Does the Policy Lending of the Government Financial Institution Mitigate the Credit Crunch? Evidence from the Loan Level Data in Japan

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Abstract

Using the data of individual loan contracts extended by the government owned Japan Finance Corporation for Small and Medium Enterprise (JASME), we examine whether the JASME's lending from December 1997 through March 1999 mitigated the effects of the credit crunch. We find that on average the JASME offset more than a quarter of reduction in lending by a firm's main bank due to poor capital adequacy. We further find that the effect of JASME's loans on a firm's performance is negative in three years after loans are made but dies out afterward.

Keywords: government financial institution, credit crunch, loan contracts
JEL classification: G01, G21, G28

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1. Introduction

In the 1980's, Japanese banks that had lost loans to large *keiretsu* firms reoriented their lending portfolios toward lending to the real estate sector since real estate lending was largely secured by real estates whose collateral values kept rising and banks had expected somewhat ex-post wrongly that they would never fall. Real estate prices finally began to fall in 1991 and soon saw rollercoaster slide in 1991. As a result, many of loans that had been made during the real estate price bubble period became non-performing as borrowers became underwater. Banks, however, decided to leave these problem loans unrecognized for the time being, partly expecting that real estate prices would bounce back shortly and partly being reluctant to see their capital severely eroded by disposing these non-performing assets.

It is in March 1998, or at the end of FY 1997, that the Ministry of Finance, then a banking regulator requested banks to rigorously self assess their assets as the Prompt Corrective Action (PCA) framework based on the capital adequacy was about to begin in April 1998, the beginning of the following FY 1998, so that an individual bank's capital adequacy needed to be more accurately measured. This resulted in large losses of banks' capital, triggering the credit crunch, as capital depleted banks attempted to drum up their capital adequacy ratios by reducing their risk assets, which are the weighted sum of classes of assets with a weight assigned to each asset class being positively associated with its perceived risk. Since under the Basel I that was in effect at that time all corporate loans were assigned the highest risk weight of 1 regardless of how risky a loan was, banks cut back on lending to firms across the board, or worse reduced lending more modestly to unhealthy or unproductive firms at the cost of aggressive reduction in lending to relatively healthy and potentially productive firms because banks attempted to avoid further recognitions of non-performing loans by

defaulting unhealthy firms through treating them more generously using rescue lending. The banks' cutting back on lending even to healthy firms became known as a credit crunch and well documented in the literature (Bernanke and Lown, 1991, Woo, 2003, Watanabe, 2007).

The credit crunch is detrimental to the real economic activities because the reduced credit supply constrains firms' investments. Small and medium enterprises (SMEs) that constitute the lion's share of firms operating in Japan are generally less transparent than larger firms because very few SMEs are publicly listed so that they are not required to make their financial statements publicly available. Therefore, SMEs are mostly financially dependent on banks. As it is hard for these SMEs to raise capital externally, they cannot help but hold off investment when banks are reluctant to lend to them.

As such, the governments are entitled to conduct policies aiming at offsetting such adverse effects of the credit crunch inflicted on the real economic activities. The policy measures deployed by the Government of Japan can be divided into four types.

First, large amounts of public capital were infused into banks. This was aimed at strengthening banks' capital by raising the numerator of the capital adequacy ratio so that banks could resume lending. Two major public recapitalization programs were implemented in response to the capital crunch of FY 1997. The first of the two was implemented in March 1998, where 21 mostly systematically important large banks received total public capital of 1.8 trillion yen, while, in March 1999, 15 mostly large banks received the total amount of 7.5 trillion yen of public capital. The effects of these public recapitalization programs are well researched in the literature (Montgomery and Shimizutani, 2000; Allen et al., 2011; Giannetti and Simonov, 2013).[1]

Second, the protection of depositors by the deposit insurance system was greatly expanded. The insurance cap at 10 million yen for principals was abandoned in June

[1] Duchin and Sosyura (2000), Bayazitova and Shivdasani (2012) and Li (2013) investigate the effects of TARP public capital infusions into US banks during the global financial crisis.

1996, making the system the unlimited (blanket) insurance. The blanket insurance had continued until April 2002, when the insurance cap was reinstated so that only up to 10 million yen of principals and accruing interests became insured. The expansion of the deposit insurance protection was intended to relax banks' ability to lend by lowering their costs of funding through taking deposits, when their costs to raise funds from the markets had sharply increased due to wholesale lenders' concerns about their financial health.[2] [3]

Third, the public credit guarantees of loans originated by private financial institutions including banks were greatly expanded. The Government launched the Special Guarantee Program, under which SMEs were fully guaranteed their repayments of loans borrowed from banks by publicly insured Credit Guarantee Corporations. This program was aimed at publicly complementing declining risk taking capabilities of private banks by guaranteeing their loans made to SMEs.

Fourth, but not the least important, the Government expanded policy lending by government financial institutions (GFIs), particularly lending to SMEs. In December 1997, the Japan Finance Corporation for Small and Medium Enterprise (JASME) established the "Fund to Respond to Changes in Financial Environments" and began to help smooth SMEs raising working capital. It is the efficacy of the lending by this government lender who targets SMEs that we explore in this study. The roles played by state owned banks (SOBs) during economic downturns and financial crises have become the focus of the recently evolving literature particularly in light of the global

[2] The widening premiums Japanese banks had to pay above the rates charged to American and European counterparts in international interbank markets became known as the Japan premium.
[3] For details about the expansion of the deposit insurance coverage in response to the banking crisis in Japan, see Guizani and Watanabe (2016).

financial crisis of 2008 and 2009 but the empirical results are mixed.[4]

To the best of our knowledge, we are the first to directly test whether an SOB (SOBs) behaved in such a way to mitigate the adverse impact of the private lenders' reduction in credit supply during the financial crisis period and if so to what extent using the contract and firm level data. We examine whether the JASME was more aggressive in lending to SMEs that were more greatly affected by the credit crunch. More precisely, we examine whether the JASME extended larger amounts of loans to the firms whose main banks reduced lending more greatly. The extent of an individual bank's reduction in lending supply is computed based on Watanabe (2007) who estimates the effect of the shortage of the capital adequacy relative to its target on the lending growth for the sample of domestically licensed banks during the period of the credit crunch.

We are interested not only in the JASME's response to the credit crunch but also how firms that borrowed loans aimed at mitigating the effects of credit crunch performed ex post. To this end, we examine how the JASME's lending as explained by the extent of reduced lending supply of a firm's main bank affected the firm's ex-post performance as measured by ROA and EBITDA to total assets ratio.

The primary sources of the data we use in this study are the data provided by the Japan Finance Corporation (JFC) that include the data of loan contracts extended by the JASME, a predecessor to the JFC's Small and Medium Enterprise Unit, the data about the firms that borrowed from the JASME, and the data about these firms' lenders.[5]

[4] Chapter 4, " Direct State Interventions", of the World Bank (2013) is a good survey of the relevant empirical studies.

[5] The JFC was established in October, 2008, by consolidating the JASME with three other government financial institutions. The functions of the former JASME was taken over by the JASME's Small and Medium Enterprise Unit.

The regression of Watanabe (2007) whose results we use when estimating a measure for a bank's reduction in lending is run on the sample of domestically licensed banks.

Using the sample of loan contracts extended by the JASME during the period from December 1997 through March 1999, we find that the JASME extended the larger total amount of loans, particularly of working capital loans to the firms whose main banks reduced lending more greatly due to the poorer capital adequacy. Our findings are economically significant. On average, the JASME offset more than a quarter of reduction in lending by a firm's main bank due to poor capital adequacy.

As for the effect of JASME's lending on the ex-post firm performance, we find that the JASME's lending that was meant to mitigate the effects of the credit crunch was negatively associated with a firm's performance in three years after loans were made but dies out afterward.

The paper is arranged as follows. The next section discusses the credit crunch and policy measures including a state owned bank's lending to deal with it and introduce the literature about state-owned banks. Section 3 explains the data and the empirical methodology. Section 4 presents the empirical results. Section 5 concludes.

2. The Credit Crunch, Policy Measures and the Literature About State-Owned Banks

2.1. The Credit Crunch

According to Bernanke and Lown (1991), a credit crunch is defined as a "a significant leftward shift in the supply curve of bank loans, holding constant both the safe real interest rate and the quality of potential borrowers." Finding that the loans

outstanding of depository institutions decreased by 3.6% in 1991, while they had increased in previous recessions, Bernanke and Lown argue that declining bank lending caused firms to perform poorly. They also find that in New Jersey, a fall in the ratio of capital to total assets at the end of 1989 by 1 percent point is associated with a fall in the annualized loan growth measured over the third quarter of 1990 through the first quarter of 1991 by 2.7%.

A credit crunch is likely caused as a side effect of the capital adequacy requirements, which are primary regulations meant to ensure banks' financial health under the modern regulatory framework. The requirements request a bank to hold capital no less than the minimum amount of capital proportional to the bank's risk assets that increase in risks of its assets. The basic premise behind the requirements is that a better capitalized bank is resilient to negative shocks to its assets such as asset devaluations caused by writing off non-performing loans, thus less susceptible to insolvency.[6]

The capital adequacy requirements, however, likely exacerbate a bank's unwillingness to lend. This is well known problem of procyclicality. Because the capital adequacy ratio is defined as the ratio of capital to risk assets, in response to losses on capital, a bank compresses its risk assets by reducing assets designated as high risk assets under the regulatory framework such as corporate loans. This reduction in lending is detrimental to investment of firms that are liquidity constrained and seek external credits to finance their investment. Theoretically speaking, poorly capitalized

[6] Holmstrom and Tirole (1997) develop a model to show the mechanism through which a credit crunch occurs even in the absence of capital adequacy requirements. They discuss that, in the presence of informational asymmetry about a firm's use of a loan that allows a firm to engage in moral hazard of diverting the borrowed fund to less productive use, a poorly capitalized bank resorts to reducing lending to firms.

banks can issue equity to prop up their capital adequacy ratios, but as Stein (1998) discusses, it is impractical for capital depleted banks to raise equity in the presence of asymmetric information between banks and their potential shareholders. [7] [8]

2.2. The Japanese Credit Crunch of 1997-1998.

Figure 1 shows the trends of the year on year growth of total loans and loans to small and medium enterprises (SMEs) outstanding held by banking accounts of domestically licensed banks. Both total loans and loans to SMEs exhibit negative year on year growth in the first quarter of 1998, which is the final quarter of FY 1997, but the negative growth for the latter is more pronounced. The negative growth for loans to SMEs continues until the first quarter of 2001.

Figure 2 shows the trends of the spread of the average agreed lending rate for domestic banks of different types above the interest rate of a 5 - year maturity Japanese Government Bond (JGB). [9] It appears that the spread rises from about 1996 through 1998 regardless of bank type.

Figure 3 shows the trends of financial institutions' lending attitude diffusion indices of *tankan* survey for small and medium enterprises conducted by the Bank of Japan. These indices sharply decrease in the first quarter of 1998 across the board.

[7] For the theoretical explanations of the difficulty to raise equity externally faced by a bank when its capital is depleted, see Stein (1998).

[8] As another mean to prop up capital adequacy, the practice known as forbearance lending or evergreening to prevent loans from being classified as non performing by conducting rescue lending to borrowers to whom existing loans outstanding are de fact non-performing became widespread among Japanese banks. For details about this practice, see Sekine et al. (2003) and Peek and Rosengren (2005).

[9] We use the interest rate on a 5 - year maturity JGB because this maturity is closest to the average remaining duration to maturity of banks' loans outstanding, 4.9 years, among maturities of JGBs issued in primary markets. The average remaining duration to maturity is computed by taking the weighted average of the average remaining durations to maturity for city banks, regional banks and regional 2 banks with the loans outstanding as a weight, which are reported in Figure/Table 5 of Yamamoto (2013).

These figures depicting trends of aggregate variables all more or less point to the occurrence of the credit crunch in the first quarter of 1998 when the credit crunch allegedly took place; loans decreased, the banks' lending spread sharply increased and the BOJ's *tankan* survey's financial institutions lending attitude diffusion indices were seriously deteriorated. We, however, are unable to tell whether or not a credit crunch as defined by Bernanke and Lown (1991) had actually occurred by only examining those aggregate stylized facts. Decreasing loans outstanding may mean that weaker loan demand. The widening lending spreads and worsening lending attitude DIs may reflect that the credit quality of borrowers became deteriorated. Ultimately, we need the micro level data to identify the banks' reduced lending supply due to their depleted capital.

Watanabe (2007) disentangles the effect of bank capital on bank lending supply with the positive association between the slower (greater) demand for loans and capital losses (retained earnings) due to the contemporaneous economic downturn (economic upturn) by employing an instrumental variable for bank capital, the share of loans to the real estate industry among total loans at the end of the bubble period, which captures a structural cause of capital losses after the bust of the bubble in the late 1990s that is independent of a contemporaneous business cycle fluctuation. By doing so, one is able to measure the causal effect of bank capital on bank lending supply. Measuring a bank's capital adequacy by the differential between the bank's actual capital adequacy and its target, Watanabe (2007) finds that in FY 1997, in aggregate, the bank's insufficient capital adequacy reduced lending to the manufacturing industry and the lending to "healthy" non-manufacturing industries, which exclude the industries to which the share of loans that became non-performing was higher than the industry wide

average, by 5.7% and 8.5%, respectively, confirming that the credit crunch made the access to bank credit by relatively healthy firms challenging.

2.3. The JASME and Government Interventions in Lending to Mitigate the Japanese Credit Crunch

The primary objective of the JASME, which was established in August 1953, was to make loans to SMEs whose access to private credit is relatively limited. By laws, the JASME was stipulated to lend long-term loans with maturity no less than one year. The loans outstanding of the JASME stood at 1,820 billion yen as of the end of FY 1997. The JASME was disestablished in October 2008 and was consolidated into a newly established GFI, the Japan Finance Corporation (JFC) along with three other incumbent GFIs.

As a credit crunch became increasingly evident, the Government of Japan took a wide range of actions to ease the stress felt by the firms, particularly bank dependent SMEs that were having increasing difficulty in meeting their financing needs. The Government announced three comprehensive policy packages in which the adverse effects of the credit crunch from late 1997 through 1998 were explicitly addressed. The three are the "Emergency Economic Measures to Clear a Path for the 21st Century" (hereafter referred as the "Emergency Economic Measures") released at the Meetings of Ministers for Economic Measures in November 1997, the "Comprehensive Economic Measures" released in April 1998 and the "Outline of the Measures for SMEs Affected by the Banks' Less Willingness to Lend" (hereafter referred to as the "Outline"), which the Cabinet approved in August 1998.[10] [11]

[10] The policy measures mentioned in the "Outline" intended to mitigate adverse effects of the credit

Among these three, it is the first package, the "Emergency Economic Measures", that lead to the creation of the largest counter credit crunch program of the JASME. This package specifically requested government financial institutions to launch the lending programs targeting SMEs potentially having a hard time financing because of, for instance, having difficulty securing working capital after undergoing substantial changes in transactions with (private) financial institutions. In response to the request in this package, by inaugurating the working capital targeting "Fund to Respond to Changes in Financial Environments" (hereafter referred to as the "Fund"), the JASME became more committed to greatly expanding its policy lending to SMEs likely adversely affected by the credit crunch.[12]

The amount of JASME's loans extended under the "Fund" is far greater than the total amount of its loans extended under various measures the JASME employed under two later packages. Thus, our primary interests lie in the JASME's lending behavior after its establishment of the "Fund" in December 1997. As Figure 4 shows, the JASME's working capital loans the "Fund" targeted grew more rapidly during the period from FY 1997 through FY 1999 than before, while its equipment loans did not.[13]

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crunch included the expansion of SME lending by GFIs, the JASME included, as well as recapitalizations of GFIs by the government. In response to this package, the JASME launched the "Special Loan Program to Support Business Expansions of SMEs" and the "Special Loan Program to Smooth Working Capital of SMEs".

[11] In response to a suggestion of the "Outline" to establish the working capital lending facility targeting SMEs having difficulty managing working capital due to such problems as reduced sales, the JASME established the unsecured lending facility and the low loan rate lending facility targeting SMEs intending to expand business. The JASME also relaxed the conditions an SME needs to meet to be eligible for the "Special Loan Program to Smooth Working Capital of SMEs" and for the "Special Program to Support Business Expansion of SMEs".

[12] The "Fund to Respond to Changes in Financial Environments" was transferred to the "Special Lending Program to Respond to Changes in Financial Environments" in April 1998.

[13] The amount of equipment loans outstanding had substantially exceeded that of working capital loans outstanding over the 1990s until FY 1996. The latter almost overtook the former at the end of FY 1997. The latter had exceeded the former since FY 1998, reflecting the faster growth of the latter than that of the former. During the period from December 1 through March 31. 1999 (the end of FY 1998), 81 percent of firms in our sample described in 3.1 borrowed working capital loans only,

2.4. The Relevant Literature about State Owned Banks

The World Bank (2013) reports that in developed economies the asset share of state owned banks in the financial system increased from 6.7 percent during the period 2001-2007 to 8 percent during the period 2008-2010, while in developing economies the share decreased from 20.5 percent to 17.3 percent.

The extant studies using the bank level data or the firm level data report the mixed results about SOBs in relation to the business cycle or the financial crises. Ianonetta et al. (2010) find that European SOBs were not more counter-cyclical (less procyclical) than private banks over the 2000-2009 period. Cull and Peria (2013) find that during the crisis period of 2008 and 2009 lending by SOBs was counter-cyclical in Latin America but that it was not in Eastern Europe. Bertay et al. (2015) find that lending by SOBs is less pro-cyclical than lending by private banks in developing countries and that it is counter-cyclical in developed economies. Duprey (2015) find that SOBs are less cyclical than private banks in high income and middle income countries but are not in low-income countries. Coleman and Feler (2015) find that in Brazil the share of government bank branches in a locality during the crisis period of 2008 and 2009 is associated with greater lending in that locality. Using the same JASME provided data as ours, Ogura (2015) finds that during the period of the global financial crisis Japanese SMEs increased the share of borrowing from GFIs if their main banks were large banks whose loans outstanding to SMEs decreased in aggregate.

Another concern about SOBs is whether their lending help firms become more

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while only 9 percent and 10 percent of firms borrowed both working capital loans and equipment loans, and equipment loans only, respectively. This suggests that during the credit crunch period the JASME shifted its focus toward working capital loans in order to help mitigate financial difficulties faced by firms.

productive or profitable, particularly their counter-cyclical lending during the crisis period does so.

Using the data of localities in Brazil, Coleman and Feler (2015) find that, the share of government branches in a locality is not statistically significantly associated with the firm productivity of that locality as measured by output per firm, wage bill per firm and exports per firm during the crisis of 2008 and 2009. Using the data of Japanese listed firms over the period from 1978 through 1996, however, Lin et al. (2015), find that the lending to a listed firm by GFIs is positively associated with the contemporaneous investment and ex-post ROA one year later and these associations are stronger in the crisis period of 1991 through 1994 when the real GDP growth slowed down markedly.

Using the plant level data of manufacturing firms in Brazil during the non-crisis period from 1995 through 2005, Carvalho (2014) finds that the firms eligible for borrowing loans from SOBs shift their employment to the states politically attractive to incumbents but do not expand the overall employment. Using the data of listed firms in Brazil over the period from 2002 through 2009, Lazzarini et al. (2015) find that the amount of loans a firm borrows from BNDES, a government development bank, affects the firm's performance as measured by ROA, the EBTDA to total assets ratio and Tobin's q neither positively nor negatively. Using the establishment level data of manufacturing firms in Colombia from 2004 through 2009, Eslava et al. (2014) find that small firms that borrowed loans from Bancoldex, a public development bank, are associated with larger employment, larger investment and larger output. Using the data of firms in China over the period from 1998 through 2009, Ru (2015) finds that the public funding of state owned enterprises (SOEs) through the lending to a local government by state owned China Development Bank is associated with greater

employment by SOEs and smaller employment by private firms in the locality.

3. Data and Methodology

3.1. The Hypothesis and the Empirical Models

Our primary objective is to examine the efficacy of the JASME's policy to expand lending aimed at mitigating adverse effects the credit crunch inflicted on SMEs. If the JASME's lending achieved its policy objective, it should have lent more aggressively to a firm that faced a financial constraint by the credit crunch more greatly, and thereby played a role of compensating private financial institutions (banks). Therefore, the hypothesis we need to test on is, "the amount of loans the JASME lent to a firm whose main bank cut bank on more lending supply was greater."

The empirical model to test on this hypothesis we employ is the following equation (1).

$$JASME_i = \alpha_0 + \alpha_1 CAPSUR_i + \alpha_2 Z_i + \varepsilon_i \quad \cdots (1)$$

$JASME_i$ is a measure for the amount of loans the JASME extended to firm i during the period from December 1997 through March 1999, which we call the JASME credit crunch policy period. Z_i is a set of control variables. Following Gopalan et al. (2011), we employ, as control variables, the logarithm of total assets, ROA as defined by net income divided by total assets and the leverage as defined by total liabilities, which equals total assets less net wealth, divided by total assets.[14] [15] [16] [17] These

[14] In order to avoid taking logarithm of 0, when taking logarithm of a variable such as total assets,

financial statement based variables are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998. $CAPSUR_i$ is the growth rate of lending (supply) by firm i's main bank due to the bank's capital adequacy in excess of its target. We will explain the way CAPSUR is constructed shortly.

For $JASME_i$, we examine amounts of two types of loans grouped in the JFC contract data, equipment loans and working capital loans as well as total loans that are a sum of amounts of equipment loans and working capital loans. If the JASME extends multiple loans to a firm during the JASME credit crunch policy period, we obtain the total amount of loans for each loan type by summing loan amounts.

We construct CAPSUR based on the regression run by Watanabe (2007). Watanabe estimates the following regression equation using the data extracted from the Nikkei NEEDS bank financial data.

$$\Delta lnL_{j,97} = \beta_0 + \beta_1 \Delta lnL_{j,96} + \beta_2 \left\{ \frac{K_{j,97}}{A_{j,97}} - \left(\frac{K_j}{A_j} \right)^{target} \right\} + \beta_3 X_j + \epsilon_j \quad \cdots (2)$$

Where $ln\Delta L_{j,97}$ is the growth rate of bank j's loans excluding loans to "troubled" industries that consist of real estate, construction, services and wholesale and retail

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we take logarithm of 1 plus the value for that variable.

[15] For a reader's reference, a firm is undercapitalized when its leverage is greater than 1.

[16] We do not control for a firm's industry because as explained in 3.2, a firm's industry is unidentifiable in our data.

[17] Sapienza (2004), Khwaja and Mian (2005) and Imai (2009) find the evidence that SOBs conduct politically motivated lending in Italy, Pakistan and Japan, respectively. As our data do not provide information that implies a firm's political affiliation such as a firm's location, we are unable to discuss whether the JASME lent to ex-ante unprofitable firms for political objectives.

industries, which are the industries where the share of non-performing loans exceeds the average across the entire industries . $\frac{K_{j,97}}{A_{j,97}}$ is the ratio of capital to total assets of bank j, $\left(\frac{K_j}{A_j}\right)^{target}$ is its time invariant target as estimated by the time series average of bank j's ratio of capital to total assets over the three year period from FY 1992 through FY 1994. X_j is a set of dummy variables for such bank types as city banks, trust banks and regional banks while regional 2 banks are a base group. ϵ_j is an error term. Watanabe (2007) identifies the estimate of β_2, $\widehat{\beta_2}$ by employing a bank's share of lending to the real estate industry in FY 1989 and the bank's 10 year-growth of lending share to the real estate industry since FY 1980 as instrumental variables that are independent of the business cycle driven correlation between bank capital and borrowing demand.[18]

CAPSUR is constructed as the product of the differential between the actual ratio of capital to total assets and its target, which Watanabe calls the capital surplus, $\left\{\frac{K_{j,97}}{A_{j,97}} - \left(\frac{K_j}{A_j}\right)^{target}\right\}$ and $\widehat{\beta_2}$, $\widehat{\beta_2}\left\{\frac{K_{j,97}}{A_{j,97}} - \left(\frac{K_j}{A_j}\right)^{target}\right\}$. CAPSUR is the growth rate of loans excluding loans to "troubled" industries that can be explained by the capital surplus of a bank. A negative CAPSUR means that to what extent a bank's inadequate capital slowed the bank's lending growth. Thus, (the negative of) CAPSUR is a

[18] Ideally, we could employ a change in a firm's loans outstanding owed to its main bank in FY 1997 as an independent variable and then instrument this variable by CAPSUR. The loans outstanding of a firm's main bank are available in the JFC financial institutions data. Thus, theoretically, one could compute $\Delta lnL_{ij,97} = lnL_{ij,97} - lnL_{ij,96}$, which is the log growth of loans firm i borrows from bank j, a firm i's main bank, in FY 1997, and then compute a firm specific CAPSUR. By doing so, we could capture the JASME's direct response to a firm's finances affected by its main bank's capital adequacy. To do so, one requires the data about firm i's loans outstanding borrowed from bank i for FY 1996. As we will report in Table 1-1, there are 2,061 firms in our base sample. Among these firms, it is only for 107 firms that the information about their main bank including the loans outstanding they are owed to it are available for FY 1996. Thus, using the individual firm level data about the loan growth would substantially reduce the number of observations and be impractical.

measure for the extent of bank j's reduction in lending supply due to poor capital adequacy, which is a variable to measure the extent of the credit crunch a firm that borrows from bank j faces.[19]

We also attempt to assess the JASME's policy lending by examining the effect of its lending on a borrowing firm's ex-post performance. In practice, we run the following regression.

$$PERFORMANCE_i = \delta_0 + \delta_1 JASME_i + \delta_3 W_i + \nu_i \quad \cdots (3)$$

Where $PERFORMANCE_i$ is a measure for a firm i's ex-post performance. We employ ROA as of fiscal years after the period of JASME loans being lent, the period from December 1997 through March 1999, as performance measures. As robustness tests, we examine EBITDA to total assets ratio, where EBITDA is constructed as a sum of the operating profit and the depreciation cost. As for our main independent variable, $JASME_i$, we use the logarithm of total loans firm i borrowed from the JASME. W_i is a set of control variables. We employ a lagged logarithm of total assets as well as the ex-ante performance measure as employed when running the regression of equation (1) as control variables. We control for the ex-ante performance because a firm that was less (more) profitable before the loans were borrowed may continue to be less (more) profitable due to the remaining effect of the pre borrowing business structure. ν_i is an error term.

We run the 2SLS regressions using all the independent variables employed in equation (1) excluding the control variables contained in a vector W, which include

[19] For details about estimating equation (2), see Watanabe (2007).

CAPSUR. This is meant to examine the effect of the JASME loans extended as measures to make up for reduced lending by a firm's private lender (main bank) on its performance. We intentionally excluded the variables included the lagged total assets from a set of instrumental variables because it is an ex post variable that is measured after the JASME extended all the loans.

Methodologically, our empirical approach most closely resembles that employed by Aiyar et al. (2014). Using the bank level data of the United Kingdom, they run the regressions of the lending growth by a foreign bank branch not subject to the Basel capital requirements on the local lending growth by domestic banks subject to the requirements instrumented by changes in their regulatory requirements in order to examine the effects of changes in capital requirements on unregulated foreign banks competing with regulated domestic banks through the (negative) impacts of the more stringent requirements on lending by domestic banks. We believe our approach improves over theirs because a dependent variable is a firm level measure for new borrowing rather than the bank level lending growth employed by them. This is because our firm level measure for a firm's borrowing from the JASME is constructed by summing all the loans each firm borrowed from the JASME during a fixed (credit crunch) period and is a measure for the JASME's new lending to that firm, whereas the lending growth is not a secular measure for new lending but is affected by any other changes in the amount of total loans outstanding including loan write-offs and redemptions of loans.

3.2. Data

The data used in this study are primarily firm level and contract level micro data

provided by the JFC. We select contracts agreed over the period of one year and four months from December 1, 1997 through March 31, 1999, which corresponds to the period from the date of inauguration of the "Fund to Respond to Changes in Financial Environments" through the end of FY 1998. We end the sample period at the end of FY 1998 because the credit crunch largely subsided after FY 1999 owing to the overall success of the mix of various policy measures.

The data provided by the JFC are the data about loan contracts extended by the JFC (the JFC contract data) along with the data about financial statements of the firms collected by the JFC (the JFC financial statements data) and the data about the information about financial institutions each firm borrows from including the JFC (the JFC financial institutions data). What is unique about our loan contract data is that they are not randomly sampled but cover all the contracts extended by the JFC.

The JFC contract data record the contract details such as the facility size and the date of loan execution. The JFC financial statements data record the financial statements of the firms at dates of their annual fiscal closing. Similarly, the JFC financial institutions data record the details about the financial institutions a firm borrows from at dates of their annual fiscal closing. We, however, are unable to identify any other attribute of a firm including its industry. Our dataset is compiled by merging the data about firms extracted from the JFC financial statement database, the data about firms' lenders extracted from the JFC financial institutions database and the data about contracts that were extended from December 1st, 1997 through March 31st, 1999 extracted from the JFC contract database so that every firm recorded in it has at least one contract the JFC extended to during this period.

We link the abovementioned dataset constructed based on the data provided by the

JFC with the data about firms' main banks. We utilize the data about firms' main banks used by Watanabe (2007) originally collected from the Nikkei NEEDS databank. As Watanabe analyzes 126 domestically licensed banks under the Banking Act that operated as of the end of FY 1997, we drop the contracts extended to the firms whose main bank was not a domestically licensed bank under the Banking Act such as a *shinkin* bank. [20] After consolidating multiple contracts for a firm, we are left with 2,061 firms in our base sample.[21]

Although the JFC financial institutions database records the information about a firm's lenders that are neither the firm's main bank nor the JFC, we utilize the information about the firm's main bank only because in our view it is when the firm's main bank becomes less willing to lend to the firm that the firm is the most severely adversely affected by the credit crunch. [22] [23]

4. Results

4.1. Descriptive statistics

Table 1-1 presents descriptive statistics of variables used to construct dependent variables and independent variables used in equation (1).

[20] Watanabe (2007) examines the relationship between the actual capital to asset ratio and its target year by year and finds that all 14 large banks failed to meet their target in FY 1997, that many large banks were able to meet their target in FY 1998 thanks primarily to the massive public capital infusions and that all but three large banks achieved their target in FY 1999.

[21] We consolidate all loans extended to a given firm because we are interested in how the JASME responded to the credit crunch. The JASME did not necessarily deal with a firm affected by the credit crunch in a single loan contract. Any follow up loan contract subsequent to the first contract was likely intended to mitigate the effect of the credit crunch on the firm.

[22] A firm's main bank is self reported by the firm to the JASME.

[23] For details about assembling our data, see the Appendix. The relatively small number of firms in our sample despite that the original data are the population of contracts extended by the JASME has to do with its recording policy on the financial statements and the information about financial institutions of its borrower, which will be explained in greater details in the Appendix.

As for measures for loans we use for dependent variables, amounts of total loans, working capital loans and equipment loans are on average 78 million yen, 61 million yen and 16 million yen, respectively. The median of the amount of equipment loans is 0 presumably because equipment loans are borrowed to replace equipment such as machineries every several years. Total assets are on average 1.62 billion yen.

As for independent variables, CAPSUR, a measure for the lending growth due to a firm's main bank's capital surplus is on average negative at -2.4 percent. The ratio of capital to total assets of main banks of our sample firms is on average falls short of its target at the end of FY 1997 so that they reduced lending. The average ROA and the average leverage of our sample firms are -0.008 and 0.88, respectively, suggesting that our sample firms on average incur small accounting losses and are highly leveraged. Though not reported on the table, about 10 percent of sample firms are undercapitalized because their leverage is greater than 1.

Table 1-2 presents the descriptive statistics of dependent and independent variables used when running the regressions of equation (3). The firms whose ROA is below or at the 1 percentile or those whose ROA is above or at the 99 percentile are dropped as outliers and those whose EBITDA to total assets ratio is below or at the 1 percentile or those whose EBITDA to total assets ratio is above or at the 99 percentile are dropped, when the ROA and the EBITDA to total assets ratio are used as a dependent variable, respectively.[24] As years go by, ROA trends down as indicated by its mean and its distributions becomes widened. We do not find any substantial changes in other variables over time.

[24] When performance regressions of equation (3) are run, the sample size is substantially smaller than the base sample described in Table 1-1 because we use the sample of firms in the base sample whose necessary financial statements after FY 1998 are available.

4.2. The Baseline Results for the JASME Loans Regressions

Table 2 presents the regression results of equation (1) when a dependent variable is either the logarithm of total loans, that of equipment loans or that of working capital loans. The regressions are run using the OLS.[25]

The coefficient of CAPSUR, which is a measure for the loan growth by a firm's main bank caused by the bank's capital surplus, is negative and significant when a dependent variable is either the logarithm of total loans or that of working capital loans, but it is not when the dependent variable is the logarithm of equipment loans. These results show that the JASME made a larger amount of new working capital loans to a firm whose poorly capitalized main bank reduced lending. The coefficient of CAPSUR is not significant for the regression with the logarithm of equipment loans most likely because it is working capital loans rather than equipment loans that were targeted by the JASME's "Fund". The coefficient estimate of -1.067 for total loans means that a decrease in CAPSUR by one standard error (3.1 percent) is associated with an increase in total loans by about 3.4 percent, or 2.6 million yen when evaluated at the sample mean of the amount of total loans. Similarly, a decrease in CAPSUR by one standard error is associated with an increase in working capital loans by 5.2 percent or 3.2 million yen when evaluated at the sample mean of the amount of working capital loans. A monetary increase in total loans associated with a decrease in CAPSUR and that in working capital loans associated with a decrease in CAPSUR of the equal

[25] As we described in footnote 13, for more than 80% of firms in our dataset, the amount of equipment loans is zero. For the fewer but still great number of firms, the amount of working capital loans is zero. Therefore, we also used the Tobit model with left censoring at zero for regressions when either the amount of working capital loans or that of equipment loans is used to construct a dependent variable. The results are qualitatively similar to those obtained using the OLS (results are not reported).

magnitude are similar, reflecting the fact that the effect of CAPSUR on the JASME's lending appears only in working capital loans. The average loans outstanding borrowed from a main bank for the 2,061 firms we use for our regressions and the average CAPSUR are 412.6 million yen and -0.024, suggesting that the average decrease in the amount of loans borrowed from a main bank due to a main bank's poor capital adequacy is 9.8 million yen. This means that on average the JASME loans offsets 26.6% ($= \frac{2.6}{9.8} \times 100$) of a decrease in a firm's loans borrowed from its main bank. As mentioned above, since the JASME lends only long-term loans with maturity no less than one year, this exercise may be more appropriate for a main bank's long-term loans. The average long-term loans outstanding borrowed from a main bank for the 2,061 firms is 219.0 million yen, suggesting that the average decrease in the amount of long-term loans borrowed from a main bank is 5.2 million yen. This means that on average JASME loans offsets 50.1% of a decrease in a firm's long-term loans borrowed from its main bank. These numbers are economically very significant.

As for variables other than CAPSUR, the coefficient of the logarithm of total assets is positive and significant when a dependent variable is either the logarithm of total loans or that of working capital loans, confirming that a firm with larger total assets generally tends to borrow a larger amount of loans. The coefficient of ROA is negative and significant when a dependent variable is either the logarithm of total loans or that of working capital loans. This is presumably because the "Fund" was aimed at providing working capital loans to firms with less cash flow that suffered from liquidity constraints due to insufficient supply of loans from poorly capitalized private banks.

The effects of leverage on equipment loans and that on working capital loans are opposite each other as the coefficients of leverage are negative and positive when

dependent variables are the logarithms of equipment loans and working capital loans, respectively. The effect of leverage on the size of loans or its growth is found to be positive by both Gopalan et al. (2011) and Bharath et al. (2011). Our finding of a negative effect on working capital loans reflects the fact that a lender in our data is a single public lender rather than private lenders whose loan contracts are investigated in aforementioned studies. The positive effect of leverage on working capital loans suggests that, taking advantage of the "Fund", the JASME meant to increase working capital loans to firms with a higher leverage that were more vulnerable to reduced supply of lending by their private lenders during the period of the credit crunch. The negative effect of leverage on equipment loans, on the other hand, suggests that when making equipment loans that were not the target of the "Fund", similarly to private lenders, the JASME was reluctant to lend to greatly leveraged firms whose credit risks were generally greater.

4.3. The Results for the Regressions with JASME Loans Standardized by Total Assets

Bharath et al. (2011) employ the ratio of the amount of loans a firm borrows to its total assets rather than the logarithm of the amount of loans. Following Bharath et al. (2011), we replicate the regressions whose results are reported in Table 2 by replacing the dependent variable with the ratio of the amount of corresponding type of loans a firm borrows from the JASME to its total assets. The results are presented in Table 3.

The coefficients of CAPSUR are now all insignificant regardless of type of loans examined. Indeed, there is only one coefficient in this table that is significant. These results may suggest that, when determining its exposure to a firm, as a policy institution whose mission is to compensate private lenders, the JASME does not take into account

the firm's size in contrast to some private lenders who may prefer sharing a risk of a firm with other lenders rather than taking over a firm's entire risk.

4.4. The Results for the Performance Regressions

Table 4 shows the regression results of equation (3) with ROA as of FY 2001 as a dependent variable. The first column shows the results without control variables, whereas the second and the third columns show the results of the regressions with independent variables that include the logarithm of lagged total assets (as of FY 2000) and with this additional variable and an ex-ante ROA that is an independent variable used to run the regression of equation (1), respectively. Except in column 1 where the corresponding J statistic shows that the null of instrumental variables being independent of an error term is rejected, the coefficients of the logarithm of JASME total loans are negative and statistically significant at least at the 10 percent significance level. The effect of JASME loans is substantially smaller when the ex-ante ROA is included as an independent variable than when it isn't. Since the coefficients of two control variables are both significant, from now on, we will report the results of the regressions with them as independent variables. The effect is economically significant. An estimated coefficient of -0.095 reported in column 2 means that an increase in the amount of JASME loans by one standard error leads to a decrease in ROA by 10% when the logarithm of JASME loans is evaluated at its mean.[26]

Table 5 reports the regression results for equation (3) with the ROA as a performance measure in every fiscal year after the period from December 1997 through

[26] A change in a firm's ROA resulting from one standard error of JASME loans (85.2 million yen) equals $-0.0947 \times \frac{85.2}{81.0\ (=\text{the mean of the amount of JASME loans})} = -0.100.$

March 1999, the period of JASME loan executions we examine, until FY 2003. We find that the coefficients of the instrumented logarithm of JASME loans are negative and statistically significant at least at the 10 percent significance level for ROA of fiscal years 2000 and 2001 but that the coefficients are insignificant for other fiscal years. We, however, cannot reject the null of instrumental variables being independent of an error term for fiscal years 1999 and 2000 at the 10 percent level so that the results for these years may not be reliable.

Table 6 reports the regression results for equation (3) with the EBITDA to total assets ratio as a performance measure. The results are qualitatively similar to the results reported in Table 5 except that the effect of the instrumented logarithm of JASME total loans is weakly significant for fiscal year 1999 and we can reject the null of instrumental variables being independent of an error term for every year considered.

These results imply that the JASME loans are somewhat weakly negatively associated with the ex-post performance for about three years. We are wondering why the larger amount of JASME's loans not only does not make firms more profitable ex post but even seem to make them less profitable at least in a short run? The loans lent by the JASME generally have longer maturities than those lent by private banks.[27]

[27] The average maturity of all the loan contracts agreed from December 1997 through March 1999 weighted by the amount of respective loan recorded in the original JFC contract data is 8.5 years. The average maturities of equipment loans and working capital loans are 12.8 years and 6.3 years, respectively. It is harder to compute the average maturity of loans by private banks because our data do not contain loan contracts extended by private banks. So a guesswork is needed. In the dataset used for the regression of ROA in FY 1999 as a dependent variable, the averages of short-term loans and of long-term loans over the sample of 1988 firms are 290 million yen and 609 million yen, respectively. A short term loan is a loan whose maturity is equal to or less than one year. Thus, we assume that the average maturity of short-term loans is 0.5 years. For long-term loans, we use the only available average maturity of long-term loans surveyed in "The Fact-Finding Survey on Transactions between Enterprises and Financial Institutions", which was conducted in February 2008 by the RIETI, 5.2 years. We estimate the average maturity of loans extended by private banks to be 3.7 years by computing the weighting average of 0.5 years and 5.2 years with 290 million yen and 609 million yen as respective weights. The average maturity of loan contracts extended by private banks estimated as such is far shorter than 8.5 years, the average maturity of

The positive effects of the JASME's lending to improve a firm's profitability may emerge after several years in the course of loans' lives.

To test on such speculation, we employ a change in a firm's ex-post performance instead of its level per se as a dependent variable. Larger loans by the JASME may raise a borrowing firm's subpar performance to the performance on a par with its peers, so that their effect on a change in firm performance may be positive. Table 7 reports the results of the regressions with a change in a performance measure, ROA or EBITDA to total assets ratio, over a period from FY 1999 through FY 2001 or through FY 2003, by which time the negative effect of JASME loans disappear in Tables 5 and 6, as a dependent variable.[28] Regardless of a performance measure employed and whether a change is taken until FY 2001 or until FY 2003, the effect of JASME loans is not statistically significant.[29] These results show that over the reasonable long run, over lives of loan contracts, the JASME's lending was neutral to a firm's ex-post performance.

In a related study, Uesugi et al. (2010) find that the firms that were provided public guarantees on the loans borrowed from private lenders under the Special Credit Guarantee program that was in effect from October 1998 through March 2001, the period that partially coincides the period of the JASME's expanding lending, did not

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loan contracts extended by the JASME.

[28] In the regressions with a change in ROA and that in EBITDA to total assets ratio as a dependent variable, the firms whose ROA is below or at the 1 percentile or those whose ROA is above or at the 99 percentile in FY 1999 and in the fiscal year the change is taken through and the firms whose EBITDA to total assets ratio is below or at the 1 percentile or those whose EBITDA to total assets ratio is above or at the 99 percentile in these two years, respectively, are dropped as outliers.

[29] Interpreting the results for later years needs greater caution. A number of events should have happened between the time at which a firm borrowed loans from the JASME and the time at which its performance was measured. But we are unable to take these events into account in our regressions. The weaker effects of JASME loans on firm profitability in later years may also be partially attributable to the survivorship bias. Underperforming firms are more likely to go out of business as time goes by. Therefore, the more time elapses, the more ex-ante less profitable firms that contribute to a negative effect in earlier years drop out of the sample.

improve more than those that were not up to two years after the guaranteed loans were made, thereby concluding that the program induced banks' moral hazard and possibly contributed to creating zombies discussed by Caballero et al. (2008). Our study reinforces study by Uesugi et al. (2010) in that the package aimed to mitigate the credit crunch that alleviated credit availability to SMEs did not improve their ex-post performance or even aggravated it at least in a short run. In a long run, our findings are not inconsistent with the extant studies we introduced earlier where the effect of lending by SOBs on borrower firms' ex-post performance is found to be mostly neutral or positive, although an effect of JASME loans on a firm's performance in three years or later post borrowing may be affected by other events that occurred between times of borrowing and performance being measured.

5. Conclusion

In this paper, using the data of loan contracts extended by the JASME, we examined whether its lending behavior was consistent with its policy mission of mitigating adverse effects on SMEs caused by the credit crunch of the late 1990. As the JASME launched the "Fund to Deal with Changes in Financial Environments" on December 1, 1997, whose primary objective was to deal with the credit crunch, we selected the sample of the JASME's loan contracts extended over the period from December 1997 through the end of the next fiscal year, March 1999, and examined whether the JASME made a larger amount of loans to firms that were more vulnerable to the credit crunch. We found that the JASME made a larger amount of working capital loans to the firms whose main bank was more poorly capitalized and reduced

lending more greatly, confirming that the JASME's lending policy was aligned with its mission.

We then found that the logarithm of JASME's total loans instrumented by the extent of the growth of lending supply by a firm's main bank had a negative effect on a firm's performance as measured by ROA and EBITDA to total assets ratio in three years after loans are made but dies out afterward.

Appendix

In this appendix, we detail the steps to compile the dataset we use in this study. When constructing the dataset, we combine the data extracted from three databases about the firms borrowing from the JASME and contracts it extends to the firms as well as the Nikkei NEEDS databank for the data about the JASME's borrowers' private main banks, which was originally used by Watanabe (2007). Three databases we are provided by the JFC are the database about loan contracts extended by the JFC (hereafter referred to as the JFC contract database), the database about firms' financial statements (the JFC financial statement database) and the database about firms' transactions with financial institutions (the JFC financial institution database).

The JFC contract database records all the contracts extended by the JASME and the JFC's Small and Medium Enterprise Unit, the JASME's successor institution from FY 1995 through FY 2011. The database records 25,161 contracts and 25,321 contracts extended by the JASME in FY 1997 and FY 1998, respectively. Since the JASME may extend multiple loan contracts to a single firm in a given fiscal year, the number of contracts extended by the JASME in a respective year does not necessarily equals that of firms the JASME extends loan contracts to in the same fiscal year.

The JFC financial statement database contains 772,686 firm - fiscal year observations over the period from FY 1954 through FY 2012.[30] The JFC financial institution database, on the other hand, contains 3,638,020 financial institution - fiscal year observations over the period from FY 1982 through FY 2012.[31] In the latter

[30] In the JFC financial statement database, any financial statements dated from April of a given year , say year X, through March of year X+1 are treated as those dated fiscal year for X.

[31] The fiscal year for financial institutions in Japan including GFIs such as the JFC (JASME) runs from April through March of the following calendar year. Fiscal years for non-financial firms do not necessarily coincide with those for financial institutions.

database, for each firm in each fiscal year, the information about multiple financial institutions are recorded if the firm has a debt outstanding owed to multiple institutions in the year. These institutions include the JASME (JFC). The JFC collects financial statements of each firm and the information about its lenders for up to 10 most recent fiscal years as of the latest fiscal year in which the debt outstanding the firm owed to the JSAME (JFC) is positive. Thus, for example, if a firm borrowed a loan from the JASME in FY 1997 and keeps the positive loans outstanding owed to the JFC in FY 2011, the firm's financial statements recorded in the JFC financial statement database and the information about its lenders recorded in the JFC financial institution database are those from FY 2002 through FY 2011 only. Thus, the financial statements of that firm and the information about its lenders as of FY 1997, the year in which a loan was originated, or earlier are unavailable. Conversely, if a firm borrowed a loan from the JASME in FY 1997, the firm's financial statements and the information about its lenders of that year remain available only when the firm either lost its debt outstanding owed to the JASME by FY 2007 or it became out of business while leaving its debt not fully repaid to the JASME by that year. Since until FY 1998 the JASME was not required to record the information about all the non JASME financial institutions on the financial institution database, the number of firms whose financial statements are available and that of firms for which information about its main bank is available are not equal.

We divide the JFC financial statement database and the JFC financial institution database by the April - March fiscal year pertaining to financial institutions. As a result, we are left with financial statements for 19,108 firms and of 20,025 firms for FY 1997 and FY 1998, respectively. Similarly, we are left with the information about a

firm's lenders for 3,820 firms and 14,280 firms for FY 1997 and FY 1998, respectively.

We, then, merge the data extracted from three databases provided by the JFC year by year using an identification number assigned to each firm commonly employed in these databases. First, we merge the data extracted from the JFC contract database with the data extracted from the JFC financial statement data, leaving us with 5,881 contracts extended by the JASME and 5,848 contracts for FY 1997 and FY 1998, respectively. Next, we merge these data with the data extracted from the JFC financial institution database, leaving us with 1,194 contracts and 3,107 contracts for FY 1997 and for FY 1998, respectively. As it turns out, these 4,301 contracts extended in FY 1997 and FY 1998 remaining in our data are made to 3,297 different "firms". The caveat is that at this stage some of these 3,297 "firms" may appear in the data twice, once in FY 1997 and another time in FY 1998.

We, then, merge the data of 3,297 "firms" with the data about an increase (a decrease) in the lending growth of a firm's main bank in response to its capital surplus (shortage) in excess (shortage) of its target for the capital (to asset ratio) estimated over 126 domestically licensed banks examined by Watanabe (2007), which do not include such depository institutions as *shinkin* banks and credit cooperatives that are not chartered under the Banking Act. The number of "firms" is reduced to 2,580.

Dropping firms whose loan contracts in our data were all dated before December 1, 1997, the date of the inauguration of the "Fund to Respond to Changes in Financial Environments", the number of "firms" is reduced to 2,394. Finally, subtracting 333 firms that appear twice (both in FY 1997 and FY 1998) in the data from 2,394 "firms", the final number of firms in our dataset is 2,061.

The samples used for performance regressions of equation (3) are constructed by

merging this dataset of 2,061 firms with the financial data of firms for respective fiscal year and for its previous year (the data of the previous year are used for a lagged variable) extracted from the JFC financial data. The resulting sample sizes for fiscal years 1999, 2000, 2001, 2002 and 2003 are 1,988, 1,962, 1,650, 1,425 and 1,201, respectively.

References

Allen, Linda, Sparna Chakraborty and Wako Watanabe (2011), "Foreign Direct Investment and Regulatory Remedies for Banking Crises: Lessons from Japan," *Journal of International Business Studies*, 42(7): 875-893.

Aiyar, Shekhar, Charles W. Calomiris and Tomasz Wieladek (2014), "Does Macro-Prudential Regulation Leak? Evidence from a UK Policy Experiment", *Journal of Money, Credit and Banking*, 46 (1): 181-214.

Bayazitova, Dinara and Anil Shivdasani (2012), "Assessing TARP," *Review of Financial Studies*, 25(2): 377-407.

Bertay, Ata Can, Asli Demirguc-Kunt and Harry Huizinga (2015), "Bank Ownership and Credit over the Business Cycle: Is Lending by State Banks Less Procyclical?" *Journal of Banking and Finance*, 50: 326-339.

Bharath, Sreedhar T., Sandeep Dahiya, Anthony Saunders and Anand Srinivasan (2011), "Lending Relationships and Loan Contract Terms," *Review of Financial Studies*, 24(4): 1141-1203.

Bernanke, Ben. S. and Carla. S. Lown "The Credit Crunch," *Brookings Papers on Economic Activity*, 1991(2): 205-247.

Caballero, Ricardo J., Takeo Hoshi and Anil K. Kashyap (2008), "Zombie Lending and Depressed Restructuring in Japan," *American Economic Review*, 98(5): 1943-1977.

Carvalho, Daniel (2014), "The Real Effects of Government-Owned Banks: Evidence from an Emerging Market," *Journal of Finance*, 69(2): 577-609.

Coleman, Nicholas and Leo Feler (2015), "Bank Ownership, Lending, and Local Economic Performance during the 2008-2009 Financial Crisis," *Journal of Monetary Economics*, 71: 50-66.

Cull, Robert and Maria Soledad Martinez Peria (2013), "Bank Ownership and Lending Patterns during the 2008-2009 Financial Crisis: Evidence from Latin America and Eastern Europe," *Journal of Banking and Finance*, 37(12): 4861-4878.

Duchin, Ran and Denis Sosyura (2010), "TARP Consequences: Lending and Risk Taking," mimeo, Ross School of Business, University of Michigan.

Duprey, Thibaut (2015) "Do Publicly Owned Banks Lend Against the Wind?," *International Journal of Central Banking* 11(2): 65-112.

Eslava, Marcela, Alessandro Maffioli and Marcela Melendez (2014), "Credit Constraints and Business Performance: Evidence from Public Lending in Colombia," Centro de Estudios sobre Desarrollo Economico, Serie Documentos Cede, 2014-37.

Giannetti, Mariassunta and Andrei Simonov (2009), "On the Real Effects of Bank Bailouts: Micro-Evidence from Japan." *American Economic Journal: Macroeconomics*, 5(1): 135-67.

Gopalan, Radhakrishnan, Gregory F. Udell and Vijay Yerramilli (2011), "Why Do Firms Form New Banking Relationships?" *Journal of Financial and Quantitative Analysis*, 46(05): 1335-1365.

Guizani, Brahim and Wako Watanabe (2016), "Public Capital, the Deposit Insurance and the Risk-Shifting Incentives: Evidence from the Regulatory Responses to the Financial Crisis in Japan," mimeo, Keio University and University of Jendouba.

Holmstrom, Bengt and Jean Tirole (1997), "Financial Intermediation, Loanable Funds, and the Real Sector," *Quarterly Journal of Economics*, 112(3): 663-691.

Iannotta, Giuliano, Giacomo Nocera and Andrea Sironi (2011), "The Impact of Government Ownership on Bank Risk and Lending Behavior," Carefin Working Paper, Bocconi University.

Imai, Masami (2009), "Political Determinants of Government Loans in Japan," *Journal of Law and Economics* 52(1): 41-70.

Khwaja, Asim Ijaz and Atif R. Mian, (2005), "Do Lenders Favor Politically Connected Firms? Rent Provision in an Emerging Financial Market," *Quarterly Journal of Economics*, 120(4). 1371-1411.

Laeven, Luc and Fabian Valencia (2008), "The Use of Blanket Guarantees in BBanking Crises," IMF Working Paper, No. 8-250. International Monetary Fund.

Lazzarini, Sergio G., Aldo Musacchio and Rodrigo Bandeira-de-Mello (2015), "What Do State-Owned Development Banks Do? Evidence from BNDES, 2002-2009," *World Development*, 66: 237-253.

Li, Lei (2013) "TARP Funds Distribution and Bank Loan Supply," *Journal of Banking and Finance*, 37(12): 4777-4792.

Lin, Yupeng, Anand Srinivasan and Takeshi Yamada (2015), "The Effect of Government Bank Lending: Evidence from the Financial Crisis in Japan," mimeo, City University of Hong Kong, National University of Singapore and Australian National University.

Montgomery, Heather and Satoshi Shimizutani (2009), "The Effectiveness of Bank Recapitalization Policies in Japan," *Japan and the World Economy*, 21(1): 1-25.

Ogura, Yoshiaki (2015), "Welfare Implication of Lending by Government-Controlled Banks under a Financial Crisis," mimeo, Waseda University.

Peek, Joe, and Eric S. Rosengren (2005), "Unnatural Selection: Perverse Incentives and the Misallocation of Credit in Japan," *American Economic Review*, 95(4): 1144-1166.

Ru, Hong (2015), "Government Credit, a Double-Edged Sword: Evidence from the China Development Bank," mimeo, MIT Sloan School of Management.

Sekine, Toshitaka, Keiichiro Kobayashi and Yumi Saita (2003), "Forbearance Lending: The Case of Japanese Firms," *Monetary and Economic Studies*, 21(2): 69-92.

Stein, Jremy C. (1998), "An Adverse Selection Model of Bank Asset and Liability Management with Implications for the Transmission of Monetary Policy," *RAND Journal of Economics*, 29(3): 466-486.

Uesugi, Iichiro, Koji Sakai and Guy G. Yamashiro (2010), "The Effectiveness of Public Credit Guarantees in the Japanese Loan Market," *Journal of the Japanese and International Economies*, 24(4): 457-480.

Watanabe, Wako (2007), "Prudential Regulation and the "Credit Crunch": Evidence from Japan," *Journal of Money, Credit and Banking*, 39(2−3): 639-665.

World Bank (2013), "Global Financial Development Report 2013: Rethinking the Role of the State in Finance."

Woo, David (2003), “In Search for “Capital Crunch”: Supply Factors Behind the Credit Slowdown in Japan”, *Journal of Money, Credit and Banking*, 35(6): 1019-38.

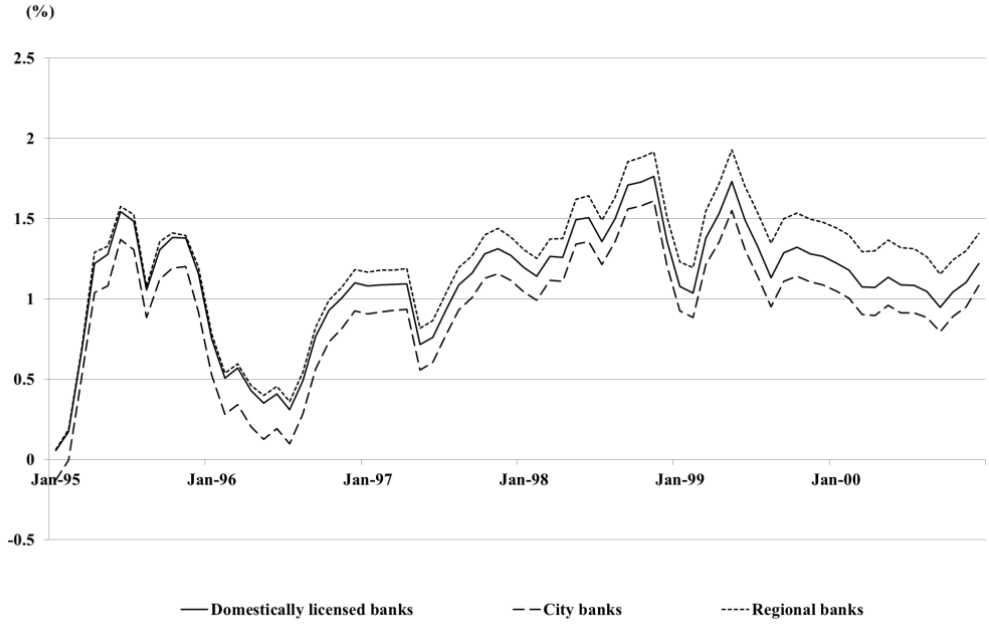
Yamamoto, Naoki (2013), “Trends of Deposits Taken, and Loans and Securities Held by Regional Banks,” NFI Research Review, Nikko Financial Intelligence, Inc, available at http://www.nikko-fi.co.jp/uploads/photos1/1283.pdf (in Japanese).

Figure 1. The Trends of the Growth Rate of Loans Held by the Banking Accounts of Domestically Licensed Banks under the Banking Act

Source: Bank of Japan

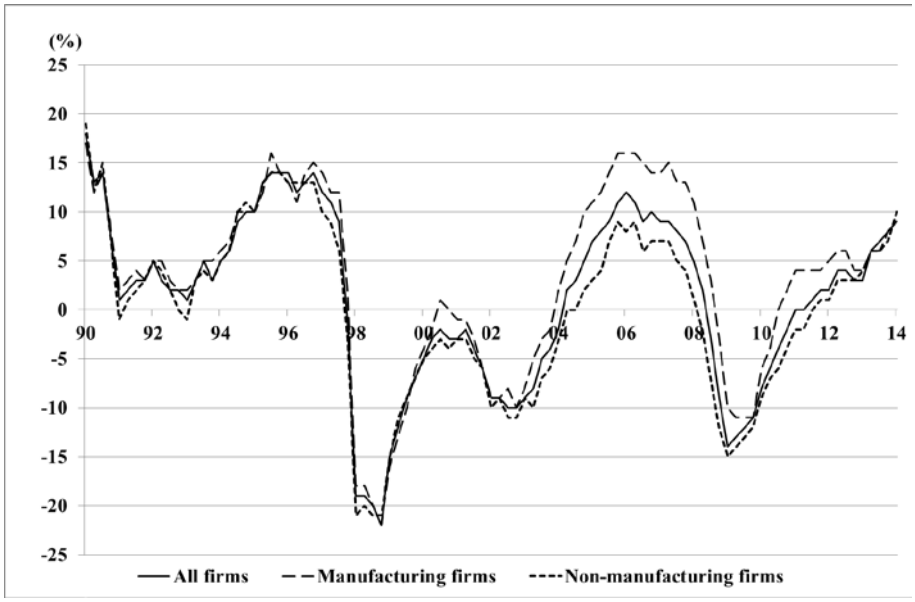
Note: The growth rate is the year on year growth rate computed over one year period preceding each month.

Figure 2. The Trends of the Spread of the Average Agreed Lending Rate of Domestically Licensed Banks over the Interest Rate on the 5-Year Maturity Japanese Government Bond



Source: Bank of Japan

Figure 3. The Trends of the Bank of Japan's Tankan Lending Attitude Diffusion Indices for Small and Medium Enterprises



Source: Bank of Japan

Figure 4. The Trends of Growths of Working Capital Loans and Equipment Loans by the JASME

Source: Disclosure reports of the Japan Finance Corporation for Small and Medium Enterprise

Table 1-1. Descriptive Statistics of the Variables Used in the Regressions for JASME Loans

Variable name	N	Mean	Median	Standard Error	Minimum	Maximum
JASME total loans	2061	77.54	50	79.73	5	900
JASME working capital loans	2061	61.35	40	66.13	0	520
JASME equipment loans	2061	16.19	0	56.08	0	900
JASME total loans/Total assets	2061	0.254	0.059	7.27	0.002	330
JASME working capital loans/Total assets	2061	0.067	0.048	0.10	0	3.42
Equipment loans/total assets	2061	0.187	0	7.27	0	330
CAPSUR	2061	-0.024	-0.032	0.031	-0.117	0.042
Total assets	2061	1623	875	2528	0.1	41632
ROA	2061	-0.008	0.002	0.087	-2.219	0.609

Note: ROA is defined as net income divided by total assets. The leverage is defined as total liabilities, which equals total assets less net wealth, divided by total assets. JASME loans, JASME working capital loans, JASME equipment loans and total assets are all in million yen.

Table 1-2. Descriptive Statistics of the Variables Used in the Performance Measure Regressions

Fiscal year	Variable name	N	Mean	Median	Standard Error	Minimum	Maximum
FY 1999	ROA	1988	-0.008	0.002	0.052	-0.421	0.098
	EBITDA/total assets	1988	0.031	0.031	0.057	-0.262	0.205
	JASME total loans	1988	78.55	50	81.39	5	900
	Total assets	1988	1626	877	2540	0.1	41632
	Sales	1988	1765	908	2744	0.1	41579
FY 2000	ROA	1862	-0.009	0.002	0.056	-0.365	0.115
	EBITDA/total assets	1862	0.031	0.031	0.060	-0.240	0.219
	JASME total loans	1862	79.36	50	82.98	5	900
	Total assets	1862	1613	865	2692	0.1	47722
	Sales	1862	1714	840	2744	0.1	35666
FY 2001	ROA	1650	-0.016	0.001	0.079	-0.734	0.222
	EBITDA/total assets	1650	0.025	0.029	0.066	-0.352	0.227
	JASME total loans	1650	80.77	50	84.52	5	900
	Total assets	1650	1656	876	2942	13	51900
	Sales	1650	1717	811	2888	0	43236
FY 2002	ROA	1425	-0.016	0.002	0.087	-0.707	0.352
	EBITDA/total assets	1425	0.027	0.029	0.064	-0.271	0.231
	JASME total loans	1425	81.09	50	84.61	5	900
	Total assets	1425	1604	827	2968	14	56767
	Sales	1425	1605	753	2627	0	42528
FY 2003	ROA	1201	-0.019	0.002	0.106	-1.023	0.229
	EBITDA/total assets	1201	0.032	0.033	0.067	-0.295	0.248
	JASME total loans	1201	81.74	50	84.66	5	900
	Total assets	1201	1561	796	2894	33.7	59258
	Sales	1201	1515	704	2557	0.1	43405

Note: ROA is defined as net income divided by total assets. The leverage is defined as total liabilities, which equals total assets less net wealth, divided by total assets. JASME total loans, total assets and sales are all in million yen.

Table 2. The Regression Results for Equation (1): The Logarithm of Loans as a Dependent Variable

Variable name	(1) Total loans	(2) Equipment loans	(3) Working capital loans
CAPSUR	-1.067 **	1.029	-1.650 *
	(-2.20)	(0.90)	(-1.76)
Logarithm of total assets	0.482 ***	0.025	0.513 ***
	(24.29)	(0.66)	(17.49)
ROA	-0.515 ***	0.367	-0.933 ***
	(-2.72)	(1.04)	(-2.68)
Leverage	-0.014	-0.560 ***	0.494 ***
	(-0.18)	(-3.36)	(3.64)
Constant	0.695 ***	1.094 ***	-0.473 **
	(4.41)	(3.63)	*(-1.97)*
R-squared	0.378	0.008	0.116
N	2061	2061	2061

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses.

Table 3. The Regression Results for Equation (1): The Ratio of Loans to Total Assets as a Dependent Variable

Variable name	(1) Total loans	(2) Equipment loans	(3) Working capital loans
CAPSUR	4.381	4.413	-0.033
	(1.00)	(1.01)	(-0.55)
ROA	-0.150	0.374	-0.524 **
	(-0.25)	(0.73)	(-2.05)
Leverage	0.389	0.389	-0.001
	(0.90)	(0.91)	(-0.00)
Constant	0.014	-0.048	0.062
	(0.11)	(-0.42)	(1.48)
R-squared	0.001	0.001	0.189
N	2061	2061	2061

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses.

Table 4. The Results of the Regressions of ROA in FY 2001

	(1)	(2)	(3)
Logarithm of JASME total loans	0.008 **	-0.177 **	-0.095 *
	(2.245)	(-2.333)	(-1.921)
Logarithm of lagged total assets		0.097 **	0.055 **
		(2.438)	(2.110)
Ex ante ROA			0.151 **
			(2.289)
Constant	-0.048 ***	0.038	0.034
	(-3.217)	(0.871)	(1.231)
Number of observations	1650	1650	1650
J	42.368	3.075	1.297
	(0.000)	(0.688)	(0.935)
F statistic for excluded instruments for the logarithm of JASME loans	265.06	265.06	354.81

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. A dependent variable is a firm's ROA in FY 2001. Excluded instrumental variables are independent variables used in the regressions whose results are reported in Table 2, CAPSUR and three financial statement based variables, the logarithm of (ex-ante) total assets and (ex-ante) leverage. Ex-ante independent and instrumental variables including the ex-ante ROA are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998.

Table 5. The Year by Year Results of the Regressions of ROA

Fiscal Year	coefficient	N	J statistic
1999	-0.076	1988	27.012
	(-1.648)		(0.000)
2000	-0.092 *	1862	10.555
	(-1.820)		(0.061)
2001	-0.130 **	1650	1.983
	(-2.099)		(0.852)
2002	-0.084	1425	0.774
	(-1.609)		(0.979)
2003	-0.088	1201	6.073
	(-1.304)		(0.299

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. The reported results for each fiscal year are based on the regression equation with a firm's ROA as a dependent variable and logarithms of total assets as an additional independent variable. The presented coefficients are those of the logarithm of JASME total loans. Instrumental variables are independent variables used in the regressions whose results are reported in Table 2, CAPSUR and three financial statement based variables, the logarithm of total assets, ROA and leverage, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998.

Table 6. The Year by Year Results of the Regressions of the EBITDA to Total assets Ratio

Fiscal Year	coefficient	N	J statistic
1999	-0.110 *	1988	4.167
	(-1.825)		(0.526)
2000	-0.095 *	1862	0.648
	(-1.779)		(0.986)
2001	-0.095 *	1650	1.297
	(-1.921)		(0.935)
2002	-0.033	1425	0.224
	(-0.933)		(0.999)
2003	0.033	1201	0.011
	(0.744)		(1.000)

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. The reported results for each fiscal year are based on the regression equation with a firm's EBITDA to total assets ratio as a dependent variable and logarithms of total assets as an additional independent variable. The presented coefficients are those of the logarithm of JASME total loans. Instrumental variables are independent variables used in the regressions whose results are reported in Table 2, CAPSUR and three financial statement based variables, the logarithm of total assets, ROA and leverage, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998.

Table 7. The Results of the Regressions with a Change in a Performance Measure from FY 1998 as a Dependent Variable

A change until	Performance measure	coefficient	N	J statistic
2001	ROA	-0.037 (-0.719)	1617	4.208 (0.520)
	EBITDA /Total Assets	0.020 (0.457)	1617	1.848 (0.870)
2003	ROA	-0.033 (-0.412)	1176	8.131 (0.149)
	EBITDA /Total Assets	0.071 (1.329)	1176	0.3159 (0.997)

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. The reported results are based on the regression equations with logarithms of total assets as an additional independent variable. The presented coefficients are those of the logarithm of JASME total loans. Instrumental variables are independent variables used in the regressions whose results are reported in Table 2, CAPSUR and three financial statement based variables, the logarithm of total assets, ROA and leverage, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998.

Table 8. The Comparisons of the Coefficients of JASAME Loans (in logarithm) for the Regressions of ROA between the Regressions with CAPSUR as An Instrumental Variable for JASME Loans and Those without

Fiscal Year	(1) Without CAPSUR				(2) With CAPSUR	
	coefficient		coefficient	J statistic	coefficient	
1999	-0.367	**	1988	1.837	-0.223	***
	(-2.557)			(0.766)	(-3.052)	
2000	-0.339	**	1862	0.006	-0.150	***
	(-2.026)			(1.000)	(-2.600)	
2001	-0.263	*	1650	0.140	-0.177	**
	(-1.833)			(0.998)	(-2.333)	
2002	-0.083		1425	0.927	-0.071	*
	(-1.290)			(0.921)	(-1.694)	
2003	-0.424		1201	0.013	-0.121	*
	(-1.361)			(1.000)	(-1.755)	
2004	-0.129		989	0.000	-0.010	
	(-0.511)			(1.000)	(-0.130)	

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. The reported results are based on the regression equations with logarithms of total assets an additional independent variable. The presented coefficients are those of the logarithm of JASME total loans. Instrumental variables are independent variables used in the regressions whose results are reported in Table 1, CAPSUR and three financial statement based variables, the logarithm of total assets, ROA and leverage, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998.

Table 9. The Comparisons of the Coefficients of JASME Loans (in logarithm)for the Regression of EBITDA to Total Assets Ratio between the Regressions with CAPSUR as An Instrumental Variable for JASME Loans and Those without

Fiscal Year	(1) Without CAPSUR			(2) With CAPSUR		
	coefficient		coefficient	J statistic	coefficient	
1999	-0.589		1988	0.178	-0.289	**
	(-1.431)			(0.996)	(-2.473)	
2000	-0.310	**	1862	0.593	-0.186	***
	(-2.217)			(0.964)	(-2.753)	
2001	-0.288	*	1650	0.819	-0.182	**
	(-1.738)			(0.936)	(-2.277)	
2002	-0.143		1425	1.020	-0.079	*
	(-1.420)			(0.907)	(-1.729)	
2003	-0.117		1201	4.668	-0.008	
	(-1.0167)			(0.323)	(-0.180)	
2004	-0.096		989	1.132	-0.007	
	(-1.075)			(0.889)	(-0.145)	

Note: *, ** and *** show that the estimated coefficient is statistically significant at the 10 percent significance level, the 5 percent level and the 1 percent level, respectively. t statistics based on robust standard errors are in parentheses. The reported results are based on the regression equations with a logarithm of total assets as an additional independent variables. The presented coefficients are those of the logarithm of JASME total loans. Instrumental variables are independent variables used in the regressions whose results are reported in Table 1, CAPSUR and three financial statement based variables, the logarithm of total assets, ROA and leverage, which are measured as of the fiscal year closing for a firm between April 1997 and March 1998 if the earliest loan contract was extended until March 1998, and are measured as of FY closing for a firm between April 1998 and March 1999 if the earliest contract was extended after April 1998.