	0.09	0	0.74	2368
Tobin's Q	3.94	6.07	0	53.96	2368
Bank-relationships	18.65	13.6	2	141	2359
Leverage	4.85	11.21	0.14	81.67	2368
Size	10.56	1.46	6.19	14.83	2368

This table presents descriptive statistics of dependent and independent variables used for the loan-level analysis and corporate-level analysis. Detailed definitions of the variables are provided in Table 1.

Panel A	Credit growth	Short-term credit	Long-term credit	Exit	Entry
	(1)	(2)	(3)	(4)	(5)
Bank Exposure	-0.795* (0.432)	-0.583 (0.352)	-0.914** (0.336)	0.0903 (0.269)	-0.180 (0.156)
Firm FE	Y	Y	Y	Y	Y
Bank Controls	Y	Y	Y	Y	Y
No. of obs.	9608	7134	5596	17284	12906
	Investment				
Panel B	(1)				
Firm Exposure	-0.0706** (0.0289)				
Firm Controls	Y				
Firm Industry Fixed Effects	Y				
Firm Prefecture Fixed Effects	Y				
No. of obs.	2296				

Table 3 | The Impact of Bank Taxation on Credit Growth and Firm Investment

This table presents the estimates from the first stage of the empirical analysis, which focuses on the impact of the Tokyo bank tax on credit supply and corporate investment activity. Panel A presents estimates of Equation (1). The dependent variable is the growth in credit (Column 1), short-term credit (Column 2) and long-term credit (Column 3) issued by bank *j* liable to the Tokyo bank tax to corporate *i* between FY 1999 and FY 2001. The dependent variable in Column 4 is an indicator variable that is one if bank-corporate relationships are terminated between FY 1999 and FY 2001; zero otherwise. The dependent variable in Column 5 is a dummy variable that is one for new bank-corporate relationships and zero otherwise between FY 1999 and FY 2001. Bank Exposure is measured as the number of employees based in Tokyo relative to total number of employees as of FY 1999 for banks liable to Tokyo bank tax; otherwise zero. Bank-specific control variables are capital, return on equity, provisions to loans, liquidity, bank size as of FY 1999. Heteroskedasticity robust standard errors clustered at the bank level are reported in parentheses. The dependent variable in Column 1 of Panel B is corporate cumulative net investment in FY 2001 divided by the value of total assets as of FY 1999 (pre-shock). Firm Exposure is the average exposure of corporate i to the Tokyo bank tax measured as the weighted average of Bank Exposure of all banks that are lending to the corporate. Weights are bank share of total credit to corporate i. Control variables are corporate credit demand, corporate size (+ quadratic), corporate liquidity, corporate leverage, corporate Tobin's Q as of FY 1999. Firm industry and prefecture fixed effects are included. Heteroskedasticity robust standard errors clustered at the main bank level are reported in parentheses. ***, **, *, indicate significance at the 1%, 5%, and 10% level respectively.

Panol A Firm Hodging	Funds		
	(1)		
Firm Exposure	-0.0482***		
THE EXPOSITO	(0.0170)		
Firm Credit Demand	Y		
Bank Controls	Y		
Firm Industry FE	Y		
Firm Prefecture FE	Y		
No. of obs.	2348		
Panel B Credit Supply (Competitor Banks)	Short-term credit	Long-term credit	
	(1)	(2)	
ΤΛΥ	0.108***	-0.0291	
1111	(0.037)	(0.127)	
Bank Controls	Y	Y	
Firm Industry FE	Y	Y	
Firm Prefecture FE	Y	Y	
No. of obs.	2403	1277	
Panel (Loan Growth (Competitor Banks)	Loan to asset ratio	Loan volume	
raner c Loan Growth (Competitor Banks)	(1)	(2)	
TAV	0.0140*	0.0167**	
ΙΑλ	(0.00786)	(0.00730)	
Bank Controls	Y	Y	
No of obs	273	273	

Table 4 | The Impact of Bank Taxation on Firm Hedging and Local Loan Markets

This table presents the estimates of Equation (4), (5) and (6) from Stage II of our analysis focusing on the impact of the Tokyo bank tax on corporate hedging behaviour and spill-over effects in local loan markets. The dependent variable in Column 1 of Panel A is the growth in credit issued by banks, both liable to and exempt from the Tokyo bank tax, plus issuance of new equity, bonds and change in cash of a corporate between FY 1999 and FY 2001. Firm Exposure is the average exposure of corporate i to the Tokyo bank tax measured as the weighted average of Bank Exposure of all banks that are lending to the corporate. Weights are bank share of total credit to corporate i. Bank-specific control variables are loan-size weighted averages of bank capital, return on equity, provisions to loans, liquidity, bank size as of FY 1999. Heteroskedasticity robust standard errors clustered at the main bank level are reported in parentheses The dependent variable in Column 1 (2) of Panel B is the growth in short-term (long-term) credit issued by banks exempt from the Tokyo bank tax. *TAX* is a dummy variable which equals one if a bank (exempt from the Tokyo bank tax) is headquartered in the same prefecture in which a bank liable to pay the Tokyo bank tax is headquartered; zero otherwise. Heteroskedasticity robust standard errors clustered at the bank level are reported in parentheses. The dependent variable in Column 2, is the change in total loans (logarithm). *TAX* is a dummy variable which equals one if a bank (exempt from the abank liable to pay the Tokyo bank tax) is headquartered; zero otherwise. Heteroskedasticity robust standard errors clustered at the bank level are reported in parentheses. The dependent variable in Column 2, is the change in total loans (logarithm). *TAX* is a dummy variable which equals one if a bank (exempt from the Tokyo bank tax) is headquartered; zero otherwise. Heteroskedasticity robust standard errors clustered at the bank liable to pay the Tokyo bank tax is headquartered; zero otherwise. Heter

Table 5 | Common Trend Analysis

Panel A Credit Growth	FY 1999 (pre-shock)	FY 2000	FY 2001	FY 2002 (post-shock)
Firm Exposure	-0.382 (0.230)	-0.244** (0.0953)	-0.324* (0.190)	-0.658 (0.394)
Bank Controls	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y
No. of obs.	2035	2035	2035	2035
Panel B Investment	FY 1999 (pre-shock)	FY 2000	FY 2001	FY 2002 (post-shock)
Firm Exposure	-0.0290 (0.0186)	-0.0543** (0.0272)	-0.0706** (0.0289)	-0.0682* (0.0402)
Firm Controls	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y
No. of obs.	2354	2357	2296	1939
Panel C Credit Growth (Competitor Banks)	FY 1999 (pre-shock)	FY 2000	FY 2001	FY 2002 (post-shock)
TAX	0.00007 (0.0226)	-0.0543** (0.0272)	-0.0706** (0.0289)	0.0523 (0.0339)
Bank Controls	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y
No. of obs.	3738	2357	2296	2277

This table presents the results from the trend analysis of pre- and post-shock trends. To test pre- and post-shock trends we falsely assume that the Tokyo bank tax was imposed in FY 1999 and FY 2001 and introduce a placebo tax for these fiscal years. The dependent variable in Columns 1-4 in Panel A is the difference between the stock of credit at the beginning and end of the indicated year normalised by the stock of credit in FY 1999. This sample is restricted to corporates exposed to banks liable to the Tokyo bank tax. Bank-specific control variables are loan-size weighted averages of bank capital, return on equity, provisions to loans, liquidity, bank size as of FY1999. Firm industry and prefecture fixed effects are included. Heteroskedasticity robust standard errors clustered at the main bank level are reported in parentheses. The dependent variable in Columns 1-4 in Panel B is the cumulative net investment in indicated year divided by the value of total assets as of FY 1999. Firm Exposure is the average exposure of corporate i to the Tokyo bank tax measured as the weighted average of Bank Exposure of all banks that are lending to the corporate. Weights are bank share of total credit to corporate i. Firm-specific control variables are size, credit demand, Tobin's *Q*, leverage, cash, bank-relationships as of FY1998. Heteroskedasticity robust standard errors clustered at the main bank level are reported in parentheses. The dependent variable in Columns 1-4 in Panel C is the short-term credit growth. This sample is restricted to bank that were exempt from the Tokyo bank tax. *TAX* is a dummy variable which equals one if a bank (exempt from the Tokyo bank tax) is headquartered in the same prefecture in which a bank liable to pay the Tokyo bank tax is headquartered; zero otherwise. Heteroskedasticity robust standard errors clustered at the bank level are reported in parentheses. ***, **, *, indicate significance at the 1%, 5%, and 10% level respectively.

Table 6 | Robustness Tests

Panel A Non-Tokyo Corporates	(1)	(2)	(3)
Bank Exposure	-0.848** (0.376)	-0.467 (0.310)	-0.995*** (0.289)
Bank Controls	Y	Y	Y
Firm Fixed Effects	Y	Y	Y
No. of obs.	4609	3248	2910
Panel B OLS	(1)	(2)	(3)
Bank Exposure	-0.826* (0.430)	-0.590* (0.332)	-0.842** (0.354)
Bank Controls	Y	Y	Y
Industry Fixed Effects	Y	Y	Y
Prefecture Fixed Effects	Y	Y	Y
No. of obs.	9608	7134	5596

Appendix

Table (A1) | Samples used in Stage I and II

· · · •	Stage I		Stage II		
Outcome variable	Credit supply	Firm investment	Firm hedging behaviour	Credit supply (competitor banks)	Loan Volume (competitor banks)
Level/Cross.Unit	Loan	Firm	Firm	Loan	Bank
	(issued by bank j to corporate i)			(issued by bank j to corporate i)	
No. corporates/banks	2368 corporates	2368 corporates	2368 corporates	2368 corporates	112 banks (exempt from
	26 banks (liable to the		140 banks	112 banks (exempt from Tokyo bank tax, bank type: regional)	Tokyo bank tax, bank type: regional) (of which 26 banks compete in local loan markets where the headquarter of at least one bank liable to the Tokyo bank tax is located)
	Tokyo bank tax)		(of which 26 liable to the Tokyo bank tax, 114 exempt		
			from the Tokyo bank tax)	(of which 26 banks compete in local loan markets where the headquarter of at least one bank liable to the Tokyo bank tax is located)	
Composition	Unbalanced	Unbalanced	Unbalanced	Unbalanced	Unbalanced
Merged with	Bank balance sheet, income statement, attributes	n.a.	Firm equity and bond issuance	Bank area code	Bank area code
	Firm balance sheet, income statement, attributes				
Selection criteria/ Drop if Amendents Drop if 1999 Number relation	Drop if corporate asset/ bank asset not present in FY 1999	Aggregate data on loans to each corporate	Expand baseline sample by including banks exempt from Tokyo bank tax	Exclude banks liable to the Tokyo bank tax	Exclude banks liable to the Tokyo bank tax
	Number of bank relationships: >1	(see Section 3.2 for details)	Aggregate data on loans to each corporate		
			Create single "average" bank (see Section 3.2 for details)		