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Firm Growth, Financial Constraints, and Policy-Based Finance [1]

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Abstract

This paper investigates how additional credit supply affects the growth of small and medium enterprises (SMEs) by looking at a unique policy-based, small business lending program in Japan. Combining the loan-level data provided by the Japan Finance Corporation with the financial statement database for SMEs, we compare outcomes between SMEs receiving the loan (treated group) and SMEs not receiving the loan (control group). We find that policy-based credit supply increases investment and employment, which results in a higher long-run growth rate of SMEs. SMEs increase their asset value and hire more employees immediately after the credit supply and the effects stay persistent over years. On the other hand, sales increases gradually over years, which suggests that the credit supply changes the growth rate of SMEs, though we cannot detect any improvement in labor productivity. The persistent differences in long- and short-term loans between treated and control groups may suggest that SMEs are indeed credit constrained and face difficulty finding alternative financing sources.

Keywords: Policy-based finance, Small and medium-sized enterprises, Firm growth, Financial constraints, Industrial policy.
JEL classification: D04, D25, G21, G31, L25.

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1 Introduction

Lending to small businesses is typically fraught with risk. Relative to larger businesses, small businesses fail at higher risk and tend to be more informationally opaque, leading to severe asymmetric information.[1] As a result, small businesses, even though with profitable investment opportunities, often have trouble borrowing and, due to binding financial constraints, cannot grow. A common solution to this problem is government support of lending to small businesses. This support often takes the form of a government guarantee of a small business loan by a private lender or low-interest loans issued directly by the government. The Small Business Administration 7(a) program in the United States and the Enterprise Finance Guarantee program in the United Kingdom are examples of the former type of government support. The Small Business Managerial Improvement Loan (hereinafter MIL) program in Japan, the focus of this paper, is an example of the second form of government support of small business lending.

While these programs are popular across the world, relatively little is known about the effects on small business performance. In this paper, we study the effects of the MIL program on growth and finance of Japanese small businesses. To do so, we use a propensity score matching algorithm to match recipients of MIL loans to other Japanese small businesses.

We find that, following the loan, MIL borrowers increase both employment levels and tangible assets relative to non-borrowers. In the year of the loan, treated firms have six percent higher levels of employment and 16 percent higher levels of tangible assets. Moreover, these effects are persistent. Three years after the loan, treated firms have five percent higher levels of employment and 13 percent higher levels of tangible assets. Interestingly, the impacts on employment and tangible assets are positively correlated across firms. This finding suggests that labor and capital are complementary, which makes the effects of MIL larger.

We interpret these results as the effects of the MIL loan relaxing financing constraints at treated firms. First, we find that treated firms increase debt levels in the year of the loan relative to control firms and this increase persists for several years, suggesting that the MIL loan is the only source of debt for these firms. Second, we find that financially constrained firms,

[1] For more information on the risks associated with lending to small businesses, see Berger and Udell (1995).

identified as those firms with below-median levels of assets and asset tangibility, experience larger effects on employment and, particularly tangible assets. Again, this is consistent with the relaxation of financial constraints at treated firms.

The most closely related paper is Brown and Earle (2017), which analyzes the effects of loans through the U.S. Small Business Administration (hereinafter SBA) on employment growth. Our paper builds on their analysis of the effects of government small business loan programs by exploiting the richer data available for Japanese firms. In particular, unlike Brown and Earle (2017), we have income sheet and balance sheet data. These data allow us to estimate the effects on firm capital decisions and firm sales and profitability. The data also allow us to more fully explore financing constraints, as we can observe financing behavior over time and we can create more detailed proxies of financing constraints.[2]

There is a broader literature on the role of credit provision on small business performance, at both the firm-level and in the aggregate. Generally, analysis of firm-level data shows sizable impacts of small business lending on firm survival and employment growth.[3] Analysis of aggregated data, on the other hand, generally is mixed. While Chen et al. (2017) finds that, following the financial crisis, decreases in county-level small business lending led to a decline in business expansion, employment and wages, Greenstone et al. (2020) find little effect of small business loan originations on employment at the county level.

The remainder of the paper is organized as follows. Section 2 discusses the institutional background of small business lending in Japan. Section 3 discusses the data. Section 4 presents the identification strategy employed in this paper and Section 5 discusses our results. Section 6 concludes.

2 Institutional Background

In this section, we first describe the small businesses in general and their financing situation in Japan. Then, we explain the government-backed small business lending program that we focus in our paper.

[2]For additional evidence on the impact of government small business lending programs, see Lelarge et al. (2010) and Bach (2014).

[3]See, for example, Cingano et al. (2016).

2.1 Small Businesses and Their Financing Sources

As in many countries, small businesses account for a significant fraction of Japanese economy and employment. In Japan, there are approximately 3.6 million companies and 85% of them, 3.0 million, are small business companies in 2016.[4] In 2016, those 3.6 million companies had 47 million employees and generated value-added of 256 trillion Japanese Yen in total, where small business companies account for 22% of the total employment, 10 million, and 14% of the value-added, 36 trillion Japanese Yen (The Small and Medium Enterprise Agency, 2019). According to the statistics of the Bank of Japan, the total outstanding of loans and bills discounted by private banks and credit unions on March 31 2019 was 580 trillion Yen, of which about 70% was for small and medium sized enterprises.[5]

For small companies, borrowing from banks and credit unions are the main financing source. Table 1 shows the composition of liability of all firms in Japan by firm size, based on the *Hojin Kigyo Tokei* (Financial Statements Statistics of Corporations), and the numbers represent the percentage of each item of total liability in each firm size category on March 31, 2015. The information in Table 1 is based on the survey the Japanese government conducted for the firms in Japan, and the numbers represents the percentage of each item of total liability in each firm size category. Borrowing accounts for the largest fraction of liability for the smallest category of companies. As company size increases, the fraction of borrowing to total liability decreases but borrowing accounts for a significant fraction for all company size categories. Bond accounts for a very small fraction of liability except for the largest company size category, suggesting that issuing bonds does not substitute borrowing for small businesses. Overall, Table 1 shows that small businesses heavily rely on borrowing and suggests that financial friction in borrowing could be a huge impact on financing and growth of small businesses.

[4] Here, a small business company is defined as a company with less than 21 employees (less than 6 employees if the company is in the commerce or service sectors).

[5] Bank of Japan uses slightly different definition of small and medium sized enterprises; Companies with capital less than 300 million Japanese Yen. The outstanding loan amounts for small and medium enterprises include loans originated by credit unions (*shinkin* banks). See https://www.boj.or.jp/statistics/dl/loan/ldo/index.htm/.

Table 1: Financing Sources for Non-Financial Companies in Japan

	less than 10M JPY	10M to 50M JPY	50M to 100M JPY	100M to 1B JPY	1B JPY or more	All
Capital	33.4%	34.8%	34.5%	26.9%	42.6%	39.0%
Bond	0.6%	0.9%	1.1%	0.5%	6.2%	3.6%
Borrowing	43.6%	36.8%	34.6%	33.7%	25.7%	31.2%
Interfirm credit etc.	22.4%	27.5%	29.8%	28.9%	25.5%	26.2%

Source: Ministry of Finance, *Hojin Kigyo Tokei (Financial Statements Statistics of Corporations)* for 2014 FY.
Note: Composition of liability of non-financial corporations by company size in terms of capital.

2.2 Small Business Managerial Improvement Loan Program

In Japan, there is a public financial institution specialized in financing small businesses, namely Japan Finance Corporation (JFC), the largest public financial institution in Japan. JFC was founded in 2008, by consolidating four public financial institutions specialized in small business finance, and is a policy-based financial institution in the sense that it was founded by a special law, the Japan Finance Corporation Act.[6]

One of the main financing programs of JFC is the Small Business Managerial Improvement Loans or also known as "Marukei Loans," which is the focus of this paper. MIL, which aims at improving managements of small businesses, has a couple of unique features. First, there is a firm size restriction for the application. Only firms with less than 21 employees (6 employees for the commerce and service sectors) are eligible to apply. Second, for this program, JFC collaborates with regional business associations of small firms, specifically "Chambers of Commerce and Industry" and "Societies of Commerce and Industry." A small firm applying for MIL needs to participate in a managerial improvement program provided by these regional business associations for at least six months and the MIL application requires a recommendation letter by the advising association. Third, MIL needs neither collateral nor credit insurance. Collateral and credit insurance are often barriers for small companies to access loans. By removing them, MIL aims to contribute to relaxing financial constraints of small firms. Finally, there are restrictions on loan term. The upper limit of each loan is 20 million JPY (approximately 185 thousand USD). Meanwhile, the term of payment

[6]According to the law, the scope of JFC's activities is determined by the budgets and plans approved by the government and reflecting its policy. The annual report of JFC states that its basic philosophy is "Following the national policy, provide flexible policy-based financing by utilizing a variety of financing programs and schemes to meet the needs of society, while complementing the activities of private financial institutions" (Japan Finance Corporation 2019).

Table 2: Descriptive Statistics of MIL Program

Fiscal Year	Number of Loans Newly Executed	Total Amount	Average Loan Size	SBMIL Interest Rate (%)	Interest Rate of CUs
2008	45,948	185,625	4.04	2	1.856
2009	42,655	187,244	4.39	1.85	1.85
2010	37,654	147,819	3.93	1.95	1.586
2011	35,159	154,315	4.39	1.85	1.445
2012	40,047	172,228	4.30	1.65	1.459
2013	39,303	198,265	5.04	1.6	1.421
2014	40,083	223,734	5.58	1.35	1.332
2015	43,210	249,566	5.78	1.15	1.339
2016	43,421	257,103	5.92	1.16	1.39
2017	44,060	270,192	6.13	-	-
2018	44,176	279,147	6.32	-	-

Source: Japan Finance Corporation (2019) and The Small and Medium Enterprise Agency (2018).
Note: Total amount and average loan size are in million Japanese Yen.

is 7 years with one-year deferment for working capital loan, and 10 years with two-year deferment for investment capital loan. The interest rate is fixed at a low rate and is revised reflecting the financial market condition and the government policy.

Table 2 summarizes the number of loan origination, total loan amount, average loan size together with the interest rate of MIL loans and the average interest rate of loans originated by credit unions. As the average loan size has increased from around four million Japanese Yen to six million Japanese Yen, whereas the number of loan origination has stayed relatively constant. As a result, the total size of MIL program has increased by about 50% since 2008. Regarding the interest rate, because of the zero interest rate policy of the Bank of Japan since the late 1990s, loan rates of private financial institutions including credit unions for small firms have been staying at a low level, and the loan rate of MIL has not been significantly lower. However, taking account of the condition that MIL needs neither collateral nor credit insurance, the MIL has been attractive for borrowers.

3 Data

3.1 Sources and Construction of the Data

To examine the effects of MIL, we use proprietary data provided by the JFC, which contain the list of loan recipients. In the list, we can observe 52,984 firms that have outstanding bal-

ance as of the end of the fiscal year 2018, i.e., March 31, 2018. The unique feature of this data is also recording information on whether these firms have outstanding balances as of the end of fiscal years 2014, 2015, 2016, and 2017, which enables us to identify when these firms start receiving MIL.[7] Although we also observe several key variables found in their financial statement information, such as sales amount, capital, location of the headquarter, and so on, as of March 31, 2018, we do not directly observe some variables of our interests, such as tangible fixed assets, machinery and equipment, as well as past information for these firms. Thus, for complementing these missing information and constructing a control group, we link this list of the loan recipients to the Credit Risk Database (hereinafter CRD data), explained below.

CRD data is one of the most comprehensive financial data for the Japanese small- and medium-sized firms, collecting financial statement information for more than one million firms, annually. The data is collected by the CRD Association, which compiles the data from its member organizations involving SME business, including 51 local Credit Guarantee Corporations, 3 public financial institutions, 98 private financial institutions, and 15 institutions, such as credit rating companies. In Japan, local credit guarantee corporations that are public institutions support SMEs by serving public guarantors to make it easier for them to borrow funds. Thus, SMEs having any loans from the public or private financial institutions must be recorded into this data through their guarantors, as well as big companies having loans from private financial institutions.

We link the list of the loan recipients to the CRD data via five key variables: Prefecture, Sales (in 2017), Japanese SIC, Accounting closing month, and Capital. By doing so, we have 33,274 matched firms out of 52,984 firms listed in the data. There are several caveats. First, as five matching variables may not be sufficient to uniquely pin down the firm, there are 2,955 firms matched multiply in the CRD data and we drop these firms. Second, the timing of treatment may not be perfectly identified, as the data do not contain the information in which month they start borrowing.

[7] In other words, we can observe whether these firms have outstanding balances as of March 31, 2014, 2015, 2016, and 2017, as well as March 31, 2018.

3.2 Descriptive Statistics

Table 3 shows the summary statistics of the firm-year level variables. Panels (A) and (B) show the statistics for all firms in the sample and firms receiving the MIL, respectively. Throughout this paper, we call the firms receiving the MIL as the treated group and the remaining firms as the control group. As we describe in the previous section, the timing of the treatment can be different across firms depending on the year they receive the MIL. We have about 3.4 million and 76 thousand observations for all samples and the treated group, respectively.

Table 3: Summary Statistics

	N	Mean	S.D.	5%	25%	50%	75%	95%
Panel (A): All Sample								
ROA	3,287,572	.0036	.154	-.260	-.025	.017	.061	.210
Num of Employees	3,401,456	14	25.6	0	2	5	14	60
Cash and Deposit	3,369,204	55,959	136,674	500	3,190	11,200	40,700	273,000
Temporal Liquidity	3,272,597	.172	.200	.013	.051	.109	.213	.548
Short Term Loans	3,401,211	30,134	90,396	0	0	2,500	18,600	150,000
Short/Long Term Loans	3,401,262	142,707	312,964	1,080	13,800	40,300	118,000	652,000
Sales Amount	3,401,226	360,534	808,923	9,860	39,800	102,000	288,000	1,630,000
Total Assets	3,401,212	321,921	771,228	5,670	24,700	73,600	242,000	1,520,000
Tangible Fixed Assets	3,401,304	112,147	286,014	0	2,200	14,200	79,100	574,000
Buildings & Structures	2,205,121	60,543	156,027	0	100	5,960	40,800	320,000
Machinery & Equipment	2,156,139	12,797	36,564	0	90	2,120	8,260	60,200
Panel (B): Treated (MIL = 1)								
ROA	73,753	-.015	.160	-.306	-.054	.001	.050	.199
Num of Employees	76,519	4.47	5.35	0	1	3	6	16
Cash and Deposit	75,761	12,031	18,514	400	1,900	5,320	13,600	48,300
Temporal Liquidity	73,761	.118	.110	.011	.040	.084	.159	.345
Short Term Loans	76,468	9,851	19,555	0	0	2,170	10,500	45,600
Short/Long Term Loans	76,466	48,572	61,584	3,140	13,000	28,400	58,200	168,000
Sales Amount	76,466	104,941	121,145	11,700	32,300	64,100	127,000	351,000
Total Assets	76,468	68,631	92,378	4,990	16,200	36,200	80,600	250,000
Tangible Fixed Assets	76,467	21,947	40,757	0	1,340	6,420	23,200	98,200
Buildings & Structures	27,599	12,268	26,868	0	60	2,370	11,200	58,400
Machinery & Equipment	27,575	5,939	10,659	0	300	2,080	6,470	25,800

Note: This table shows summary statistics for the following variables used in our study: ROA, defined as 'Operating Income' divided by 'Total assets'; Number of Employees, measured in number of people; Cash and Deposit, measured in 1,000JPY; Temporal Liquidity, defined as 'Cash and Deposit' divided by 'Sales Amount'; Short Term Loans, measured in 1,000JPY; Short and Long Term Loans, measured in 1,000JPY; Total Assets, measured in 1,000JPY; Tangible Fixed Assets, measured in 1,000JPY; Buildings and Structures, measured in 1,000JPY; and Machinery and Equipment, measured in 1,000JPY. Each column shows the number of observations, means, standard deviations, or 5, 25, 50, 75, and 95 percentiles for each variable.

One notable difference between all samples and the treated group is that the latter is much smaller when measured by the number of employees or by the asset size. It is consistent with the policy that the MIL is aimed to help small businesses. When we look at the

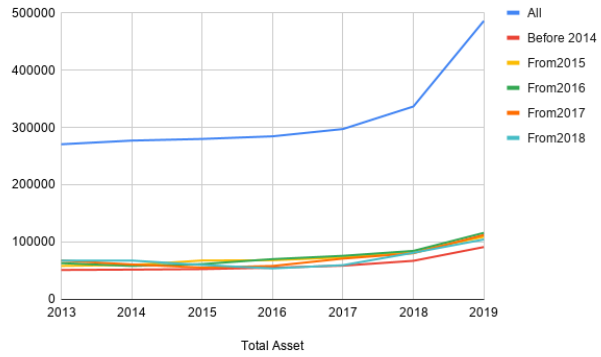
distributions of the return on asset (ROA), the treated group firms have a slightly lower ROA. Since most of the firms in the sample are private firms and not publicly traded, they are not required to follow the strictly transparent accounting rules as publicly traded firms do and the profit they report may not capture the true profitability. Therefore, whether we can have a meaningful interpretation of ROA is questionable. Note that about one-third of all samples and two-third of the treated group do not report "Buildings & Structures" and "Machinery & Equipment." Since larger firms tend to report these variables, we have more missing values for the treated group.

A natural way to examine the effect of the MIL is to track the average of the variables of interest for the treated group and control group over time. For example, Figure 1 shows how the total asset, measured in 1,000 Japanese Yen, evolves over time. Panel (a) of Figure 1 plots the average total asset of the control group, firms treated before 2015, firms treated in 2015, firms treated in 2016, firms treated in 2017, and firms treated in 2018. As is clear from the figure, the treated group firms are very different from the control group firms. As a result, the effect of the MIL is hardly recognizable from the figure. For a valid comparison, it is essential to compare firms with similar characteristics. Panel (b) of Figure 1 plots the same variable as in Panel (a) excluding the control group. Since the treated group firms have similar characteristics, Panel (b) allows us to make a valid comparison among treated firms with different treatment timing. When we look at the year they are treated, for each group of firms, the average value of asset increases, suggesting that the MIL has a positive effect on total asset. Also, note that the control group firms and firms treated before 2015 follow a similar trend, which captures macroeconomic factors or year-specific factors that affect all firms.

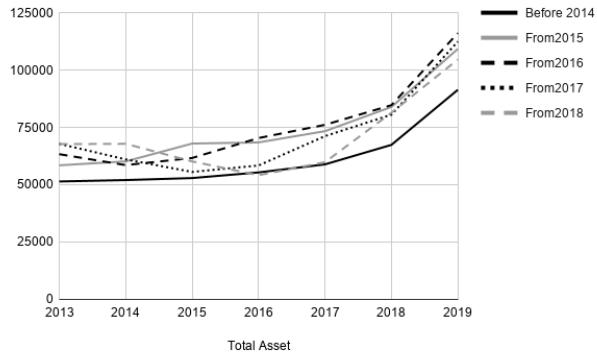
Figure 2 plots the average number of employees, measured in number of people, for the same group of firms as in Figure 1. Again, it is clear that the control group firms are larger firms than the treated firms. Within the treated firms with different treatment timing, we can observe an increase in the employment in the year the firms receive the treatment for all groups of firms. The overall patterns are similar to those presented in Figure 1.

Figures 1 and 2 suggest that the MIL program has a positive effect on firm growth both in terms of the asset size and the number of employees. At the same time, they also highlight

Figure 1: Average Total Asset over Time

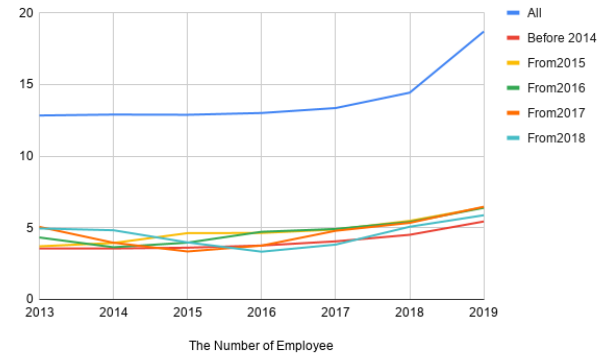


(a) Average of All Firms

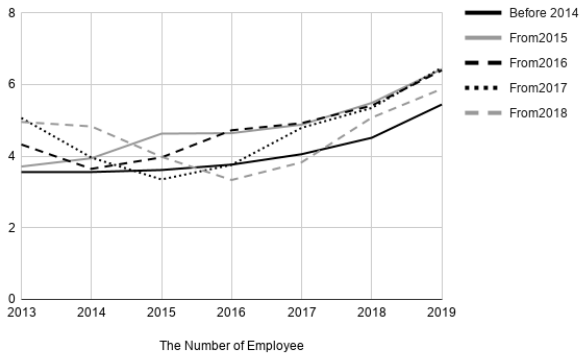


(b) Average of Treated Group Firms

Figure 2: Average Number of Employees over Time



(a) Average of All Firms



(b) Average of MIL Receiving Firms

the importance of controlling for firm characteristics and year fixed effects.

4 Empirical Strategy

The statistics in Section 3 suggest that controlling for firm characteristics is essential to evaluate the effect of the MIL program. Also, MIL is not randomly allocated in the sense that only firms with credit needs would apply for the program. Therefore, controlling for the potential credit needs is also essential. To this end, we adopt a semiparametric Difference-in-Differences model proposed by Callaway and Sant'Anna (2019), a Difference-in-Differences with the propensity score as the weights to observations. This estimation method has several advantages in our setting. First, it explicitly controls for the firm characteristics. As pre-

sented in Section 3, there exist huge firm heterogeneity. The model proposed by Callaway and Sant'Anna (2019) controls for the firm heterogeneity through the propensity score. Second, related to the first point, it allows for selection due to firms' credit needs by observable. Firms participate in the MIL program only if they face credit needs. By including observables that capture firms' credit needs, such as the growth rate of sales, assets and/or employment, into the propensity score calculation allows us to control selection due to firms' credit needs. This is essential because we expect the standard "parallel trends assumption" to hold only after conditioning on firms' credit needs. Our estimation strategy allows for the possibility that the parallel trend assumption does not hold unconditionally but hold after controlling on observed covariates. Third, it allows heterogeneous treatment effects depending on firm characteristics. Since the semiparametric Difference-in-Differences model does not impose linearity, our estimation model allows for potential heterogeneous effects of the MIL program. Fourth, it allows for variation in treatment timing. As discussed in Goodman-Bacon (2019), when there is variation in treatment timing, estimation based on a standard Difference-in-Differences model results in a weighted average of different treatment effects between different cohorts. The model proposed by Callaway and Sant'Anna (2019) gives us estimates that have an intuitive interpretation. A natural alternative to our estimation strategy is to use a standard Difference-in-Differences model. We discuss the results under the alternative models intensively in Appendix A. The results are qualitatively similar when we control for firm characteristics.

Furthermore, we are not only interested in the causal effect of the MIL program but also in the evolution of the effect over time. For example, if all firms have access to alternative financing sources other than the MIL program, then we would expect the effect to vanish over time since the firm's credit needs would be satisfied eventually. On the other hand, if firms are financially constrained and firms cannot find alternative financing sources easily, we would expect the effect to be persistent. To examine how the effect evolves over time, we adopt an event study design framework—estimating a series of treatment effects around the treatment year. This framework is a very common approach when evaluating the treatment effect, e.g., Deshpande and Li (2019), and allows us to see whether any pre-trend exists.

Formally, the average treatment effect on treated (ATT) from τ years from the treatment

for the firms who receive MIL in year t is identified as

$$\text{ATT}(t,\tau) = E\left[\left(\frac{G_{it}}{E[G_{it}]} - \frac{\frac{p_t(X_{i,t-1})C_{it}}{1-p_t(X_{i,t-1})}}{E\left[\frac{p_t(X_{i,t-1})C_{it}}{1-p_t(X_{i,t-1})}\right]}\right)(y_{i,t+\tau} - y_{i,t-1})\right], \tag{1}$$

where G_{it} is one if firm i receives MIL in year t and zero otherwise, C_{it} is one if firm i never receives MIL and zero otherwise, $p_t(X_{i,t-1})$ is the probability that firm i with covariates $X_{i,t-1}$ receive MIL in year t conditional on $G_{it} = 1$ or $C_{it} = 1$, and y_{iu} is the outcome variable of firm i in year u. We define ATT τ years from the treatment as the weighted average of ATT(t,τ) as

$$\text{ATT}(\tau) = \sum_t w_t \text{ATT}(t,\tau),$$

where w_t denotes the weight, the number of firms treated in year t divided by the total number of treated firms.

We estimate ATT(t,τ) by replacing the expectation by the empirical average and $p_t(X_{i,t-1})$, the propensity score, by estimating a logit model. For $X_{i,t-1}$, we use a dummy variable indicating whether the total number of employee is less than 21, years of operation, region- and industry-fixed effects, and one year to three year lagged values, values in year $t-1$, $t-2$ and $t-3$, of the logarithm of sales, the number of employees, cash deposits, total assets, tangible assets, and short-term and long-term loans. The lagged values of the variables are meant to capture firms' credit needs. For example, by including one-year and two-year lagged values of sales, we can control for the level of sales and the growth rate of sales in the year before the treatment. We present the estimation results for the propensity score in Appendix B. The standard error is estimated by bootstrap with 200 replications.

5 Results

In this section, we discuss our main results of the effects of the loan program on firm outcomes. We first explore how firms use the proceeds of the loan. Then we study the effects on firm performance and finally we examine the mechanisms driving our results.

Table 4: Estimation Results: Employment and Assets

	Log(Num of Employees)	Log(Total Assets)	Log(Tangible Fixed Assets)	Log(Building & Structure)	Log(Machinery & Equipment)
-3	-0.004	0.009**	0.002	0.016	-0.073***
	(0.008)	(0.004)	(0.019)	(0.017)	(0.022)
-2	0.007	0.005*	0.016	0.021	0.014
	(0.006)	(0.003)	(0.014)	(0.013)	(0.017)
0	0.058***	0.039***	0.158***	0.042***	0.109***
	(0.006)	(0.003)	(0.016)	(0.014)	(0.018)
1	0.064***	0.032***	0.157***	0.036*	0.134***
	(0.007)	(0.005)	(0.02)	(0.019)	(0.024)
2	0.052***	0.023***	0.146***	0.065**	0.141***
	(0.01)	(0.007)	(0.029)	(0.027)	(0.03)
3	0.05***	0.035***	0.13***	0.065	0.162***
	(0.015)	(0.01)	(0.036)	(0.041)	(0.046)
4	0.065**	0.002	0.086	-0.046	0.113
	(0.028)	(0.02)	(0.067)	(0.064)	(0.08)
N	2,921,666	2,921,666	2,921,666	2,033,082	1,982,589

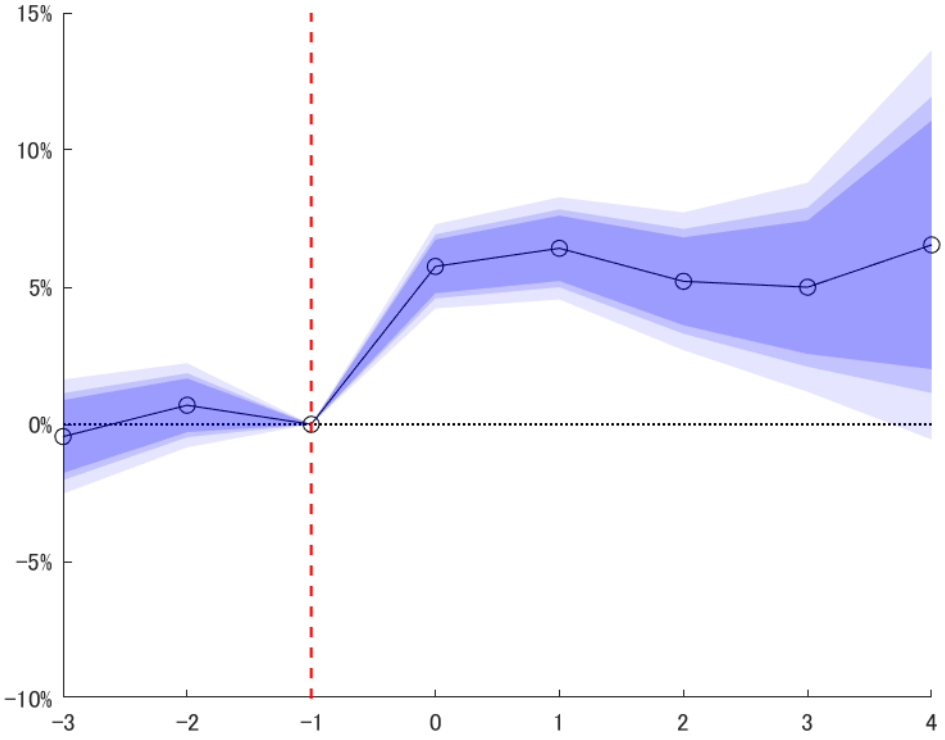
Note: Standard errors in parentheses and significance levels are denoted by <0.1 (*), <0.05 (**), and <0.01 (***).

5.1 How Firms Use the Proceeds of the Loan

To understand how firms use the loan proceeds, we present in Table 4 the ATT for employment and measures of tangible assets. First, in column 1, we find that, in each of the three years prior to the loan, there is no significant difference in employment levels between treated and control firms. Moreover, as shown in Figure 3, the trend in the estimate is flat in the years prior to the loan. However, in the year of the loan, employment at treated firms increases significantly relative to employment at control firms. The estimate implies that the increase in employment is approximately 6 percent. The estimated effect for the years following the loan remains positive, significant, and similar in magnitude to the initial effect. Thus, it appears that firms use part of the loan proceeds to immediately increase employment and then maintain this higher level of employment for several years.

The effect on tangible assets is similar. Again, the estimates for the years before the loan are small and insignificant and, as shown in Figure 4, show no meaningful pre-trend. However, in the year of the loan, tangible assets increase at treated firms relative to control firms; the estimate is positive and significant, and implies the increase of about 15.8 percent. Un-

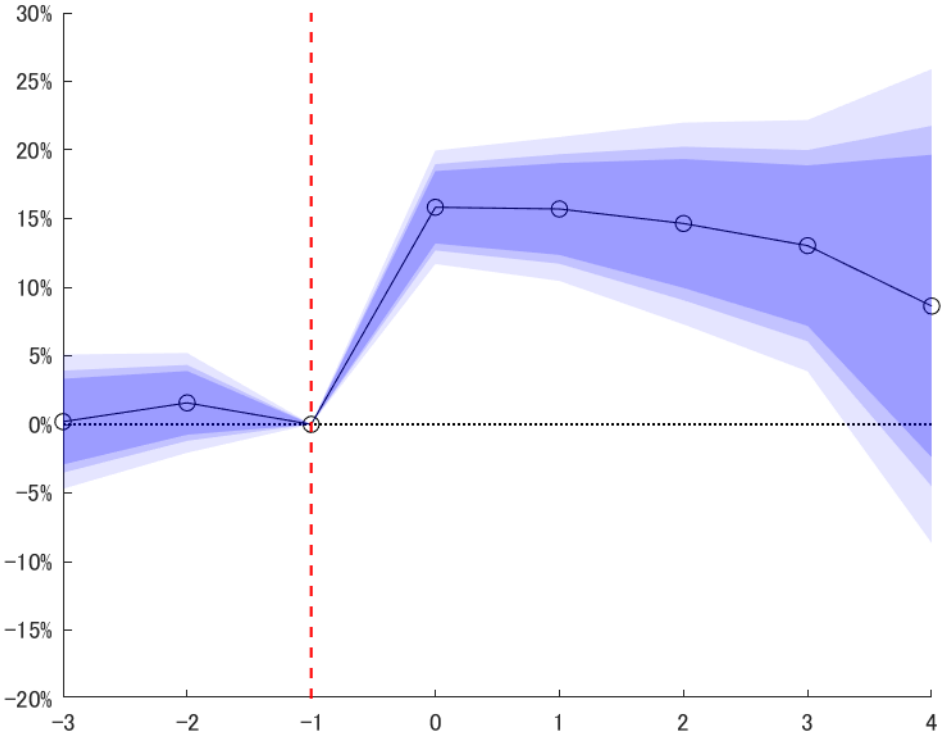
Figure 3: Employment Estimates Over Time



like the effect on employment, however, the estimates show that the effect on tangible assets attenuates somewhat over time. Treated firms have approximately 13 percent higher levels of tangible assets three years after the loan and 8.6 percent higher levels four years after the loan. While the latter estimate is not statistically significant, this is likely due to low power as there are relatively few observations four years after the loan.

Columns 3 and 4 of Table 4 then separate tangible assets into buildings and structures and machinery and equipment. Treated firms increase both types of tangible assets in the year of the loan, although the effect on machinery and equipment is much larger in magnitude. Buildings and structures increase by approximately 4.2 percent at treated firms relative to control firms in the year of the loan, while machinery and equipment increase by approximately 10.9 percent. In the years following the loan, there is a slight upward trend in the estimates; two years after the loan, the value of buildings and structures at treated firms are 6.5 percent higher than at control firms while the value of machinery and equipment is

Figure 4: Tangible Fixed Asset Estimates Over Time



approximately 14.1 percent higher. In the third year after the loan, the estimated effect on buildings and structures is still 6.5 percent, although not significant, while the estimate for machinery and equipment is 16.2 percent, or almost 50 percent higher than the initial effect.

Our estimates, therefore, suggest that the firms use the proceeds to increase employment as well as their tangible capital and that these increases seem to be fairly long-lasting. However, the estimated ATT for the assets and number of employees are average across firms, and the estimates are silent whether each individual firm increases both capital and labor at the same time or increases only either one of them, i.e., whether capital and labor are complement or substitute. Whether capital and labor are complement or substitute has a different implication on the severity of financial constraints. Firms need larger credit to invest in both to achieve the efficient level of capital and labor when they are complement, whereas firms need less credit when they are substitute since firms only need to invest in one of them. Therefore, financial constraints would be severer when capital and labor are

Table 5: Residual Regression

	Treated Firms Only			All Firms		
	log(Tangible Fixed Asset	log(Building & Structure)	log(Machinery & Equipment)	log(Tangible Fixed Asset)	log(Building & Structure)	log(Machinery & Equipment)
Employment Residual (Treated)	0.205*** (0.038)	0.272*** (0.075)	0.134 (0.102)	0.171*** (0.022)	0.261*** (0.066)	0.091 (0.088)
Employment Residual (Control)	- -	- -	- -	0.126*** (0.002)	0.179*** (0.003)	0.145*** (0.004)
Other Controls	x	x	x	x	x	x
N	7,760	3,260	3,240	2,683,359	1,887,834	1,844,798
Adj. R^2	0.213	0.030	0.037	0.087	0.020	0.015

Note: Standard errors in parentheses and significance levels are denoted by <0.1 (*), <0.05 (**), and <0.01 (***).

complement.

To test whether the labor input and capital input are complement or substitute, we examine the correlation between the residual from the employment regression and asset regression. If firms substitute capital for labor, firms who increase capital would decrease labor relative to ATT, which creates a negative correlation between the capital residual and labor residual. On the other hand, if capital and labor are complement, firms increasing capital more would increase labor more relative to ATT, which creates a positive correlation.

Formally, we first define the residual by

$$\text{Res}_{it}^{y} = y_{i,t} - y_{i,t-1} - \text{ATT}^{y}(t,0) \times I\{i \text{ treated in year } t\},$$

where $\text{ATT}^{y}(t,0)$ is ATT for variable y, and $I\{\}$ is an indicator function. Then, we regress Res_{it}^{Asset} on $\text{Res}_{it}^{Employee}$ by estimating the following equation:

$$\text{Res}_{it}^{Asset} = \beta^{res}\text{Res}_{it}^{Employee} + FE_t + FE_{ind} + \text{Control}_{it} + e_{it},$$

where FE_t is a year fixed effect, FE_{ind} is an industry fixed effect, Control_{it} is other control variables, and e_{it} is an error term.

Table 5 summarizes the estimation results. The first three and the last three columns show the estimation results using only treated firms and using all firms with β^{res} estimated separately for treated and control, respectively. First, when we look at the first three columns,

the results show that the residual from the employee regression is positively correlated with the residual from the asset regression, and the correlation is statistically significant for tangible fixed asset and building and structure. The positive correlation implies that firms increase labor and capital at the same time and the loan enables firms to expand rather than creates capital-labor substitution. The results suggest that financial constraints would bind firm growth severely since firms need to invest both in capital and labor at the same time, which requires more credit compared to the case when firms invest only in one of them. Second, the next three columns show that the positive correlations exist among treated firms as well but with smaller magnitude for tangible fixed asset and building and structure residuals. This result implies that firms, in general, increase or decrease capital and labor at the same time. At the same time, the estimated coefficients to be larger for treated firms implies that treated firms increase capital more when expanding the firm size relative to control firms. Investing in capital is more difficult for financially constrained firms and, thus, they would have suboptimal capital to labor ratios. When the constraints are relaxed, firms would invest more in capital. The results presented in Table 5 are consistent with the view that the loan relaxes the financial constraints and help SMEs to achieve more efficient capital to labor ratios.

5.2 The Effects of the Loan on Performance and Liquidity Management

Thus far, we have found that, immediately following the loan, borrowing firms increase their use of both labor and capital, which translates into a higher rate of sales growth. Moreover, these are persistent effects lasting at least three years post-loan.

To understand the source of this persistent difference in performance, we first look at the patterns in debt over time in Table 6, which demonstrates the estimation results for sales and liquidity related variables. In the three years before the loan, the estimate is small and statistically significant. In the year of the loan, the estimate is large – implying a 15 percent increase in outstanding debt – and highly significant, consistent with the borrowing firms receiving the government loan while the control firms did not receive a loan from any source. In the three years following the loan, outstanding debt for the treated firms remains significantly higher relative to that of the control firms. After three years, treated firms have approx-

Table 6: Estimation Results on Sales and Liquidity Management

	Log(Sales)	Log(Cash & Deposit)	Log(Temporal Liquidity)	Log(Short Term Loans)	Log(Short & Long Term Loans)
-3	0.003	0.009	0.012	0.036	0.021*
	(0.005)	(0.009)	(0.009)	(0.032)	(0.012)
-2	0.000	0.005	0.009	-0.012	0.019*
	(0.003)	(0.008)	(0.008)	(0.029)	(0.01)
0	0.014***	0.036***	0.028***	-0.005	0.15***
	(0.003)	(0.009)	(0.009)	(0.03)	(0.008)
1	0.031***	-0.007	-0.028***	0.046	0.162***
	(0.005)	(0.01)	(0.01)	(0.037)	(0.01)
2	0.039***	-0.032**	-0.061***	0.073	0.15***
	(0.008)	(0.013)	(0.013)	(0.051)	(0.013)
3	0.05***	0.003	-0.029	0.159**	0.172***
	(0.009)	(0.019)	(0.018)	(0.079)	(0.016)
4	0.051***	-0.001	-0.033	0.273*	0.171***
	(0.015)	(0.035)	(0.033)	(0.149)	(0.025)
N	2,921,666	2,921,666	2,917,819	2,912,986	2,921,666

Note: Standard errors in parentheses and significance levels are denoted by <0.1 (*), <0.05 (**), and <0.01 (***).

imately 17.2 percent more outstanding debt than control firms. In other words, it appears that, due to the government loan, debt at the treated firms increases substantially but, in subsequent years, neither group of firms receive another loan.

5.3 The Role of Financial Constraints

To provide additional evidence on the role of financial constraints, we next re-estimate the effects on employment and tangible assets for financially constrained and unconstrained firms separately. We identify financially constrained firms based on two separate measures in the year prior to the loan; the first measure is total assets while the second measure is asset tangibility, defined as the ratio of tangible fixed assets to total assets. We then classify firms as financially constrained if these measures are below their respective median values among treated firms. The results are presented in Table 7, where Panel A uses total assets to measure financial constraints and Panel B uses asset tangibility to identify financially constrained firms.

As shown in columns 1 and 2 of Panel A, the effects on employment are much stronger for constrained firms than for unconstrained firms. Among constrained firms, employment

at treated firms increases in the year of the loan by approximately 6.9 percent relative to the control firms. For constrained firms, employment is only 3.5 percent higher at treated firms. Moreover, while the effect remains positive and generally significant for constrained firms, the estimate for the unconstrained firm sample is close to zero and insignificant for years $t+1$ through $t+4$. Thus, it appears that the loan allows financially constrained firms to permanently increase employment while there is no long-term effect on employment at unconstrained firms.

Table 7: Results by Financial Constraints Measures

	Log(Employment)		Log(Tangible Fixed Assets)	
	Constrained	Unconstrained	Constrained	Unconstrained
Panel (A): Total Assets as a Measure of Financial Constraints				
-3	0.048**	-0.001	0.13	0.003
	(0.021)	(0.01)	(0.089)	(0.022)
-2	-0.021	0.002	-0.052	0.004
	(0.014)	(0.007)	(0.067)	(0.02)
0	0.069***	0.035***	0.584***	0.087***
	(0.022)	(0.009)	(0.084)	(0.015)
1	0.108***	0.015	0.606***	0.088***
	(0.027)	(0.01)	(0.111)	(0.022)
2	0.053*	-0.007	0.57***	0.059**
	(0.032)	(0.012)	(0.16)	(0.029)
3	0.056	-0.006	0.549**	0.048
	(0.04)	(0.02)	(0.21)	(0.042)
4	0.183*	0.006	0.344	0.029
	(0.096)	(0.034)	(0.367)	(0.062)
N	719,339	2,188,316	719,339	2,188,316
Panel (B): Asset Tangibility as a Measure of Financial Constraints				
-3	0.005	0.002	0.063	-0.051**
	(0.013)	(0.016)	(0.054)	(0.026)
-2	-0.007	-0.008	0.011	-0.035*
	(0.009)	(0.013)	(0.043)	(0.019)
0	0.034***	0.049***	0.455***	-0.003
	(0.01)	(0.01)	(0.043)	(0.015)
1	0.009	0.051***	0.426***	0.000
	(0.015)	(0.013)	(0.066)	(0.016)
2	0.01	-0.001	0.347***	0.014
	(0.02)	(0.017)	(0.074)	(0.026)
3	-0.014	0.017	0.281**	0.033
	(0.03)	(0.024)	(0.116)	(0.031)
4	0.04	0.018	0.182	0.035
	(0.04)	(0.044)	(0.179)	(0.047)
N	1,291,682	1,629,757	1,291,682	1,629,757

Note: Standard errors in parentheses and significance levels are denoted by <0.1 (*), <0.05 (**), and <0.01 (***).

Similarly, the treatment effect on tangible assets is significantly larger for constrained

firms, as shown in columns 3 and 4 of Panel (A). While both constrained and unconstrained firms experience a significant increase in tangible assets in year t, the magnitude of the effect is much larger for constrained firms; whereas the estimates imply that unconstrained firms experience an increase of approximately 8.7 percent, tangible assets at constrained firms increase by approximately 58.4 percent. Moreover, while the effect at constrained firms is fairly persistent – in year $t+3$, treated firms have approximately 54.9 percent higher levels of tangible assets – the effect at unconstrained firms declines over time and, in year $t+3$, is approximately half of the initial effect and no longer statistically significant.

When asset tangibility is used to identify financially constrained firms, as shown in Panel (B) of Table 7, we no longer find that the effects on employment are stronger for financially constrained firms. Rather, columns 1 and 2 show that the initial effect is larger in magnitude for unconstrained firms; whereas, among constrained firms, treated firms increase employment by 3.4 percent in year t, treated unconstrained firms increase employment by approximately 4.9 percent. For both populations, however, we find no long term effect on employment as the estimates in years $t+2$ and $t+3$ are no longer statistically significant.

However, as shown in columns 3 and 4 of Panel (B), there are large, permanent effects on tangible capital for financially constrained firms and no effects for financially unconstrained firms. In particular, among constrained firms, treated firms increase tangible assets by 45.5 percent in year t relative to control firms. This estimate in later years remains large and significant, with the estimate for year $t+3$ implying that treated firms have approximately 28.1 percent higher levels of tangible assets than control firms. Among unconstrained firms, however, the estimates across all years are close to zero and statistically insignificant.

Taken together, the results of Table 7 suggest the government loan plays an important role in relaxing financial constraints among small firms. While there is some weak evidence that relaxing this constraint allows firms to increase employment, the evidence is much stronger on the effect on tangible assets. Regardless of how financially constrained firms are identified, the treatment effect on tangible asset levels is significantly larger for constrained firms. These results suggest that not only are financial constraints binding for the treated firms, the constraint is particularly relevant for tangible assets. This is consistent with our earlier results that suggest the government loan program allows small firms to move closer to their

optimal capital to labor ratios.

6 Conclusion

We study the impact of a government loan program in Japan on small business performance. We find that borrowers grow significantly larger than control firms. In particular, borrowers increase both employment and capital levels immediately following the loan and these differences are persistent for several years. Moreover, our analysis suggests that, while both labor and capital increase, the effects are stronger for capital, suggesting that the government loan allows firms to move closer to their optimal capital to labor ratio.

Our analysis suggests that these results arise because the government loan relaxes binding financial constraints at treated firms. Relative to the control firms, treated firms experience an immediate and persistent increase in outstanding level. Additionally, we find that the results are significantly stronger at financially constrained firms than at unconstrained firms. Smaller firms and firms with lower asset tangibility tend to have larger increases in employment and capital, with the differences particularly large for capital.

These results all suggest that the government loan program relaxes financial constraints at treated firms, allows them to expand, and to move closer to their optimal capital to labor ratio. In future work, we plan to explore the implications on firm outcomes such as sales and profitability. It should be noted, however, that we do not touch upon the cost of the MIL program in this paper. According to the Small Enterprise Agency, for implementing the program, the central government and prefectural governments spend approximately 100 billion yen per year, which comprises the cost of the MIL program. The cost benefit analysis of the MIL program is for future research.

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Appendix A Alternative Estimation Strategy

One natural alternative to the estimation model presented in Section 4 is to use a Difference-in-Differences model. The most naive specification would be the following:

$$y_{it} = \alpha_i + \alpha_t + \sum_{\tau=-3}^{4} \beta_\tau I\{\tau \text{ year after Treatment}\} + \varepsilon_{it}, \tag{2}$$

where α_i and α_t are individual and year fixed effects. A regression model with both individual fixed effects and time fixed effects as in Equation (2) is commonly called as a two-way fixed-effect model. A two-way fixed effect model is easy to implement and often used when there is a variation in treatment timing. See Goodman-Bacon (2019) for a detailed discussion of the model. As in the standard Difference-in-Differences model, one crucial assumption we need to have meaningful estimates is the parallel trend assumption. However, as argued in Section 4, the participation decision to the MIL program would not be random, and firms with higher credit demand would be more likely to participate in the program. As a result, we would expect a statistically significant pre-trend to exist when we estimate Equation (2).

One straightforward way to address this concern is to include covariates in the estimation equation, i.e., modify the equation to the following:

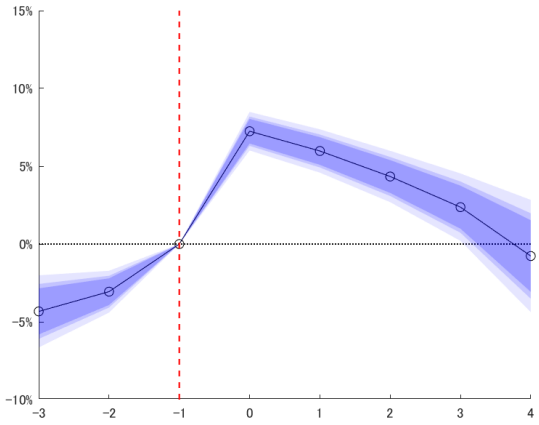
$$y_{it} = \alpha_i + \alpha_t + \sum_{\tau=-3}^{4} \beta_\tau I\{\tau \text{ year after Treatment}\} + X_{i,t-1}\gamma + \varepsilon_{it}, \tag{3}$$

where $X_{i,t-1}$ is the covariates that capture firms' credit needs. In this section, we present the estimation results based on Equation (2) and (3) to show that a naive Difference-in-Differences model is not appropriate in our setting and a Difference-in-Difference model with covariates produce qualitatively and quantitatively similar results as in the main text. In the estimation of equation (3), we use the same variables as in the estimation of the propensity score for $X_{i,t-1}$.

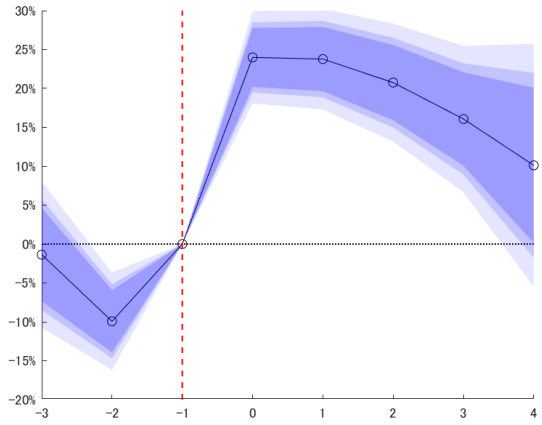
Table A1 and A2 show the estimated coefficients for Equation (2) and (3), respectively. In the estimation, we restrict our sample to firms with the number of employees less than 21. As we expect, the estimated coefficients in Table A1 exhibit strong pre-trends, whereas many of those pre-trends are eliminated in the estimated coefficients in Table A2. Figure A5 and A6 present the estimated coefficients for a subset of dependent variables, logarithm of total asset, tangible fixed asset, the number of employees, sales, short- and long-term loans, and cash and deposits, based on Equation (2) and (3), respectively.

For all dependent variables, the estimated coefficients in Figure A5 exhibit an increasing pre-trend just before the treated firms receive MIL, which suggests that firms face credit needs when those variables are increasing, i.e., when they are increasing asset and employment, borrowing more, and facing increasing sales. Compared to the estimates in Figure A5, including covariates eliminate some of the pre-trends. We no longer see the increasing pre-trend for total asset, sales and cash and deposits, suggesting that the covariates infact help control for the firms' credit needs. In terms of the magnitude, the estimated coefficients are similar to the estimated coefficients based on Equation (1). However, there still remain an increasing pre-trend for some of the variables.

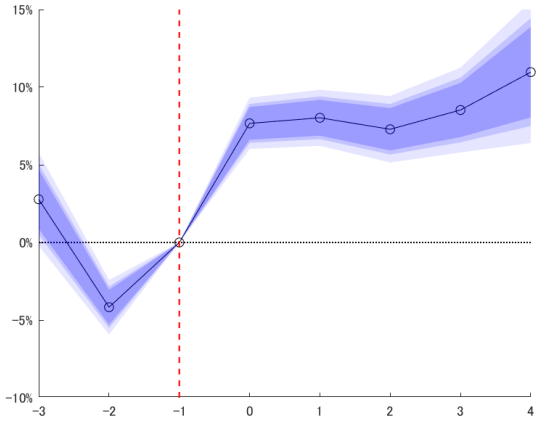
Figure A5: Plain DiD Estimates



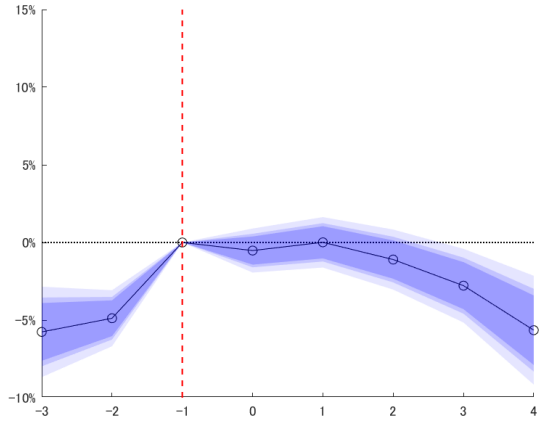
(a) Total Assets



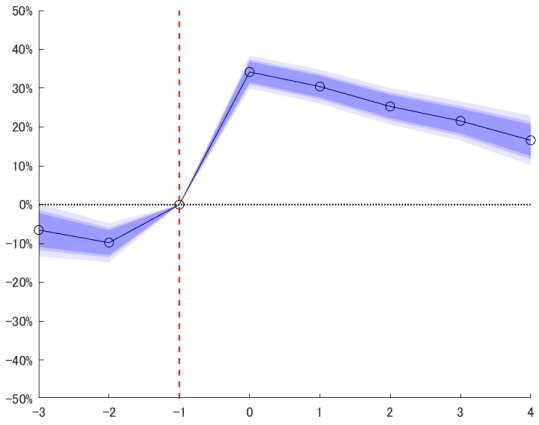
(b) Tangible Fixed Assets



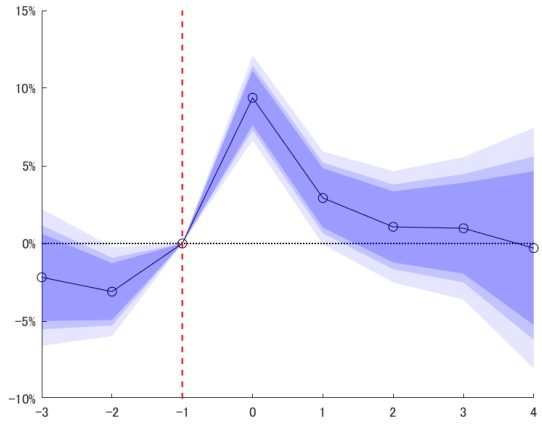
(c) Number of Employees



(d) Sales

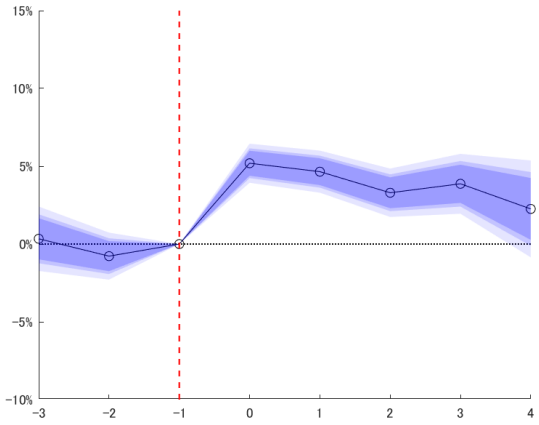


(e) Short and Long Term Loans

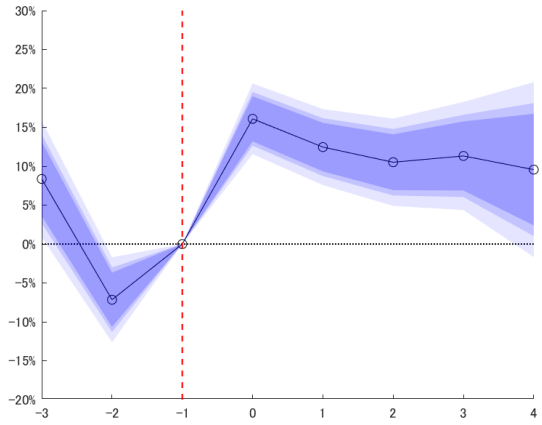


(f) Cash and Deposit

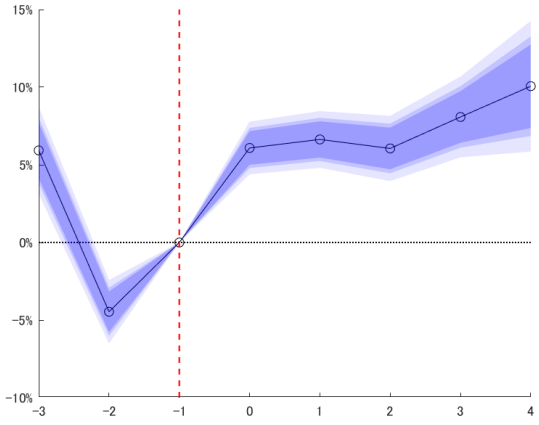
Figure A6: DiD with Covariates Estimates



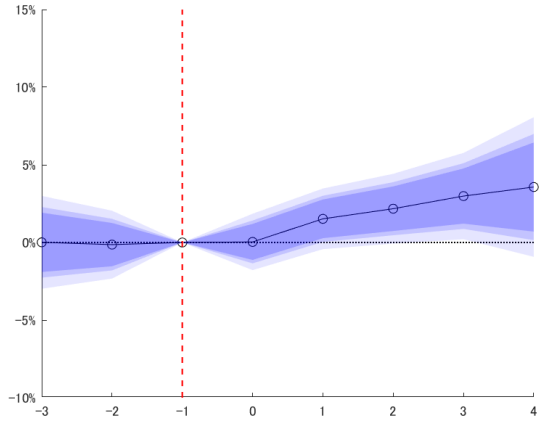
(a) Total Assets



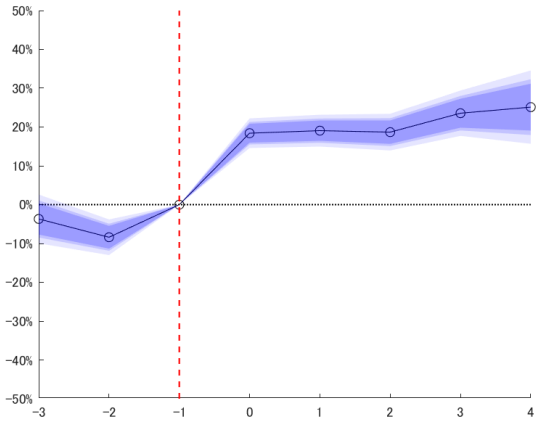
(b) Tangible Fixed Assets



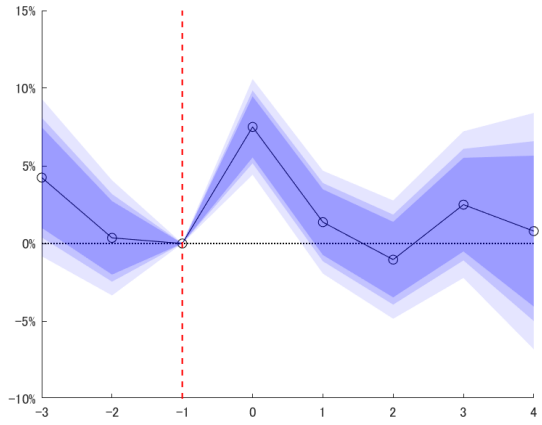
(c) Number of Employees



(d) Sales



(e) Short and Long Term Loans



(f) Cash and Deposit

Table A1: Estimation Results: Plain DID

	ln(Short Term Loans)	ln(Short/Long Term Loans)	ln(Cash & Deposit)	ln(Temporal Liquidity)	ln(Sales)	ln(Num of Employees)	ln(Total Assets)	ln(Tangible Fixed Assets)	ln(Building & Structure)	ln(Machinery & Equipment)
-3	-0.02	-0.065**	-0.022	0.024	-0.058***	0.028**	-0.043***	-0.014	-0.045	0.023
	(0.059)	(0.027)	(0.017)	(0.017)	(0.011)	(0.012)	(0.009)	(0.036)	(0.06)	(0.07)
-2	-0.049	-0.098***	-0.031***	0.009	-0.049***	-0.042***	-0.031***	-0.099***	-0.08**	0.025
	(0.038)	(0.019)	(0.011)	(0.011)	(0.007)	(0.007)	(0.005)	(0.024)	(0.039)	(0.051)
0	0.054	0.342***	0.094***	0.094***	-0.005	0.077***	0.073***	0.24***	0.115***	0.157***
	(0.037)	(0.016)	(0.011)	(0.011)	(0.006)	(0.006)	(0.005)	(0.023)	(0.032)	(0.042)
1	0.108**	0.304***	0.029**	0.02*	0	0.08***	0.06***	0.238***	0.136***	0.164***
	(0.041)	(0.017)	(0.012)	(0.011)	(0.006)	(0.007)	(0.005)	(0.025)	(0.034)	(0.046)
2	0.164***	0.253***	0.011	0.003	-0.011	0.073***	0.043***	0.208***	0.188***	0.149***
	(0.048)	(0.018)	(0.014)	(0.014)	(0.008)	(0.008)	(0.006)	(0.029)	(0.042)	(0.053)
3	0.183***	0.216***	0.01	0.014	-0.028***	0.085***	0.024***	0.161***	0.162***	0.129*
	(0.064)	(0.02)	(0.018)	(0.017)	(0.009)	(0.011)	(0.008)	(0.037)	(0.051)	(0.066)
4	0.327***	0.166***	-0.003	0.022	-0.057***	0.11***	-0.008	0.101*	0.087	-0.027
	(0.109)	(0.025)	(0.03)	(0.029)	(0.014)	(0.018)	(0.014)	(0.061)	(0.081)	(0.103)
N	3,651,618	3,650,074	3,614,854	3,597,817	3,657,591	3,661,269	3,654,017	3,650,021	2,175,582	2,153,655
R^2	0.768	0.799	0.8556	0.7359	0.8739	0.8491	0.9483	0.8703	0.9101	0.8053

Note: Standard errors in parentheses and significance levels are denoted by <0.1 (*), <0.05 (**), and <0.01 (***).

Table A2: Estimation Results: DID with Covariates

	ln(Short Term Loans)	ln(Short/Long Term Loans)	ln(Cash & Deposit)	ln(Temporal Liquidity)	ln(Sales)	ln(Num of Employees)	ln(Total Assets)	ln(Tangible Fixed Assets)	ln(Building & Structure)	ln(Machinery & Equipment)
-3	-0.063	-0.037	0.042**	0.036*	0	0.059***	0.003	0.084***	-0.029	0.103
	(0.073)	(0.024)	(0.02)	(0.019)	(0.012)	(0.011)	(0.008)	(0.029)	(0.052)	(0.074)
-2	-0.103*	-0.084***	0.004	0.001	-0.001	-0.045***	-0.008	-0.072***	-0.098**	0.052
	(0.053)	(0.018)	(0.014)	(0.014)	(0.008)	(0.008)	(0.006)	(0.021)	(0.038)	(0.054)
0	0.025	0.184***	0.075***	0.074***	0	0.061***	0.052***	0.161***	0.131***	0.135***
	(0.044)	(0.015)	(0.012)	(0.012)	(0.007)	(0.007)	(0.005)	(0.018)	(0.031)	(0.045)
1	0.11**	0.191***	0.014	0.002	0.015*	0.066***	0.047***	0.125***	0.126***	0.141***
	(0.048)	(0.016)	(0.013)	(0.013)	(0.008)	(0.007)	(0.005)	(0.019)	(0.033)	(0.047)
2	0.153***	0.187***	-0.01	-0.027*	0.022**	0.061***	0.033***	0.105***	0.139***	0.092*
	(0.055)	(0.018)	(0.015)	(0.015)	(0.009)	(0.008)	(0.006)	(0.022)	(0.038)	(0.054)
3	0.229***	0.236***	0.025	0.004	0.03**	0.081***	0.039***	0.113***	0.135***	0.132**
	(0.068)	(0.023)	(0.018)	(0.018)	(0.011)	(0.01)	(0.007)	(0.027)	(0.046)	(0.065)
4	0.434***	0.251***	0.008	-0.017	0.036**	0.101***	0.023*	0.096**	0.089	-0.017
	(0.109)	(0.037)	(0.03)	(0.029)	(0.017)	(0.016)	(0.012)	(0.044)	(0.069)	(0.098)
N	2,244,896	2,247,098	2,234,653	2,231,191	2,247,769	2,248,054	2,248,054	2,247,231	1,540,886	1,524,570
R^2	0.781	0.857	0.878	0.766	0.929	0.849	0.969	0.906	0.937	0.825

Note: Standard errors in parentheses and significance levels are denoted by <0.1 (*), <0.05 (**), and <0.01 (***).

Appendix B Estimation Results for the Propensity Score

Tables B1 and B2 below present the propensity score estimation results; Table B1 presents the results without including a constraint measure, whereas Table B2 presents the results including asset tangibility as one of the measures of financial constraint.

Table B1: Estimation Results on First Stage Propensity Score Regression

	2016	2017	2018	2019
Log(Years of Operation$_i$)	-0.012	-0.056*	-0.012	-0.113*
	(0.035)	(0.033)	(0.038)	(0.058)
$1_{\{Employees_{i,t-1} \leq 20\}}$	1.722***	1.920***	1.796***	1.894***
	(0.205)	(0.201)	(0.215)	(0.301)
Log(Sales$_{i,t-1}$)	0.150**	0.144**	0.061	0.174
	(0.074)	(0.072)	(0.08)	(0.127)
Log(Employees$_{i,t-1}$)	-0.047	0.019	-0.037	-0.106
	(0.053)	(0.051)	(0.058)	(0.097)
Log(Cash Deposits$_{i,t-1}$)	-0.030	-0.095***	-0.028	-0.129**
	(0.034)	(0.033)	(0.038)	(0.056)
Log(Total Asset$_{i,t-1}$)	-0.061	-0.015	0.029	-0.029
	(0.092)	(0.089)	(0.099)	(0.147)
Log(Short Term and Long Term Loans$_{i,t-1}$)	0.188***	0.100***	0.073**	0.107**
	(0.037)	(0.033)	(0.035)	(0.051)
Log(Tangible Asset$_{i,t-1}$)	0.039*	0.021	0.060***	0.002
	(0.023)	(0.021)	(0.023)	(0.034)
Log(Sales$_{i,t-2}$)	0.151*	0.105	0.189**	0.210
	(0.084)	(0.083)	(0.096)	(0.144)
Log(Employees$_{i,t-2}$)	-0.442***	-0.484***	-0.460***	-0.368***
	(0.058)	(0.055)	(0.064)	(0.109)
Log(Cash Deposits$_{i,t-2}$)	-0.037	0.010	-0.103***	-0.073
	(0.037)	(0.037)	(0.041)	(0.061)
Log(Total Asset$_{i,t-2}$)	-0.006	-0.093	0.006	0.093
	(0.111)	(0.108)	(0.121)	(0.176)
Log(Short Term and Long Term Loans$_{i,t-2}$)	-0.070**	-0.022	-0.036	-0.076
	(0.033)	(0.034)	(0.036)	(0.052)
Log(Tangible Asset$_{i,t-2}$)	-0.101***	-0.106***	-0.151***	-0.088**
	(0.028)	(0.026)	(0.028)	(0.042)
Log(Sales$_{i,t-3}$)	-0.103*	-0.034	-0.011	-0.060
	(0.056)	(0.064)	(0.073)	(0.098)
Log(Employees$_{i,t-3}$)	0.057	0.100*	0.133**	0.124
	(0.054)	(0.052)	(0.06)	(0.101)
Log(Cash Deposits$_{i,t-3}$)	0.010	0.051	0.018	-0.005
	(0.034)	(0.034)	(0.038)	(0.056)
Log(Total Asset$_{i,t-3}$)	-0.243***	-0.205**	-0.300***	-0.355**
	(0.092)	(0.09)	(0.101)	(0.146)
Log(Short Term and Long Term Loans$_{i,t-3}$)	0.025	0.023	0.023	0.050
	(0.03)	(0.028)	(0.031)	(0.047)
Log(Tangible Asset$_{i,t-3}$)	0.069***	0.083***	0.111***	0.095**
	(0.025)	(0.023)	(0.026)	(0.038)
Δ Log(Employees$_{t-3}$)	-0.071	-0.101**	-0.219***	-0.069
	(0.05)	(0.049)	(0.057)	(0.095)
Fixed-effects				
Region	X	X	X	X
Industry	X	X	X	X
N	638,947	618,771	572,567	309,440
Pseudo R^2	0.051	0.051	0.051	0.064

Note: Standard errors in parentheses and significance levels are denoted by <0.1 (*), <0.05 (**), and <0.01 (***).

Table B2: Estimation Results on First Stage Propensity Score Regression

	2016	2017	2018	2019
Asset Tangibility$_{i,t-1}$	0.291*	0.431***	0.426***	0.264
	(0.151)	(0.145)	(0.163)	(0.245)
Log(Years of Operation$_i$)	-0.01	-0.054	-0.01	-0.112*
	(0.035)	(0.033)	(0.038)	(0.058)
$1_{\{Employees_{i,t-1} \leq 20\}}$	1.727***	1.926***	1.802***	1.899***
	(0.205)	(0.201)	(0.215)	(0.301)
Log(Sales$_{i,t-1}$)	0.164**	0.162**	0.079	0.187
	(0.075)	(0.073)	(0.082)	(0.129)
Log(Employees$_{i,t-1}$)	-0.046	0.019	-0.037	-0.105
	(0.053)	(0.051)	(0.058)	(0.097)
Log(Cash Deposits$_{i,t-1}$)	-0.02	-0.08**	-0.012	-0.12**
	(0.035)	(0.034)	(0.038)	(0.056)
Log(Total Asset$_{i,t-1}$)	-0.067	-0.026	0.016	-0.037
	(0.092)	(0.089)	(0.099)	(0.147)
Log(Short Term and Long Term Loans$_{i,t-1}$)	0.183***	0.095***	0.069**	0.105**
	(0.037)	(0.033)	(0.034)	(0.051)
Log(Tangible Asset$_{i,t-1}$)	0.021	-0.003	0.035	-0.012
	(0.024)	(0.022)	(0.025)	(0.036)
Log(Sales$_{i,t-2}$)	0.157*	0.113	0.199**	0.216
	(0.085)	(0.084)	(0.097)	(0.144)
Log(Employees$_{i,t-2}$)	-0.442***	-0.483***	-0.459***	-0.369***
	(0.058)	(0.055)	(0.064)	(0.109)
Log(Cash Deposits$_{i,t-2}$)	-0.035	0.013	-0.101**	-0.071
	(0.037)	(0.037)	(0.041)	(0.061)
Log(Total Asset$_{i,t-2}$)	-0.014	-0.106	-0.005	0.085
	(0.111)	(0.107)	(0.121)	(0.175)
Log(Short Term and Long Term Loans$_{i,t-2}$)	-0.069**	-0.021	-0.035	-0.076
	(0.033)	(0.034)	(0.036)	(0.052)
Log(Tangible Asset$_{i,t-2}$)	-0.101***	-0.106***	-0.15***	-0.088**
	(0.028)	(0.026)	(0.028)	(0.042)
Log(Sales$_{i,t-3}$)	-0.101*	-0.028	-0.005	-0.057
	(0.057)	(0.065)	(0.074)	(0.098)
Log(Employees$_{i,t-3}$)	0.057	0.100*	0.134**	0.125
	(0.054)	(0.052)	(0.06)	(0.101)
Log(Cash Deposits$_{i,t-3}$)	0.011	0.054	0.02	-0.004
	(0.034)	(0.034)	(0.038)	(0.056)
Log(Total Asset$_{i,t-3}$)	-0.238***	-0.200**	-0.294***	-0.351**
	(0.092)	(0.089)	(0.101)	(0.146)
Log(Short Term and Long Term Loans$_{i,t-3}$)	0.026	0.025	0.024	0.05
	(0.03)	(0.028)	(0.031)	(0.047)
Log(Tangible Asset$_{i,t-3}$)	0.065**	0.077***	0.105***	0.092**
	(0.025)	(0.023)	(0.026)	(0.038)
Δ Log(Employees$_{t-3}$)	-0.071	-0.101**	-0.22***	-0.069
	(0.05)	(0.049)	(0.057)	(0.095)
Fixed-Effects				
Region	X	X	X	X
Industry	X	X	X	X
N	638,947	618,771	572,567	309,440
Pseudo R^2	0.051	0.052	0.051	0.064

Note: Standard errors in parentheses and significance levels are denoted by <0.1 (*), <0.05 (**), and <0.01 (***).