The Real Effects of Bank Taxation

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Abstract

Government interventions and policies aimed at the banking industry are likely to have implications for funding conditions facing corporates and their resultant strategic investment decisions. We investigate whether taxation of the banking industry matters for 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 more than less exposed counterparts. Moreover, the imposition of bank taxes reduces credit supply, and leads corporates to reduce levels of investment. 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 channel, real economy, firm investment

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1. Introduction

The recent financial crisis and subsequent economic slowdown has 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 specifically targeted 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. 2015).

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 costs through costs by reducing the availability of credit or increasing the costs of borrowing to corporate customers, this is likely to have implications for the ability of these 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 firm-level investment in the corporate sector is relevant to policymakers charged with overseeing developments in the banking industry and real economy.

In this paper we exploit a sudden imposition of a tax on the gross profitability of banks in order to identify how: banks adjust their balance sheets in response to higher tax costs; and how this adjustment process affects the real economic decisions of corporate borrowers. However, assessing the impact of bank taxation on the 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. Second, in order to assess the effects of bank taxation on real economic decisions of firms, it is crucial that supply-side effects on credit availability can be disentangled from demand-side effects. In this study, we overcome these aforementioned challenges via an empirical setting where a change in taxation affected some banks, but left other banks unaffected. Specifically, we focus on the imposition of a local tax which affected banks differently depending on bank size

and resources deployed in a specific geographic area. In order to control for credit demand (and dis-entangle demand from supply-side effects), we utilise a dataset which details the amount of loans that a firm borrows from each of its banks (and thus allow for the presence of multiple bank-firm relationships).

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 Tokyo bank tax, the tax base shifted from a net income tax to a gross profit tax. This resulted in a considerable broadening of the tax base. The Tokyo bank tax was not part of a broader or widely anticipated set of fiscal reforms, but was specifically targeted at large banks, which represented an important source of investment funding for corporates. There was considerable variation in the individual bank exposure to the tax since the amount payable to the local (Tokyo) government was related directly to the number of employees based in Tokyo. As a consequence, there were large differences in the tax liabilities of banks subject to the Tokyo bank tax.[1]

Our empirical analysis comprises three stages. In Stage 1, we identify the mechanism via which bank taxation affects lending and investigate the extent to which the Tokyo bank tax prompts changes in bank tier-one capital and competition. In Stage 2, we then assess the impact of the bank tax on the availability of credit. Using a loan-level dataset, we investigate if banks more affected by the Tokyo bank tax supply less credit to firms compared to less affected banks. 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 banks.[2] We investigate changes in both the likelihood that a new loan is granted and the amount of credit extended. By means of a firm fixed effects estimation strategy, we show that banks more exposed to the

[1] http://taxsummaries.pwc.com/ID/Japan-Corporate-Taxes-on-corporate-income

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

Tokyo bank tax reduce lending to firms. More precisely, the within-firm comparison reveals that a 10-percentage point increase in a bank's exposure to the tax, reduces lending by 5.5 percentage points.

In Stage 3, we assess the implications of changes in the lending patterns of banks for firm-level investments. In theory, when financing frictions are present a negative shock to the supply of external finance will impede firm investment (Holmstroem and Tirole 1997). The effects of such a shock should be more severe for firms that depend on external finance to fund investment opportunities, and for firms that face high costs in raising external finance. Using firm-level data, we first investigate the extent to which firms substitute for the decline in credit by borrowing more from non-affected banks. We also take into consideration that firms may make up for the reduction in credit by seeking funding from capital markets, or simply use internally generated funds. We find that in the first year of the Tokyo bank tax, firms compensate for the decline in credit by using alternative sources of funding. However, in the second year, we find that firms can no longer compensate for the decline in credit, and instead experience a decline in credit supply. Finally, we quantify the extent to which the investments of firms are affected by the reduction in credit supplied by banks liable to the Tokyo bank tax. We find that a 10-percentage-point increase in firm exposure to the bank tax results in a reduction in firm-level investment rate of 0.5 percentage points. This suggests that the imposition of the Tokyo bank tax had a relatively mild impact on firm investment. The small effect of the Tokyo bank tax on firm investment is attributed to the ability of firms to access alternative forms of funding, and thus compensate for the decline in the credit supplied by banks affected by the Tokyo bank tax.

In order to test the robustness of our results, we undertake a number of checks. We perform placebo tests in order to check the plausibility of our assumption of common trends. Moreover, we employ propensity score matching in order to achieve more balanced treatment and non-treatment groups. We also undertake further tests that help to disentangle credit

supply effects from demand side effects. For example, we conduct a sub-sample analysis excluding firms located in the Tokyo prefecture. This allows us to control for local differences in any credit developments that might explain the imposition of the Tokyo bank tax. Overall, the results of these tests provide support for our main findings.

Our paper is closely related to a literature which examines the real effects of the direct taxation of non-financial firms. The results of 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 firms. 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 firm-level investment activity.

We also contribute to a growing literature that investigates bank lending decisions to firms following a regulatory shock. 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 firms. In particular for those firms that have a high dependence on external finance. Using the re-capitalisation of Japanese banks in the late 1990s as a setting, Giannetti and Simonov (2013) show that large capital injections are effective in increasing bank lending with a subsequent positive effect on the investment behaviour of borrowing firms. Small capital injections have little effect on credit supply. Berger and Roman (2017) provide evidence that the US Treasury's purchase of toxic assets from banks (under the Troubled Asset Relief Programme) improved employment conditions and reduced the occurrence of business bankruptcies. Gropp et al. (2017) investigate the effects of higher capital requirements (by exploiting the 2011 capital exercise by the European Banking Authority) on lending behaviour. The authors provide evidence of a strong link between bank capital and lending (which is particularly evident for

corporate and retail borrowers). Finally, Jimenez et al. (2017) investigate the impact on real economic outcomes of macroprudential policy measures introduced in Spain in 2000. The authors provide evidence that dynamic loan loss provisioning smooths credit supply cycles, which in turn impacts positively on firm 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 firms from various industries (to investigate the lending decision 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 on firm investments via a decline in credit availability. We identify two mechanisms that drive the decline in bank lending, namely bank tier-one capital and competition.

The rest of the paper is structured as follows. Section 2 provides a background to the present study. In section 3, we discuss our identification strategy, and highlight empirical challenges. Section 4 describes the dataset of banks and non-financial firms, while section 5 presents the results of the empirical analysis. Section 6 provides a summary.

2. The Tokyo Bank Tax

Following the banking crisis of 1997, Japanese banks reported large losses for several consecutive years. This led to a large decline in the tax revenues of the Tokyo prefecture due to its dependence on the tax revenue generated by the financial sector.[3] To address the decline in tax revenue, the Tokyo Government introduced a new tax targeted at commercial banks operating in Tokyo. The tax became effective on April 1, 2000, but was declared void two years later by the Tokyo District Court on the grounds that it violated the right to equal treatment

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

(Article 14 of the Japanese Constitution).[4] Table 1 provides a chronology of key events of the Tokyo bank tax.

[Insert Table 1 about here]

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 ranged from a low 0.1 to a high 0.65 across banks liable to pay the Tokyo bank tax.

At the time when the tax was introduced, the gross profitability of banks was at relatively high level (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 losses (negative 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 exposures to the tax by inflating expenses, and thus ensured a stable stream of tax revenue for the Tokyo government.

3. Empirical Strategy

We exploit the Tokyo bank tax to identify how banks adjust their behaviour in response to higher tax costs, and in turn how this change in behaviour affects firms which borrow from these banks. In Stage 1, we analyse at the bank level the extent to which banks exposed to the

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

Tokyo bank tax adjust their balance sheets (in particular tier-one capital). Then in Stage 2, we examine if banks affected by the tax, change the amount of credit supplied to firms to assess the impact of the Tokyo bank tax on non-financial firms. Rather than using aggregate loans recorded on banks' balance sheets, we instead utilise loan-level data on the individual corporate customers of banks. Then by exploiting the presence of multiple bank-corporate relationships, we investigate whether following the imposition of the Tokyo bank tax, banks reduce credit to corporate customers, and in turn whether this affects overall firm-level investment.

3.1 Stage 1: (Bank-Level) The Impact of the *Tokyo Bank Tax* on Bank Capital and Competition

The effect of the Tokyo bank tax on aggregate credit supply has been documented previously (to some extent) by Banerji et al (2018). Using bank-level data, the authors focus on the pass-through of tax costs on to bank customers. The evidence provided suggests that banks reduce aggregate credit supply in response to the imposition of the Tokyo bank tax.

One potential explanation for the negative impact of gross profit taxation on bank lending is that gross profit taxation leads to a deterioration in bank capital.[5] Inadequate bank capital has been shown to be a key factor in the propagation of shocks to bank lending in particular in an environment where issuance of new bank equity is costly and regulatory capital constraints are binding (Van den Heuvel 2001; Gambacorta and Mistrulli, 2004; Gropp et al. 2016).[6] Gross profit taxation may contribute to a depletion of bank capital in two ways. First, ordinary business expenses (e.g. personnel and administrative expenses) as well as those that

[5] An alternative mechanism through which taxation impacts on bank lending is through its impact on monitoring incentives. Banerji et al. (2018) theoretically explore the impact of gross profit tax on banks' monitoring activity. A gross profit tax is predicted to reduce banks' resources available to perform monitoring. Banks that monitor less are shown to lower interest rates charged to borrowers in order to avert a potential increase in borrower defaults. Faced with the prospects of lower expected profits from lending, banks then reduce the amount of loans issued.

[6] Van den Heuvel (2006) shows theoretically that banks forgo lending opportunities in order to avoid failure to meet future capital requirements. For a sample of Italian banks, Gambacorta and Mistrulli (2004) show that bank capitalisation affects lending behaviour in an environment where imperfect markets for bank equity exist and capital requirements are binding. Carlson et al. (2013) provide further evidence for a strong link between bank capital and lending behaviour across a sample of US banks. Lower loan growth is associated with bank with low capital ratios relative to counterparts with higher capital ratios. Corporate loans to industrial firms are particularly affected.

arise from provisioning for bad loans are *not* tax deductible.[7] This non-deductibility of expenses may have an immediate, negative effect on net profits by reducing the ability of banks to retain earnings and accumulate capital required to meet regulatory targets.[8] Second, the negative impact of gross profit taxation on retained earnings also has implications for deferred tax assets (which represented an important source of regulatory capital for Japanese banks in the early 2000s, Skinner 2008).[9] Under gross profit taxation, any deferred tax assets reduce in value and deplete regulatory bank capital.

Another explanation for a decrease in bank lending following the Tokyo bank tax is related to changes in the competitive conditions for banks. The imposition of the Tokyo bank tax should worsen the competitive position of affected banks relative to unaffected counterparts. In a more competitive environment banks earn lower rents from lending, prompting a reduction in the supply of credit (Boot & Thakor 2000).

Overall, both the capital channel and the competition channel suggest that under the Tokyo bank tax banks will reduce the supply of credit. Notably, these two identified mechanisms are not mutually exclusive. To examine if the Tokyo bank tax impacts on bank lending via the capital channel, we investigate whether banks subject to the Tokyo bank tax indeed decreased retained earnings as well as tier-one capital. To examine if the Tokyo bank tax leads to a change in the competitive conditions, we investigate whether banks subject to the Tokyo bank tax lose market share.

We obtain bank balance sheet data from the Nikkei NEEDS Financial Quest database for the period fiscal year 1999 to 2002. Our sample comprises balance sheet data of 105 banks of which 26 banks are affected by the Tokyo bank tax. Among the treated banks are 9 city banks, 8

[7] Banks liable to the Tokyo bank tax were subject to a 10% tax on net profits before the tax was imposed. With the imposition of the tax, banks became liable to pay a 3% tax on gross profits. These banks remained subject to national corporate income taxation which allows the deduction of loan losses for tax purposes.
[8] The Japanese Bankers Association expected the net profit shortfall of 24 member banks due to the Tokyo bank tax to amount to 428 billion yen (around one third of banks' expected net profits).
[9] Following the introduction of deferred tax asset accounting in fiscal year 1998, Japanese banks incurred sizable accounting expenses from writing off large amounts of non-performing loans. The lag between the recognition of losses for accounting and tax purposes resulted in the built up deferred tax assets. Under Japanese law, losses were allowed to be carried forward for 5 years.

regional banks, 6 trust banks, and 3 long-term credit banks. We average the observations in dates prior to the Tokyo bank tax into a pre-intervention period, and the observations in dates after the introduction of the tax into a post-intervention period. Because banks were not selected randomly by the Tokyo government to pay the Tokyo bank tax, we address potential selection problems through the use of the bias-corrected matching estimator by Abadie and Imbens (2002).[10] To test our hypothesis, we estimate the following regression:

$$\Delta Y_j = \delta TAX_j + \beta X_j + \epsilon_j \quad (1)$$

ΔY_j is the change in the outcome variables (retained earnings, tier-one capital and market share) for bank j. $TAX_{j,t}$ is equal to one for those banks that are liable to the Tokyo bank tax and zero otherwise. X_j is a vector of pre-shock time averaged bank control variables comprising: total assets, tier1 capital ratio, total deposits-to-total assets, loans-to-total assets, net interest income-to-operating revenue, and net income-to-total assets. Consistent with the Tokyo bank tax impacting on banks' ability to retain earnings and to accumulate tier-one capital (of which retained earnings is a major component), we expect a negative coefficient on the *TAX* variable. We expect a negative coefficient on the *TAX* variable, with bank market share as the dependent variable. The definitions and summary statistics of variables used in the bank-level analysis are reported in Panel A of Table 2 and Table 3.

3.2 Stage 2: (Loan-Level) The Impact of *Bank Exposure* on Bank Lending

To identify the impact of taxation on the supply of credit to firms, we follow Khwaja and Mian (2008) and compare changes in credit across banks for each firm.[11] Specifically, we test whether banks with a relatively greater exposure to the Tokyo bank tax reduce lending to the *same* firm by more than banks less exposed to the tax. Furthermore, we use a loan-level dataset to exploit the fact that Japanese firms typically hold credit relationships with multiple banks. By

[10] Based on observable characteristics underlying the selection of banks into the tax treatment, we match banks from the treatment group to banks with similar characteristics in the control group.

[11] Khwaja 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 firm relationships in loan-level dataset, their proposed estimation strategy allows for the control of demand-side effects.

focusing on a sample of firms that borrow from multiple banks, firm-specific credit demand shocks can be absorbed through introducing firm-fixed effects to the following model:

$$\Delta Credit_{ij} = a_i + \beta BEX_j + \delta X_j + \epsilon_{ij} \quad (2)$$

where the dependent variable, $\Delta Credit_{ij}$, is the change in credit granted to firm *i* by bank *j* after the imposition of the Tokyo bank tax. a_i is the firm-fixed effect that absorbs a credit demand shock specific to an individual firm. 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). We hand-collect the number of Tokyo-based employees from banks' annual reports. This variable captures the extent to which bank gross profits are exposed to the imposition of the Tokyo bank tax. 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.

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 contains detailed annual information on the credit granted to Japanese listed companies by commercial, trust and long-term banks, as well as other types of banks. Firms report total bank debt, which can be decomposed into short-term debt (due within less than one year) and long-term debt.[12] We match this loan-level dataset with two further datasets containing bank-level balance sheet, and income statement items, as well as firm-level attributes (associated industry and location of corporate headquarters).

To obtain our baseline sample for the loan-level analysis, we select all listed industrial firms for which information on total assets and bank-firm relationships are available for the year prior to the introduction of the Tokyo bank tax. To estimate Equation 2, we restrict the

[12] The credit reported is actually drawn credit in year *t*; undrawn credit is not reported.

analysis to firms that borrowed from at least two banks.[13] This yields a baseline sample of 2368 non-financial listed firms active in fiscal year 2000.

To capture both changes in credit granted and the likelihood that a new loan is granted we employ three different credit growth measures. *Credit growth* is defined as the percentage change in the total outstanding credit granted to each firm in the sample during the year when the Tokyo bank tax was levied. 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 firm receives credit from a bank during the first (second) year when the Tokyo bank tax was levied, 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-firm relationship terminated during the first (second) year when the Tokyo bank tax was levied, and zero otherwise. Panel B of Table 2 provides detailed definitions of both our outcome and control variables. Table 3 reports descriptive statistics.

[Insert Panel B Table 2 about here]

[Insert Table 3 about here]

3.3 Stage 3: (Firm-Level) The Impact of *Firm Exposure* on Firm Investment

To identify the impact of taxation on firm-level investment, we first investigate the extent to which firms are able to substitute for a reduction in credit. We then compare changes in the investment rate across firms. We classify firms as affected by the Tokyo bank tax based upon a firm's 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:

$$\overline{FEX_{\iota,1999}} = \sum_j w_{ij,1999} * BEX_{j,1999} \quad (3)$$

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

where BEX_j is defined as bank's exposure to the Tokyo bank tax, measured as the number of employees based in Tokyo relative to total number of employees. w_{ij} is equal to the share of credit received from each bank relative to total debt (as reported in firm's balance sheet). Using *FEX* as a measure to determine the firms' exposure to the tax via its banks, we then estimate the following:

$$Y_i = a + \beta \overline{FEX_{\iota,1999}} + \gamma X_i + \epsilon_i \quad (4)$$

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

For the firm-level analysis, we add information to our baseline sample of 2368 firms. We obtain firm balance sheets and income statements items (available at a semi-annual frequency) from the Nikkei NEEDS Financial Quest database for the period fiscal year 1999 to 2002.

4. Findings

In this section, we present the empirical results obtained from StageS 1, 2 and 3 of our analysis.

4.1 Stage 1: (Bank-Level) The Impact of the *Tokyo Bank Tax* on Bank Capital and Competition

Table 4 Panel A reports the results of estimating Equation 1 for a sample of 105 banks (of which 26 banks are liable to pay the Tokyo bank tax). We find that the coefficients on *TAX* reported in Columns 1 and 2 are negative and statistically significant at the 5% level. The point estimates of -0.319 and -0.398 indicate that banks liable to the Tokyo bank tax retain fewer

earnings and have lower tier-one capital relative to banks not affected by the Tokyo bank tax. Column 3 shows how the market share of banks affected by the Tokyo bank tax adjusts following the imposition of the tax. The coefficient on *TAX* is negative and statistically significant at the 5% level. The point estimate of -0.078 indicates that banks liable to pay the Tokyo bank tax lose market share relative to unaffected banks. These results are consistent with the proposed mechanisms that the Tokyo bank tax impacts lending of banks through: a deterioration in tier-one bank capital and a change in competitive conditions.

4.2 Stage 2: (Loan-Level) The Impact of *Bank Exposure* on Bank Lending

Table 4 Panel B reports the results of estimating Equation 2. We find that the coefficients on *Bank Exposure* reported in Columns 1 (2) are negative and statistically significant at the 5% (10% level). The point estimate of -0.286 (-0.796) in Column 1 (2) implies that a 10-percentage-point increase in tax exposure reduces credit growth by about 2.9 (7.96) percentage points during the first (second) year the tax was in place. With the average bank supplying approximately ¥274bn of credit to the firms in the sample, this finding translates to a reduction in credit supply of about ¥7.92bn (¥21.81bn) in fiscal year 2000 (2001). Thus the effect of the tax on credit supply is both statistically and economically significant. Columns 7 through 10 summarise the effect of bank exposure to the tax on firm's exiting or entering bank relationships. The coefficients on *bank exposure* are not statistically significant. In other words, we do not find evidence that firms are more likely to exit or to enter a relationship with banks that are exposed to the Tokyo bank tax.

[Insert Table 4 about here]

4.3 Stage 3: (Firm-Level) The Impact of *Firm Exposure* on Firm Investment

In this section, we present the results for the firm-level portion of the empirical analysis In Section 4.3.1 we focus on the extent to which firms substitute for the reduction in credit by

tapping alternative sources of funding. In Section 4.3.2 we investigate the extent to which a reduction in credit leads to a decline in firm-level investment activity.

4.3.1 Substitution

Our empirical results suggest that a sudden increase in bank taxation leads to a decline in lending to existing firms. The degree to which this decline in lending affects firm-level investment decisions depends crucially on the extent to which other banks compensate (via increased lending) for the decline.

We therefore investigate if firms (that experience a decline in credit arising from their respective exposure to banks affected by the Tokyo bank tax) compensate for the reduction in loans by borrowing more from banks that are not liable to the Tokyo bank tax. In order to do so, we expand our dataset to include all 235 financial intermediaries. (This compares to 29 banks in the original dataset). We aggregate loan amounts, add bank control variables and construct the average tax shock faced by each firm, *FEX,* using loan-size weighted averages. Financial intermediaries not liable to the Tokyo bank tax are assumed to have experienced no change in taxation.[14] We augment our analysis by investigating if firms compensate for the reduction in loans by issuing new equity or bonds in financial markets. We add any new equity and bonds issued by the firm to firm-level aggregate loan amounts. To test the extent of substitution, we estimate the following cross-sectional regression:

$$\Delta Y_i = a + \beta \overline{FEX_{\iota,1999}} + \gamma X_i + \epsilon_i \qquad (5)$$

where ΔY_i represents the change in our two outcome variables of interest in fiscal year 2000 (2001). The first outcome variable of interest is the change in credit of firm *i* from banks liable to pay the Tokyo bank tax and from those banks not liable. The second outcome variable is the change in credit of firm *i* from all banks plus newly issued equity and bonds of firm *i*. $\overline{FEX_{\iota,1999}}$ is the loan-size weighted average of firm's exposure to the Tokyo bank tax, calculated for the fiscal

[14] 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.

year prior to the introduction of the tax. The vector of loan-size weighted averages of bank control variables, X_i, includes the: capital-to-assets ratio, return on equity, liquidity-to-assets ratio, size and the loan loss provision-to-total loan ratio. We also control for firm-level loan demand using the estimated fixed-effects from Equation (1). β in Equation (5) captures the extent to which firms compensate for the decline in loans by borrowing from other financial intermediaries (and/or financial markets). A coefficient of zero implies that firms are able to fully compensate for any decline in loans.

Columns 1 and 2 of Panel A in Table 5 report the estimates of Equation (5) for the change in credit in fiscal year 2000 and in 2001 respectively. The estimated β-coefficient in Column 2 is statistically significant at the 1% level. Moreover, it is smaller than the coefficient in our baseline results by a factor of 7. These findings suggest that firms compensate for the decline in credit by borrowing more from banks that are less (or not) exposed to the imposition of the Tokyo bank tax. Columns 1 and 2 of Panel B in Table 5 report the estimates of Equation (5) for the change in credit augmented by the change in newly issued equity and bonds in fiscal year 2000 and in 2001 respectively. The coefficient in Column 2 is statistically significant at the 1% level, and is negative and close to zero. This implies that firms substitute almost fully for the decline in credit by either borrowing more from less exposed banks or by equity and bond issuance.

4.3.2 Investment

Our empirical results suggest that firms compensate for the decline in bank lending by borrowing more from banks that are less exposed to the Tokyo bank tax and by borrowing in financial markets.

Columns 1 and 2 in Panel C of Table 5 report the estimates of Equation 3, controlling for a number of factors that could influence firm-level investments. We include firm's Tobin's Q (market-value-to-book-value), the liquidity ratio (cash-to-total assets), the leverage ratio (debt-to-equity), firm size (and its quadratic), the number of banks that are lending to firm *i*, and the

firm's credit demand derived from the estimates of Equation 2, as well as industry and prefecture fixed effects. The various definitions of firm-specific control variables are presented in Table 2 Panel C. The financial ratios (liquidity and leverage) are included to capture firms' ability to service debt obligations. Tobin's Q is included to control for firm profitability. The quadratic of firm size is included alongside firm size to control for potential non-linear effects. To control for firms' use of banking relationships and demand for credit, the number of bank relationships and the estimated fixed effects from Equation 2 are included.

The coefficients on *Firm Exposure* in Column 1 and 2 are negative and statistically significant at the 1% and 5% level respectively. This suggests an adverse effect of the Tokyo bank tax shock on firm investment between FY 1999 and FY 2000 (FY 2001). The effect is economically significant. A one-percentage point increase in *Firm Exposure* results in a reduction in the investment rate of 3.7 percentage points between FY 1999 and FY 2001. Our findings point to a relatively benign impact of the bank tax on firm-level investment rate through a reduction in credit supply. The ability of firms to compensate for any credit reduction by borrowing more from less exposed banks, and by relying on financial markets for funding may have lowered the impact of the bank tax on firm-level investment.

[Insert Table 5 about here]

5. Robustness of Main Findings

This section presents a set of robustness tests including a common trend analysis on the bank-, loan-, and firm-level parts of the paper.

5.1 Common Trend Analysis

Stage 1 (Bank-Level): First, we investigate if systematic differences in the adjustments to tier-one capital exist between banks liable to the Tokyo bank tax and those that are not in the year *before* and *after* the Tokyo bank tax. We conduct a common trend analysis for the pre-

treatment year (fiscal year 1999) and the post-treatment period (fiscal year 2002) by falsely assuming that the Tokyo bank tax was active during these periods. The results from this trend analysis are reported in Table 6 Panel A and show that there are no systematic differences in the changes in tier-one capital between the two groups of banks. The absence of differences between the two groups in the year before the Tokyo bank tax was imposed and in the year after it was repelled by the highcourt lends strong support to our main findings.

Stage 2 (Loan-Level): Second, we show that *Firm Exposure* is not correlated with credit growth across firms *before* and *after* the Tokyo bank tax. Credit growth is measured on a year-by-year basis normalised by the stock of credit as of fiscal year 1999. Column 1 and 4 in Panel B of Table 6 report the coefficients for the pre- and the post-Tokyo bank tax period. The coefficients for those years are not statistically significant suggesting that there are no systematic differences in credit growth of firms with differential exposure to banks liable to the Tokyo bank tax.

Stage 3 (Firm-Level): Third, we repeat the common trend analysis for the firm-level part of the paper. 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 6 Panel C. The coefficients in Column 1 and 4 are not statistically significant suggesting that there are no systematic differences in investment behaviour of firms with different exposure to the Tokyo bank tax.

5.2 Loan Supply versus Demand Effects

Suppose an adverse change to the local tax environment renders investments in the area less profitable for client firms. Then there is less demand for loans, leading to a drop in lending by banks. This argument is particularly relevant for small or medium-sized firms and banks with operations confined to a single geographic area.

To mitigate concerns that local economic effects specific to the Tokyo area are driving our results from our loan-level analysis, a sample is used that contains large listed firms (most

of which are exporting firms and operate throughout Japan) and large unspecialised banks with an extensive domestic branch network. To address further concerns, we exclude from our sample those firms that are headquartered in Tokyo and are therefore more likely to invest locally. Columns 1 and 2 in Panel A of Table 7 report the results from the fixed effects model for a sample without Tokyo-based firms for FY 2000 and FY 2001. The coefficients are statistically significant at the 1% and 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 firm-level analysis by using a simple strategy proposed by Jimenez et al. (2010). We replace firm fixed-effects with firm characteristics in Equation (1) and estimate the model using OLS. If credit supply and demand shocks are highly correlated, the estimated coefficient in the model with firm characteristics would be significantly different from the coefficient in the model with fixed-effects. Columns 1 and 2 in Panel B of Table 7 reports the coefficients for the model with firm characteristics for FY200 and FY 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 firm-level analysis.

6. Summary

Exploiting the Tokyo bank tax shock and a unique loan-level dataset, we investigate the economic impact of bank taxation on the real economy. By means of a firm fixed effects estimation strategy which accounts for changes in firm-specific loan demand, we show that an increase in a bank's exposure to the tax reduces the supply of credit. A key result of our analysis is that banks did pass on the negative shock emanating from the sudden increase in tax to their respective client firms.

Using firm-level data, we find that the reduction in bank lending impacts on firm outcomes. Consistent with the view that firms cannot easily substitute between loan sources,

the investment activity of firms borrowing from bank liable to the Tokyo bank tax is affected. The effect is however relatively mild reflecting the ability of firms to hedge against the negative impact of the tax by borrowing more from less exposed banks.

The negative effect of bank taxes on firm investment has important implications for the efficacy of tax policy given that reduced firm 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

Table 1 | Timeline of Events

FY 1999	
8 February 2000	Announcement of Tokyo bank tax
30th March 2000	Tokyo Metropolitan Assembly passes bank tax legislation
FY 2000	
1st April 2000	Tokyo bank tax comes into force
18th October 2000	Banks file lawsuit against Tokyo bank tax
FY 2001	
6th July 2001	Tokyo Government announces collection of tax revenue associated with the Tokyo bank tax in the amount of 90 billion yen for FY 2000
26th March 2002	Tokyo District Court rules against the Tokyo bank tax
29th March 2002	Tokyo Government files appeal with the Tokyo High Court
FY 2002	
30th January 2003	Supreme Court rejects appeal by Tokyo Government and rules against the Tokyo bank tax

Table 2 | Variable Definitions

Shock	
Pre-shock period	FY1999
Shock period	FY2000–FY 2001
Post-shock period	FY2002
PANEL A | *Bank-level analysis*	**Definition**
Tier-one capital	Percentage growth in tier-one capital relative to tier-one capital measured in pre-shock period (FY1998-FY1999)
Retained earnings	Percentage growth in retained earnings relative to retained earnings measured in pre-shock period (FY1998-FY1999)
Market share	Percentage growth in market share relative to market share measured in pre-shock period (FY1998-FY1999)
Tokyo bank tax	Dummy variable equals one if bank is liable to the Tokyo bank tax
Total assets	Bank total assets (logarithm) measured in the pre-shock period
Tier-one capital ratio	Bank tier-one capital over total assets measured in the pre-shock period
Deposits to total assets	Bank total deposits over total assets measured in the pre-shock period
Loans to total assets	Bank total loans over total assets measured in the pre-shock period
Net interest income	Bank net interest income over operating revenue measured in the pre-shock period
Net income to total assets	Bank net income over total assets measured in the pre-shock period
PANEL B | *Loan-level analysis*	**Definition**
Credit growth	Percentage growth in credit granted within a bank-firm pair relative to credit measured in pre-shock period (FY1999)
Short-term credit growth	Percentage growth in short-term credit (maturity < 1 year) granted within a bank-firm pair relative to credit measured in pre-shock period (FY1999)
Long-term credit growth	Percentage growth in long-term credit (maturity > 1 year) granted within a bank-firm pair relative to credit measured in pre-shock period (FY1999)
Entry	Dummy variable equals one if firm has credit granted from bank during shock period but not in pre-shock period; zero otherwise.
Exit	Dummy variable equals one if bank-firm relationships are terminated; zero otherwise.
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.
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

Table 2 (continued) | Variable Definitions

PANEL C | *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).
Firm exposure	Average exposure of firms to the Tokyo bank tax measured as weighted average of *Bank Exposure* of all banks that are lending to the firm. Weights are bank share of total credit to firm.
Credit demand	Firm credit demand is the fixed effects from estimation of Equation 2
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 firm 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 3 | Descriptive Statistics

	Mean	St. dev.	Min	Max	Obs
Bank-level Analysis					
Tokyo Bank Tax	0.06	0.23	0	1	105
Tier-one capital	-0.04	0.63	-3.84	0.97	105
Retained earnings	-0.09	0.49	-3.4	0.52	102
Total assets	14.17	0.86	12.51	16.54	105
Tier-one capital ratio	0.04	0.03	-0.26	0.06	105
Deposits to total assets	0.88	0.08	0.17	0.94	105
Loans to total assets	0.69	0.07	0.49	0.91	105
Net interest income	9.38	9.05	-2.51	53.56	105
Net income to total assets	0	0.01	-0.12	0	105
Loan-level Analysis					
Bank Exposure	0.5	0.19	0.01	0.71	25100
Credit growth	0.08	0.71	-1	4.25	12925
Short-term credit growth	0.06	0.6	-0.99	3.5	9937
Long-term credit growth	0.08	0.89	-1	5.37	7692
Exit	0.06	0.23	0	1	19805
Entry	0.08	0.28	0	1	14818
Bank Control Variables					
Size	2.85	0.06	2.66	2.91	25100
Capital	0.03	0.01	0.02	0.06	25100
Liquidity	0.06	0.04	0.01	0.26	25100
Loan loss provisioning	0.02	0.01	0.01	0.11	25100
Return on equity	-0.16	0.16	-1.02	0.13	25100
Firm-level Analysis					
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

Table 4

Panel A | *Bank-level Analysis* The Impact of the Tokyo Bank Tax on Bank Retained Earnings, Tier-one Capital and Market Share

	Unmatched sample			*Matched sample*		
Dependent Variable	**Retained Earnings**	**Tier-one Capital**	**Market Share**	**Retained Earnings**	**Tier-one Capital**	**Market Share**
Tax	-0.319**	-0.398**	-0.0777** (0.0375)	-0.623***	-0.544***	-0.152***
	(0.156)	(0.164)		(0.174)	(0.137)	(0.024)
Bank Controls	Y	Y	Y	-	-	-
No. of obs.	102	105	105	102	105	105

Panel B | *Loan-level Analysis* The Impact of the Tokyo Bank on Credit Growth

Dependent Variable	**Credit Growth**		**Short-term credit growth**		**Long-term credit growth**		**Exit**		**Entry**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Bank Exposure	-0.286**	-0.796*	-0.123	-0.584	-0.490**	-0.913**	0.0872	0.0903	-0.0690	-0.180
	(0.114)	(0.432)	(0.0798)	(0.352)	(0.175)	(0.336)	(0.0551)	(0.269)	(0.0701)	(0.156)
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of obs.	12925	9601	9937	7134	7692	5595	19772	20751	14796	12887

Panel A presents estimates of Equation 1 (difference-in-differences regression analysis) for the unmatched sample and the matched sample using the bias-corrected Mahalonobis matching estimator (ATE). The dependent variable is retained earnings, tier-one capital and market share. Bank-specific control variables for the unmatched sample and matching covariates for the matched sample are: deposits to total assets, total assets, loans to total assets, net interest income to operating revenue, net income to total assets, tier-one capital ratio measured in pre-shock period. Heteroskedasticity robust standard errors clustered at the bank level are reported in parentheses. Panel B presents estimates of Equation 2. The dependent variable is credit growth (Column 1 [2]), short-term credit growth (Column 3 [4]), long-term credit growth (Column 5 [6]) within a bank-firm pair between FY 1999 and FY 2000 [FY 2001]. The dependent variable in Column 7 [8] is indicator variable that is one if bank-firm relationships are terminated between FY 1999 and FY 2000 [FY 2001]; zero otherwise. The dependent variable in Column 9 [10] and a dummy variable that is one for new bank-firm relationships and zero otherwise between FY 1999 and FY 2000 [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. ***, **, *, indicate significance at the 1%, 5%, and 10% level respectively.

Table 5 | *Firm-level Analysis*

Panel A | Substitution (loans)	**(1)**	**(2)**
Firm Exposure	-0.0106 (0.0153)	-0.103*** (0.0303)
Firm Credit Demand	Y	Y
Bank Controls	Y	Y
Industry FE	Y	Y
Prefecture FE	Y	Y
No. of obs.	2339	2339
Panel B | Substitution (loans, equity, bonds, cash)	**(1)**	**(2)**
Firm Exposure	-0.007 (0.009)	-0.0482*** (0.0170)
Firm Credit Demand	Y	Y
Bank Controls	Y	Y
Industry FE	Y	Y
Prefecture FE	Y	Y
No. of obs.	2348	2348
Panel C | Investment	**(1)**	**(2)**
Firm Exposure	-0.0543** (0.0272)	-0.0706** (0.0289)
Firm Controls	Y	Y
Industry Fixed Effects	Y	Y
Prefecture Fixed Effects	Y	Y
No. of obs.	2357	2296

The dependent variable in Column 1 [2] of Panel A is the growth in credit issued by banks affected by the Tokyo bank tax and non-affected banks between FY 1999 and FY 2000 [FY 2001]. *Exposure* is the average exposure of firm i to the Tokyo bank tax measured as the weighted average of *Bank Exposure* of all banks that are lending to the firm. Weights are bank share of total credit to firm i. Bank-specific control variables are loan-size weighted averages of bank capital, return on equity, provisions to loans, liquidity, bank size as of FY1999. The dependent variable in Column 1 [2] is the growth in credit issued by banks affected by the Tokyo bank tax and non-affected banks plus issuance of new equity and bonds of a firm between FY 1999 and FY 2000 [FY 2001]. The dependent variable in Column 1 [2] of Panel C is firm cumulative net investment in FY 2000 [FY 2001] divided by the value of total assets as of FY 1999 (pre-shock). *Firm Exposure* is the average exposure of firm i to the Tokyo bank tax measured as the weighted average of *Bank Exposure* of all banks that are lending to the firm. Weights are bank share of total credit to firm i. Control variables are firm credit demand, firm size (+ quadratic), firm liquidity, firm leverage, firm Tobin's Q as of FY1999. Firm industry and prefecture fixed effects are included. Heteroskedasticity robust standard errors clustered at the firm-level are reported in parentheses. ***, **, *, indicate significance at the 1%, 5%, and 10% level respectively

Estimated models

Panel A: $\Delta Funding_i = a + \beta \overline{FEX_{\iota,1999}} + \gamma X_i + \epsilon_i$

Panel C: $\Delta Invest_i = a + \beta \overline{FEX_{\iota,1999}} + \gamma X_i + \epsilon_i$

Table 6 | Common Trend Analysis

Panel A | Tier-One Capital	**FY 1999 (pre-shock)**	**FY 2000**	**FY 2001**	**FY 2002 (post-shock)**
Tokyo Bank Tax	0.207 (0.190)	-0.553** (0.249)	-0.0652 (0.659)	0.0509 (0.132)
Bank Controls	Y	Y	Y	Y
No. of obs.	105	105	105	105
Panel B | 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 C | Investment Rate	**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

This table list the results from the trend analysis of pre- and post-shock trends. The dependent variable in Columns 1-4 in Panel A is the change in tier-one capital. Bank-specific control variables are deposits to total assets, total assets, loans to total assets, net interest income to operating revenue, net income to total assets, tier-one capital ratio lagged by one period. The dependent variable in Columns 1-4 in Panel B 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 firms 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. The dependent variable in Columns 1-4 in Panel C 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 firm i to the Tokyo bank tax measured as the weighted average of *Bank Exposure* of all banks that are lending to the firm. Weights are bank share of total credit to firm 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 mainbank level are reported in parentheses. ***, **, *, indicate significance at the 1%, 5%, and 10% level respectively.

Table 7 | Robustness Tests

Panel A | Non-Tokyo Firms	**(1)**	**(2)**
Bank Exposure	-0.318*** (0.103)	-0.848** (0.376)
Bank Controls	Y	Y
Firm Fixed Effects	Y	Y
No. of obs.	6082	4609
Panel B | OLS	**(1)**	**(2)**
Bank Exposure	-0.316** (0.112)	-0.826* (0.430)
Bank Controls	Y	Y
Industry Fixed Effects	Y	Y
Prefecture Fixed Effects	Y	Y
No. of obs.	12915	9601

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 year 1998. Control variables are loan-size weighted averages of bank capital, return on equity, provisions to loans, liquidity, bank size. Firm industry and prefecture fixed effects are included. The dependent variable in Columns 1 [2] in Panel B is credit growth to a non-Tokyo based firm between FY 1999 and FY 2000 [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 relationship as of FY 1999. The dependent variable in Columns 1 (2) of Panel C is credit growth to a firm between FY 1999 and FY 2000 [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 relationship as of FY 1999. Firm industry and prefecture fixed effects are included. Heteroskedasticity robust standard errors clustered at the mainbank level are reported in parentheses. ***, **, *, indicate significance at the 1%, 5%, and 10% level respectively.