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Abstract

Using the data of individual loan contracts extended by the Japan Finance Corporation for Small and Medium Enterprise (JASME), which is one of the predecessor institutions of the Japan Finance Corporation (JFC) that aimed at lending to small and medium enterprises (SMEs), we examine whether the JASME's lending substituted for the reduced lending supply by private banks during the period of the credit crunch. We find that the JASME made larger loans to the firms whose main bank reduced more lending due to losses on their capital.

Keywords: Government financial institution, Credit crunch, Loan contracts
JEL classification: 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 wrongly ex-post that they would never fall. Real estate prices finally began to slide in 1991 very rapidly. 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 was about to begin in April 1998, or at the beginning of the following FY 1998 and the accurate measurement of a bank's capital adequacy was needed. 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 loans made 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 (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, based on the Financial Functions Stabilization Act. Twenty-one systematically important mostly large banks received total public capital of 1.8 trillion yen. One year later in March 1999, 15 mostly large banks received the total amount of 7.5 trillion yen of public capital based on the Early Strengthening Act. 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).

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 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 funding costs, particularly costs to raise funds from the markets that had risen due to serious concerns about banks' deteriorating financial health shared by market participants, as exemplified by sharp increases in interbank borrowing rates for Japanese banks known as the Japan premium.[1]

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 guaranteed their repayments of loans borrowed from banks by publicly insured Credit Guarantee Corporations. This program was aimed at complementing risk taking capabilities of banks by guaranteeing their lending. Uesugi et al. (2010) discuss that the Special Guaranteeing Program allowed banks to make loans to ex-post unprofitable firms, thereby concluding that the Program induced banks' moral hazard and possibly contributed to creating zombies.

Fourth, but not the least important, the Government expanded policy lending by government financial institutions (GFIs), particularly lending to SMEs. It is the efficasy of the lending by a government lender who targets SMEs that we explore in this study.

In December 1997, in response to the "Emergency Economic Measures to Clear a Path for the 21st Century" released at the Meetings of Ministers for Economic Measures

[1] For details about the expansion of the deposit insurance coverage in response to the banking crisis in Japan, see Guizani and Watanabe (2014).

of the Government of Japan, 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. The Government subsequently released the "Comprehensive Economic Package" in April 1998, which included expanding the Fiscal Investment and Loan Program (FILP) lending to SMEs and recapitalizing GFIs, and further authorized the "Outline of Measures for Unwillingness to Lend to Small and Medium Enterprises" in August of that year that included the expansion of the public credit guarantees, the extension of reductions in interest repayments as well as the expansion of loan programs of GFIs.

In this study, we examine whether 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.

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.[2] 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 banks whose data are originally

[2] 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.

extracted from the bank financial data contained in the Nikkei NEEDS data bank.

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.

The paper is arranged as follows. The next section discusses the credit crunch and policy measures to deal with it. Section 3 explains the data and the empirical methodology. Section 4 presents the empirical results. Section 5 concludes.

2. The Credit Crunch and Policy Measures

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%.

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 so that a firm may engage in moral hazard of diverting the borrowed fund to less productive use, a poorly capitalized bank resorts to reducing lending to firms.

Nonetheless, a credit crunch is likely caused as a side effect of the capital adequacy requirements, which are central to the modern day banking regulations. 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 requirement is that a better capitalized bank is resilient to negative shocks to its assets such as asset devaluations caused by non-performing loans, thus less susceptible to insolvency.

The capital adequacy requirement, however, likely exacerbates a bank's inability 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 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. [3] [4]

2.2. The Japanese Credit Crunch of 1997-1998.

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

[4] 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).

Figure 1-1 shows the trends of the year on year growth of loans outstanding held by banking accounts of domestically licensed banks. The increasing trend of loans outstanding subsided in 1995. After several calm years, they began to decrease in 1999. The decreasing trend of loans outstanding continued through 2005. Figure 1-2, on the other hands, shows the trends of the year on year growth of loans (outstanding) to small and medium enterprises held by banking accounts of domestically licensed banks. The loans to SMEs began to decrease in the first quarter of 1998 (the last quarter of FY 1997).

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). [5] It appears that the spread rises from about 1996 through 1998 regardless of bank type. This fact is consistent with a rise in an equilibrium lending rate caused by a reduced lending supply.

Figure 3 shows the Bank of Japan's trends of financial institutions' lending attitude diffusion indices of tankan survey for small and medium enterprises. We see that these indices sharply decreased in the first quarter of 1998.

From Figures 1 though 3 depicting aggregate variables, we find that overall loans outstanding did not decrease over the period from 1997 through 1998 but loans to SMEs did when the credit crunch allegedly took place, that the banks' lending spread sharply increased and that the BOJ's tankan survey's financial institutions lending attitude diffusion indices were seriously deteriorated. Though the trends of loans outstanding

[5] 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).

appear to be inconsistent with the eruption of the credit crunch, trends of loans to SMEs, the lending spreads and the lending attitude DIs are. Indeed, we 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 evidences. The absence of decreasing loans outstanding may simply reflect the stronger demand for loans, rather than indicating the increasing supply of lending. The widening lending spreads and worsening lending attitude DIs may reflect that the credit quality of borrowers became deteriorated rather than the banks' lending supply curve shifted to the left. Ultimately, we need the micro level data to identify the banks' reduced lending supply due to their capital losses.

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. Policy Responses to the Credit Crunch in Japan

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 to address the adverse effects of the credit crunch. The first such package was the "Emergency Economic Measures to Clear a Path for the 21st Century" released at the Meetings of Ministers for Economic Measures, which requested government financial institutions to launch the lending program targeting SMEs potentially having a hard time financing because of, for instance, having difficulty securing working capital after undergoing substantial changes in transactions with financial institutions. In response to 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.[6]

The second such package was the "Comprehensive Economic Measures" that were released in April 1998. The policy measures mentioned in this package intended to mitigate adverse effects of the credit 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

[6] 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.

Capital of SMEs".

The third such policy package was 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. The measures suggested in the "Outline" are divided into measures to expand public credit guarantees, measures to expand GFI's policy lending and extending reductions of rates on loans borrowed from GFIs, which had been scheduled to end in October 1998, one more year. In response to the suggestion for the expansion of public credit guarantees, the Government established the Special Guarantee Program to Stabilize SME Finances, better known as the "Special Guarantee Program", which greatly expanded the full public guarantees of privately originated loans borrowed by SMEs. [7] As for the expansion of the GFI's lending, the "Outline" suggested establishing the working capital lending facility targeting SMEs having difficulty managing working capital due to such problems as reduced sales, the unsecured lending facility, the low loan rate lending facility targeting SMEs intended to expand business and securing necessary funding for GFIs in order to expand their lending. In response to the "Outline", the JASME relaxed conditions met by SMEs eligible for the "Special Program to Support Business Expansion of SMEs" as well as relaxed conditions met by SMEs eligible for the "Special Loan Program to Smooth Working Capital of SMEs" and expanded uses of loans borrowed under the (latter) Program.

The amount of JASME's loans extended under the "Fund" is far greater than the total amount of its loans extended under various measures employed under two later packages. Thus, our primary interests lie in the JASME's lending behavior after its

[7] Using the data over the period from 1998 through 2001, Uesugi et al. (2010) empirically examine the effects of the Special Credit Guarantee Program on borrowing firms.

establishment of the "Fund" in December 1997. As Figure 4 shows, the growth of the working capital loans by SMEs that the "Fund" targeted surged from FY 1997 through FY 1999.[8]

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.

3. Data and Methodology

3.1. 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

[8] 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 latter 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 micro data described in 3.1. borrowed working capital loans only, 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.

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 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. Our dataset is compiled by merging the data about firms extracted from the JFC financial statement database and the data about firms' lenders extracted from the JFC financial institutions database with 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. As we detail a little later, we link the abovementioned constructed data 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. [9] After

[9] Watanabe (2007) examines the relationship between the actual capital to asset ratio and its target

consolidating multiple contracts for a firm, we are left with 2061 firms in our final sample.[10] 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. [11] [12]

3.2. The Hypothesis and the Empirical Model

Our objective in this paper 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 substituting 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).

$$y_i = \alpha + \beta \mathrm{CAPSUR} + \gamma Z_i + \varepsilon_i \quad \cdots (1)$$

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.

[10] We consolidate all loans extended to a given firm because we are interested in how the JASME responded to the credit crunch in the aftermath of 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.

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

[12] For details about assembling our data, see the Appendix.

y_i is a measure for the amount of loans the JASME extended to firm i. 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 the net profit on sales divided by total assets and the leverage as defined by total liabilities, which equals total assets less net wealth, divided by total assets.[13] [14] These 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 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 y_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 equipment loans and working capital loans. For each loan type, if the JASME extends multiple loans to a firm during our sample 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).[15] Watanabe estimates the following regression equation using the data extracted from the Nikkei NEEDS bank financial data.

[13] In order to avoid taking logarithm of 0, when taking logarithm of a variable such as total assets, we take logarithm of 1 plus the value for that variable.

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

[15] 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. To do so, one requires the data about firm i's loans outstanding borrowed from bank i for FY 1996. The number of firms for FY 1997 recorded in the JFC financial institutions data as described in Appendix is 3,820. The number of firms for FY 1996, on the other hand, is only 464. Thus, using the individual firm level data about the loan growth would substantially reduce the number of observations and be impractical.

$$\Delta lnL_{j,97} = \alpha_0 + \alpha_1 \Delta lnL_{j,96} + \beta \left\{ \frac{K_{j,97}}{A_{j,97}} - \left(\frac{K_j}{A_j} \right)^{target} \right\} + \phi X_j + \epsilon_j \quad \cdots (2)$$

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 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 a city bank, a trust bank and a regional bank while a regional 2 bank is a base group. ϵ_j is an error term.

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 the estimate of β, $\hat{\beta}$, $\hat{\beta} \left\{ \frac{K_{j,97}}{A_{j,97}} - \left(\frac{K_j}{A_j} \right)^{target} \right\}$. 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 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.[16]

4. Results

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

4.1. Descriptive statistics

Table 1 presents descriptive statistics of variables used to construct dependent variables and independent variables.

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 as small accounting loss 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.

4.2. Results

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.[17]

[17] As we desscribed in footnote 8, 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).

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", which had taken in effect since December, 1997. 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, an increase 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 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 2061 firms we use for our regressions and the average CAPSUR are 4,126 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 98 million yen. This means that on average the JASME loans offsets 2.7% ($= \frac{2.6}{98} \times 100$) 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 2061 firms is 2,190 million yen, suggesting that the average decrease in the amount of long-term loans borrowed from a main bank is 52 million yen. This means that on average JASME loans offsets 5.1% of a decrease in a firm's long-term loans borrowed from its main bank. Regardless, these numbers are economically not very significant.

As for variables other than CAPSUR, the coefficient of the logarithm of total loans 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 effect 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 Dependent Variables 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. These results may suggest that, when determining its exposure to a firm, as a policy institution whose mission is to substitute 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.

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, which shows that the JASME’s lending policy was consistent with its mission.

Our empirical objective is nothing more than to examine the consistency between the JASME’s behavior and its policy mission during the credit crunch period. Arguably, the equally important research agenda is to evaluate whether the JASME’s policy lending not only helped provide liquidity to cash deprived firms due to the credit crunch but also to evaluate whether the policy lending had positive real effects. If borrowers of the JASME’s lending became unprofitable (unproductive) or did not resume investment ex-post, the JASME’s public lending would have simply let unproductive firms survive as zombie firms at the cost of more productive competitors as Caballero et al. (2008) discuss. We, however, leave the evaluation of ex-post performances of the firms that borrowed loans from the JASME as a future research agenda.

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) whose data we use in this study. 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 contains all the loan contracts extended by the JFC from FY 1995 through FY 2011. The JFC contract databases sorts contracts extended by the JASME and the JFC's Small and Medium Enterprise Unit, the JASME's successor institution. The database records 25,161 contracts and 25,321 contracts extended by the JASME in FY 1998 and FY 1999, 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.[18] The JFC financial institution database, on the other hand, contains 3,638,020 financial institution - fiscal

[18] 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.

year observations over the period from FY 1982 through FY 2012.[19] In the latter 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) if the firm owes positive debt outstanding to it in that year. 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 borrowed another loan from 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 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.

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.

[19] The fiscal year for financial institutions in Japan including government financial institutions 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.

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.

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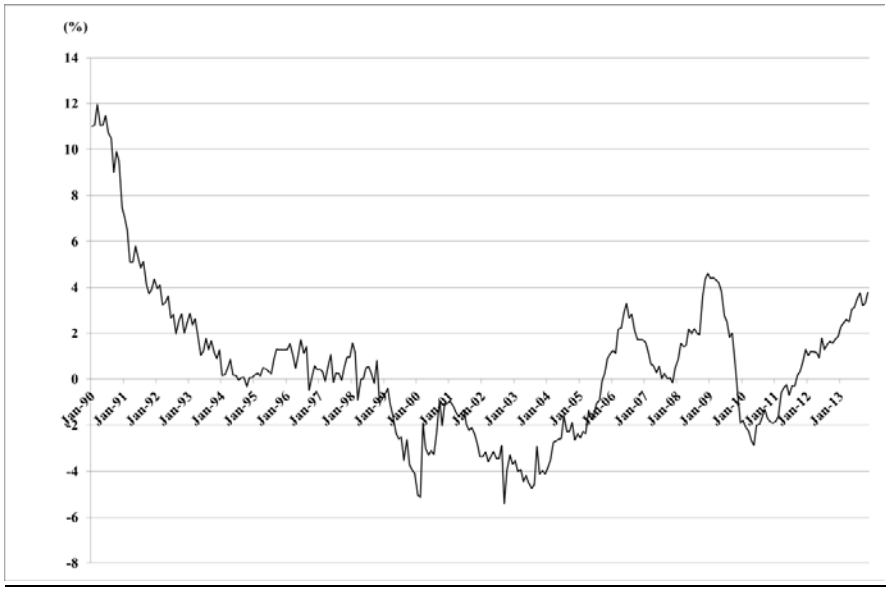
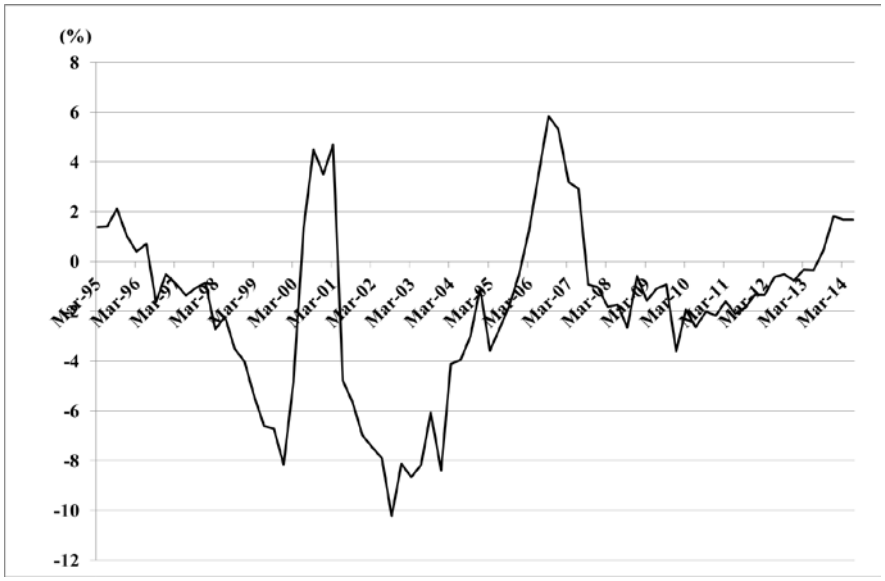
Figure 1-1. The Trends of the Growth Rate of Loans Held by the Banking Accounts of Domestically Licensed Banks under the Banking Act



Source: Bank of Japan

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

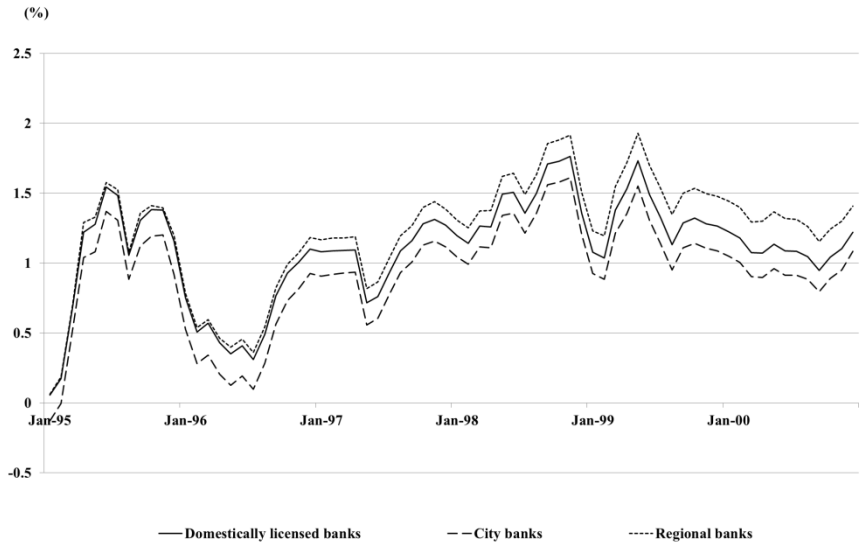
Figure 1-2. The Trends of the Growth Rate of Loans to Small and Medium Enterprises Held by the Banking Accounts of Domestically Licensed Banks under the Banking Act



Source: Bank of Japan

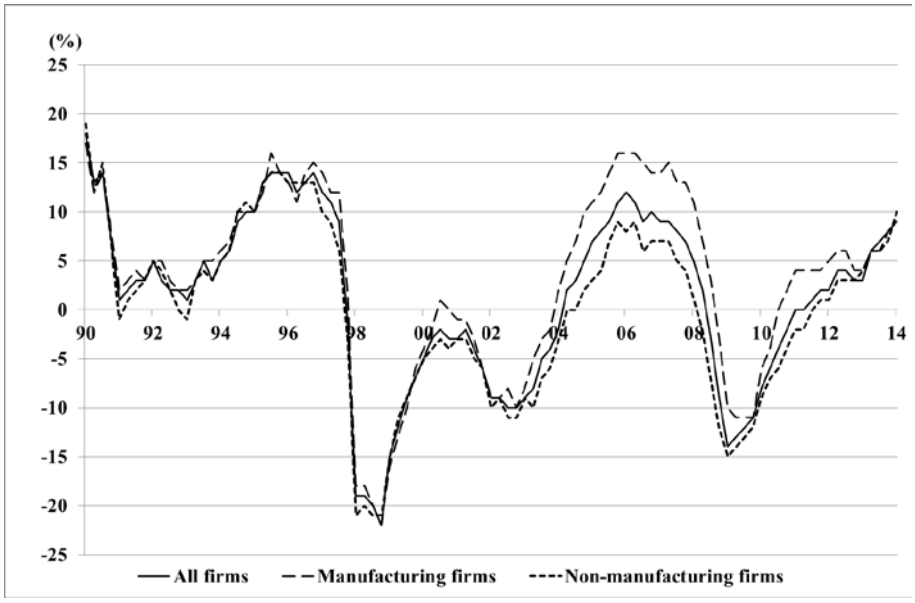
Note: The growth rate is the year on year growth rate computed over one year period preceding each month.

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 JASME (JFC).

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

Table 1. Descriptive Statistics of the Variables Used in the Regressions

Variable name	N	Mean	Median	Standard Error	Minimum	Maximum
Total loans (million yen)	2061	77.54	50	79.73	5	900
Working capital loans (million yen)	2061	61.35	40	66.13	0	520
Equipment loans (million yen)	2061	16.19	0	56.08	0	900
Total loans/Total assets	2061	0.254	0.059	7.27	0.002	330
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 (million yen)	2061	1623	875	2528	0.1	41632
ROA	2061	-0.008	0.002	0.087	-2.219	0.609
Leverage	2061	0.880	0.894	0.219	0.144	2.594

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.

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

Variable name	Total loans	Equipment loans	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 are in parentheses.

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

Variable name	Total loans	Equipment loans	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 are in parentheses.