



RIETI Discussion Paper Series 17-E-046

## **SME Policies as a Barrier to Growth of SMEs**

**TSURUTA Daisuke**

Nihon University



Research Institute of Economy, Trade & Industry, IAA

The Research Institute of Economy, Trade and Industry

<http://www.rieti.go.jp/en/>

## SME Policies as a Barrier to Growth of SMEs<sup>†</sup>

TSURUTA Daisuke

College of Economics, Nihon University

### Abstract

We investigate whether firms have incentives to retain their positions as small and medium enterprises (SMEs) to benefit from various SME policies. Using small business data from Japan, we show that firms are less likely to increase their registered capital so that they can continue to satisfy the requirement that retains their position as SMEs under the SME Basic Act. In addition, we find that, after the relaxation of this SME requirement under the act, firms were more likely to increase their registered capital. When firms do not increase their registered capital in order to keep their SME status, firm growth is impeded.

*Keywords:* SME policy, Firm growth, Equity capital, Small businesses

*JEL classification:* L53; L25; G32

RIETI Discussion Papers Series aims at widely disseminating research results in the form of professional papers, thereby stimulating lively discussion. The views expressed in the papers are solely those of the author(s), and neither represent those of the organization to which the author(s) belong(s) nor the Research Institute of Economy, Trade and Industry.

---

<sup>†</sup> This study was conducted as part of the “Study on Corporate Finance and Firm Dynamics” project at the Research Institute of Economy, Trade, and Industry (RIETI). This study uses microdata from the Surveys for the Financial Statements Statistics of Corporations by Industry (Houjin Kigyō Toukei Chōsa) conducted by the Ministry of Finance. This study was supported by a Grant-in-Aid for Scientific Research (C) #16K03753 from the Japan Society for the Promotion of Science. The author would also like to thank Fumio Akiyoshi, Hikaru Fukanuma, Kaoru Hosono, Daisuke Miyakawa, Masayuki Morikawa, Yoshiaki Ogura, Hiroshi Ohashi, Arito Ono, Kuniyoshi Saito, Daisuke Shimizu, Hirofumi Uchida, Ichiro Uesugi, Wako Watanabe, Peng Xu, and Makoto Yano for many valuable comments. The seminar participants at RIETI also provided useful comments. All remaining errors are mine.

# 1 Introduction

We investigate whether policies for small and medium enterprises (SMEs) impede incentives to graduate from SME status. Economic theories justify the use of SME policies when market failure occurs (Storey, 1994). First, owing to the information gap between lenders and borrowers, credit rationing is serious for SMEs (Berger and Udell, 1998). To enhance credit supply for SMEs, the government establishes public lending and credit guarantee schemes, which can improve social welfare (Mankiw, 1986). Therefore, public financial supports for SMEs can be justified from the point of view of economic theory.<sup>1</sup> Second, if the spillover of knowledge from R&D investment is significant,<sup>2</sup> the benefits from innovation spread to other firms that do not pay the cost of investment. If the positive externality relating to spillovers from innovation is significant, underinvestment for R&D might be serious, which causes market failure.

As Storey (1994) argues, the aim of actual SME policies is ambiguous from an economic viewpoint. Many SME policies exist even if market failure does not occur, and an excessive menu of SME policies is adopted in many countries. One of the reasons for the excessive use of SME policies is that many government departments feel that SMEs should be supported by economic policies and regard SMEs as “their responsibility” (Storey, 2008). As a result, Storey (2008) shows that, in the UK, SME policies give rise to expenditure of around 8 billion euro, which is approximately the same spending required to maintain a police force.

According to the Small and Medium Enterprise Agency in Japan, the initial general account budget for SME policies in Japan was 180.2 billion yen,<sup>3</sup> and the supplementary budget was 543.4 billion yen in fiscal year (FY) 2012.<sup>4</sup> According to Goto (2014), the

---

<sup>1</sup>Because of government failure, public financial support does not always improve social welfare.

<sup>2</sup>Acs and Szerb (2007), for instance, argue that this is the case.

<sup>3</sup>This excludes the budget for the Great East Japan Earthquake.

<sup>4</sup>See *Chusho Kigyō Shisaku Souran* (Overview of SME Policy) for more detailed information, downloadable from the website of the Small and Medium Enterprise Agency (<http://www.chusho.meti.go.jp/pamflet/souran/2013/>).

budget for SME policies was 2.9% of the total budget in FY2009, which was not particularly large.<sup>5</sup> On the other hand, as shown in Table 1, which provides a list of SME policies compiled by the Ministry of Economy, Trade and Industry (METI) in Japan, the menu of SME policies is large. In addition to these policies, the Ministry of Finance (MOF) reduces corporate tax for firms that satisfy SME requirements.

Often, the government implements SME policies even when market failure is not serious. For example, Table 1 describes that the policy program of business innovation “assists SMEs undergoing business innovation in financing, handling taxes and cultivating markets.” The aim of this program is not to support innovation that has spillovers to other firms and, thus, the program does not mitigate the market failure caused by this positive externality. Instead, the program simply aims to enhance the efficiency of the management of SMEs, which is not an intervention that is justified by market failure. Furthermore, SMEs can participate in various policy programs that assist in enhancing management of SMEs. For example, Table 1 shows that the program “Trade practices and public procurement” increases the opportunity for SMEs to win contracts in government offices. Because SMEs cannot always supply a higher quality of goods or services compared with large firms, SME policy should not increase their opportunities to win contracts because this reduces market efficiency. As noted above, corporate tax is reduced for all SMEs, which is another policy that is not justified by market failure.

Although a public credit guarantee is justified by severe market failure, the amount of credit guarantee provided is often excessive. OECD (2016) points out that “SMEs receive substantial government support, particularly through a large credit guarantee system, which supports about 40% of Japanese SMEs” (p. 16).<sup>6</sup> The substantial government financial support can enhance growth of SMEs by relaxing credit constraints. OECD (2016) also notes that this policy “has contributed to a delayed restructuring in the

---

<sup>5</sup>Goto (2014) also points out that if the amount of reduced corporate tax is included, the budget for SME policies is much larger.

<sup>6</sup>According to OECD (2013), the volume of credit guarantees as a percentage of GDP is 7.3% in Japan, the highest among the listed countries.

business sector, created some disincentives to grow and hindered the development of market-based financing” (p. 16).

In sum, SMEs receive substantial government support through a wide variety of SME policies and, as OECD (2016) argues, these policies reduce incentives for growth by SMEs.<sup>7</sup> Firms cannot benefit from the huge range of SME policies listed in Table 1 if they outgrow their SME status and become large firms.<sup>8</sup> In addition, if a firm graduates from an SME to a large firm, it cannot access the public credit guarantee. During periods of financial crisis (in particular, the global financial crisis in 2008), additional public credit guarantee programs commenced, which enabled SMEs to access guaranteed loans more easily, thereby enhancing their liquidity. Furthermore, firms are required to pay higher corporate tax if they graduate from SME status. Because they wish to retain their access to the various SME policies available, firms do not have the incentive to graduate from SME status, which impedes firm growth.

Many previous studies empirically investigate the effects of several SME policies. Numerous studies (for example, Kang and Heshmati, 2008; Oh et al., 2009; Craig et al., 2007) show empirically that the public credit guarantee program has positive effects on employment, sales, and local growth, and that it reduces the default and bankruptcy rates of SMEs. In Japan, Uesugi et al. (2010) find that special credit guarantee programs improved the availability of credit for SMEs during the financial crisis. In contrast, Ono et al. (2013) find that although the program eased credit availability, the ex post performance of SMEs that received a credit guarantee deteriorated compared with other firms. Honjo and Harada (2006) show that the SME Creative Business Promotion Law enacted by the Government of Japan provides support to SMEs to enter new areas of

---

<sup>7</sup>OECD (2016) notes that “small companies in Japan tend to remain small, in part because high public support discourages small firms from growing because they would lose the benefits associated with SME status” (p. 11).

<sup>8</sup>For example, the policies result in SMEs winning contracts even if their production ability and efficiency are not as high as larger firms, so the policies enhance the profitability of SMEs. In other words, if firms grow from SMEs into large firms, they cannot participate in these policy programs and this reduces their opportunities to win contracts.

business and enhances firm growth for SMEs. Although a number of reports focus on the effects of individual SME policies, few studies have investigated whether the substantial government support for SMEs has a negative effect on firm growth.

In this paper, we investigate whether the various SME policy programs in Japan impede the growth of firms from SMEs to large firms. To test this question, we employ two strategies. First, we focus on the definitions of SMEs under the Corporation Tax Act, which defines SMEs as firms with registered capital of 100 million yen or less. We investigate whether SMEs that are close to this cap for registered capital (i.e., 100 million yen) are less likely than other firms to increase their registered capital so that they can remain within the definitions of SMEs and retain their access to the SME policy programs.

Second, for our analysis, we use the changes in the Small and Medium-sized Enterprise Basic Act (the SME Basic Act) in Japan that came into effect in December 1999. In Japan, only firms that satisfy the definitions of SMEs under the SME Basic Act can participate in the SME policy programs listed in Table 1. Before 1999, SMEs were defined as firms with 100 or fewer regular employees or with 100 million yen of registered capital or less (except for firms in the wholesale, retail, and service industries). Following revision of the SME Basic Act, the requirement for registered capital was changed to 300 million yen or less, so that firms could increase registered capital but still satisfy the requirements of the SME Basic Act. As Table 2 shows, the definitions of SMEs differ for firms in the wholesale, retail, and service industries.

By focusing on the change of the SME Basic Act as an exogenous event, we can test whether firms have incentives to retain their SME status even if they can graduate to large firms. If firms do not graduate from SME status, but could have done so if they wished, this is indicated by the firms then increasing their registered capital after the change of the SME Basic Act, which relaxed the registered capital requirement. Furthermore, by focusing on the difference in the requirement for SMEs between industries, we can test the hypothesis using the difference-in-differences approach. As Table 2 shows, the

registered capital requirement changed from 100 million yen to 300 million yen for a firm in a manufacturing industry with the change in the SME Basic Act. On the other hand, in the wholesale, retail, and service industries, firms were required to have registered capital of 100 million yen or less both before and after the change in the SME Basic Act. Therefore, we can use the subsample of firms in the wholesale, retail, and services industries as a control group and those in the other industries as a treatment group. Similarly, by focusing on the change in the registered capital requirement for wholesale, retail, and service industries, we can use firms in those industries as a treatment group, and those in other industries as a control group.

The main findings of this paper are as follows. First, firms with registered capital of 100 million yen or less (i.e., SMEs under the definitions in the Corporation Tax Act and the SME Basic Act before it was altered in 1999) are less likely to increase registered capital, compared with firms with registered capital of over 100 million yen. This implies that SMEs have a disincentive to increase their registered capital because they benefit from keeping their SME status. Second, after the change in the definition of SMEs under the SME Basic Act in 1999, which involved the increase in the registered capital limit, firms that satisfied the previous SME requirement (registered capital of 100 million yen or less) then increased their registered capital. This effect is larger if a firm's registered capital is close to the registered capital requirement under the original SME Basic Act and the Corporation Tax Act. These effects are robust because they are supported if we estimate them using a different treatment group. Third, firms that increase registered capital increase firm size (in terms of asset growth). As firms have a disincentive to increase registered capital so that they can keep their SME status, this indicates that the SME requirements are significant constraints on firm growth. Additionally, firms decrease debts by increasing equity if they are highly leveraged or highly volatile. This implies that firms are able to adjust to an optimal capital structure after the relaxation of their registered capital requirements.

Our study is related to studies that use the calibrations of a theoretical model to argue that policies that depend on firm size cause distortions of firm size. For example, Garicano et al. (2016) and Gourio and Roys (2014) focus on the many labor laws in France that are binding for firms with 50 employees or more and estimate the welfare costs of these regulations. Guner et al. (2006) and Guner et al. (2008) show, using the Lucas model, that size-dependent laws, such as Japan's Large Scale Retail Location Law, distort the firm-size distributions. García-Santana and Pijoan-Mas (2014) focus on the Small Scale Reservation Laws in India that reserve several products for production by small-scale industries. They also use the Lucas model to show that this policy decreases the output per worker by 2% in the whole economy.

Similarly to these previous studies, our study finds that size-dependent policies impede firm growth by small businesses. However, this paper differs from the existing literature in three ways. First, whereas the previous studies employ simulations from theoretical models, we employ a difference-in-differences approach using the change in the SME Basic Act as an exogenous event and we utilize not a macroeconomic model but an econometric model, using firm-level data of small businesses. Second, we differ from the studies focusing on France because, in contrast to the labor laws in France, the SME policy that we study in Japan aims to promote the development of small businesses.<sup>9</sup> We show that the SME policy impedes firm growth of small businesses through decreases in equity capital, which is contrary to its aim. Third, we focus not only on firm growth, but also on the financial activities of small businesses.

The remainder of the paper is organized as follows. Section 2 provides the definitions of SMEs under the Corporation Tax Act and the SME Basic Act. Section 3 describes the data set. Section 4 introduces the empirical strategy and hypotheses for the relationships between SME policies, registered capital, and firm growth. Section 5 provides the estimation results for the hypotheses. Section 6 concludes the paper.

---

<sup>9</sup>see <http://www.chusho.meti.go.jp/soshiki/ninmu.html> regarding the aim of the Small and Medium Enterprise Agency in Japan.



## 2 Definitions of SMEs in Japan

### 2.1 Corporation Tax Act

There are several definitions of SMEs in Japan, with the major definitions being those of the SME Basic Act and the Corporation Tax Act. Under the Corporation Tax Act, SMEs are defined as firms with 100 million yen of registered capital or less (Panel A of Table 2). Corporate tax is reduced for firms that satisfy the definition of an SME under the Corporation Tax Act. For example, the corporate tax rate for SMEs is 22%, which is applied to incomes under 8 million yen. The corporate tax rate for large firms between 1999 and 2012 was 30%.<sup>10</sup> Therefore, if firms satisfy the definition of SMEs under the Corporation Tax Act, they can pay a low corporate tax and increase their cash flow.

### 2.2 SME Basic Act

As shown in Panel B of Table 2, the definition of SMEs in the SME Basic Act is not simple. The definitions of SMEs before December 1999 are as follows.

- SMEs under the SME Basic Act are defined as firms with 100 million yen of registered capital or less and/or 300 or fewer regular employees.
- SMEs in the wholesale industry are defined as firms with 30 million yen of registered capital or less and/or 100 or fewer regular employees.
- SMEs in the retail industry and the service industry are defined as firms with 10 million yen of registered capital or less and/or 50 or fewer regular employees.

In December 1999, the SME Basic Act was revised and the registered capital requirement was relaxed. The revised requirement for SME status after December 1999 is as follows.

---

<sup>10</sup>See the website of the Ministry of Finance in Japan ([http://www.mof.go.jp/tax\\_policy/summary/corporation/082.htm](http://www.mof.go.jp/tax_policy/summary/corporation/082.htm)) (in Japanese, last date accessed: September 2016)) regarding the corporate tax rate trends.

- SMEs under the SME Basic Act are defined as firms with 300 million yen of registered capital or less and/or 300 or fewer regular employees.
- SMEs in the wholesale industry are defined as firms with 100 million yen of registered capital or less and/or 100 or fewer regular employees.
- SMEs in the retail industry are defined as firms with 50 million yen of registered capital or less and/or 50 or fewer regular employees.
- SMEs in the service industry are defined as firms with 100 million yen of registered capital or less and/or 100 or fewer regular employees.

### 3 Data

We use annual firm-level data from the Surveys for the Financial Statements Statistics of Corporations by Industry (hereafter FSSC; *Houjin Kigyō Toukei Chōsa* in Japanese), conducted by the Ministry of Finance. According to the website of the Ministry of Finance,<sup>11</sup> the FSSC are “one part of the fundamental statistical surveys under the Statistics Act and have been conducted as sampling surveys so as to ascertain the current status of business activities of commercial corporations in Japan.” The target firms of the FSSC are all commercial corporations in Japan. All firms with capital of one billion yen or more are included. Those with capital of between 100 million and 600 million yen are randomly selected with equal probability. Those with less than 100 million yen of capital are randomly sampled every fiscal year. Therefore, of the firms with less than 100 million yen in capital, a different sample of target firms is selected each fiscal year. The response rates for each fiscal year are around 80%. The FSSC include data on firms’ balance sheets and profit and loss statements. Data on firms’ balance sheets are available at the beginning and end of each fiscal year. The data at the end of fiscal year  $t$  are set equal

---

<sup>11</sup>For details of the survey see: <http://www.mof.go.jp/english/pri/reference/ssc/index.htm> (last date accessed: June 2016).

to the data at the beginning of fiscal year  $t + 1$ . We use observations from FY1991 to FY2007. To exclude large firms, the sample is limited to firms with 500 million yen or less of registered capital. We choose the sample period FY1991–FY2007 to exclude the effects of the bubble economy before 1990 and the global financial crisis after 2008. The number of full firm-year observations is 306,353 during the period FY1991–FY2007.

## 4 Empirical Strategy

### 4.1 Effects of the Cap on Registered Capital

#### 4.1.1 Hypothesis

As described in the previous section, the cap on registered capital in the definition of SMEs under the Corporation Tax Act is 100 million yen. If firms have an incentive to retain their SME status and observe the SME requirements to save corporate tax, they will not increase their registered capital over 100 million yen. We predict that firms with registered capital close to 100 million yen are less likely to increase their registered capital. In addition, under the SME Basic Act, the caps on registered capital in the definitions of SMEs are 10, 30, 100, or 300 million yen, depending on the industry and the year. We predict that firms with registered capital close to these caps are less likely to increase their registered equity.

#### 4.1.2 Equation

To test our hypothesis, we estimate the following equation:

$$\Delta R\_Capital_{i,t} = \sum \alpha_1^j R\_Capital\_Dummy_{i,t}^j + \mathbf{X}_{i,t} \alpha_2 + \zeta_t + \eta_i + \theta_{i,t} \quad (1)$$

where  $\theta_{i,t}$  is the error term of firm  $i$  in fiscal year  $t$ ,  $\eta_i$  is industry fixed effects of 45 industries, and  $\zeta_t$  is year fixed effects from FY1991 to FY2007. We use two definitions of  $\Delta R\_Capital_{i,t}$ . One is a dummy variable that has a value of one if registered capital at the end of fiscal year  $t$  is larger than at the beginning of fiscal year  $t$  (Additional R\\_Capital Dummy, shown as “Dummy” in tables). The other is the difference in registered capital at the end of fiscal year  $t$  compared with that at the beginning of fiscal year  $t$  (Amount of Additional R\\_capital, shown as “Amount” in tables).  $\mathbf{X}$  includes leverage at the beginning of fiscal year  $t$ , tangible fixed assets at the beginning of fiscal year  $t$ , and operating incomes in fiscal year  $t$ .

We focus on the effects of 18 types of *R\\_Capital Dummy*. The definitions of each dummy variable are shown in Table 3. If firms have an incentive to satisfy the requirements under the Corporation Tax Act and the SME Basic Act, firms with registered capital close to 100 million yen are less likely to increase their registered capital. Therefore, we predict that the coefficient of R\\_capital 100M is negative. In addition, compared with the effects of the R\\_capital 110M dummy and a similar level of registered capital dummies, the magnitude of the negative effects is larger. Similarly, the caps of 30 and 300 million yen under the SME Basic Act have significant effects on additional registered capital, and the coefficients of R\\_capital 30M and R\\_capital 300M are negative.

According to Ou and Haynes (2006), funds for acquiring additional equity capital in SMEs are determined by firm age, size, sales growth, financial condition, internal financial sources (such as owner loans or personal and business credit cards), and loans with traditional or nontraditional institutions. We use leverage, cash holdings, tangible fixed assets, operating incomes, firm size, and year and industry dummies as control variables. Leverage is a proxy for financial condition and loans with traditional or nontraditional institutions. Highly leveraged firms have easier access to loans from traditional or non-traditional institutions. On the other hand, very highly leveraged firms are financially distressed firms (as argued by Opler and Titman, 1994), so leverage is also a proxy for

financial condition. Because highly leveraged firms have incentives to increase equity capital to mitigate their financial distress, we predict that leverage has positive effects on additional equity capital. Leverage is defined as the book value of debt divided by the book value of assets at the beginning of fiscal year  $t$ . Cash holdings are a proxy for liquidity. We predict that firms with higher liquidity are less risky, so the effects on additional registered equity are positive. Cash holdings are defined as cash holdings at the beginning of fiscal year  $t$ , normalized by total assets at the beginning of fiscal year  $t$ .

Operating incomes are a proxy for financial condition. High operating incomes suggest that firms have sufficiently high cash flows, which leads to low credit constraints. In addition, operating incomes are a proxy for firm profitability. If firms with low cash flows face credit constraints on bank loans and use additional equity capital, then the coefficient of operating incomes will be negative. On the other hand, if profitable firms can use additional equity, the coefficient of operating incomes will be positive. Operating income is defined as operating income in fiscal year  $t$ , normalized by total assets at the beginning of fiscal year  $t$ . Tangible fixed assets are variables representing the amount of collateral assets. Firms with high collateral assets are less risky and have easier access to loans. Therefore, tangible fixed assets are a proxy of financial condition and the availability of loans with traditional or nontraditional institutions. Therefore, the coefficient of tangible fixed assets is negative for additional equity capital if equity capital and bank loans are substitutes. Tangible fixed assets are defined as tangible fixed assets at the beginning of fiscal year  $t$ , normalized by total assets at the beginning of fiscal year  $t$ . Firm size is controlled by the natural logarithm of total assets at the beginning of fiscal year  $t$ . Larger firms are less risky and can use more capital. Therefore, we predict that the coefficient of firm size is positive.

## 4.2 Effects of Changes in Requirements in the SME Basic Act

### 4.2.1 Hypothesis

In Japan, SMEs can access the various SME policies listed in Table 1. We predict that firms ensure that they remain within the SME requirements under the SME Basic Act so that they can utilize these SME policies, which is a disincentive for firm growth. If a firm's registered capital is close to the cap specified in the SME Basic Act, they do not have an incentive to increase their registered capital. As a result, firms do not increase their equity capital. To investigate this research question, we focus on the effects of the change in 1999 in the definition of SMEs in the SME Basic Act. As noted above, this change resulted in the registered capital cap requirement being relaxed from 100 million to 300 million yen for all industries, with the exception of wholesale, retail, and service industries. Following the 1999 revision, firms with registered capital of around 100 million were able to increase their equity capital but retain their SME status under the requirements of the new Act. If the cap acts as an effective constraint on increases in registered capital, then firms would increase their registered capital after the change in the SME Basic Act. These effects would be magnified if a firm's registered capital was close to the pre-1999 cap. As the cap of 100 million yen does not apply to wholesale, retail, and service industries, we can regard the firms in these industries as a control group. We employ the difference-in-differences approach and test whether treatment group firms increased their registered capital after the revision of the SME Basic Act.

Similarly, we test our hypothesis using the wholesale, retail, and service industries as a treatment group and other industries as a control group. As noted above, the registered capital cap rose from 30 million to 100 million for the wholesale industry with the changes to the SME Basic Act. If the cap is an effective constraint, firms with a registered capital of close to 30 million yen in the wholesale industry would not increase their registered capital before the revision of the SME Basic Act. Also, this effect is significant for the treatment group, that is firms in the wholesale industry in this case. The effect of the

gap between a firm's registered capital and the cap of 30 million yen before the revision is weaker after the revision of the SME Basic Act in the treatment group. Finally, we investigate the case of the retail and service industries. In this case, the cap was 10 million yen before the revision of the SME Basic Act, and so we focus on the gap between a firm's registered capital and the cap of 10 million yen.

#### 4.2.2 Equation

To test our hypothesis, we estimate the following equation:

$$\begin{aligned}
\Delta R\_Capital_{i,t} &= \beta_1 Treatment_i \times Policy_t \\
&+ \beta_2 Treatment_i \times R\_Capital\_Gap_{i,t} \\
&+ \beta_3 Treatment_i \times R\_Capital\_Gap_{i,t} \times Policy_t \\
&+ \beta_4 R\_Capital\_Gap_{i,t} + \mathbf{X}_{i,t} \beta_5 + \nu_t + \kappa_i + \lambda_{i,t}
\end{aligned} \tag{2}$$

where  $\lambda_{i,t}$  is the error term of firm  $i$  in fiscal year  $t$ ,  $\kappa_i$  is industry fixed effects of 45 industries, and  $\nu_t$  is year fixed effects from FY1991 to FY2007. The definition of  $\Delta R\_Capital_{i,t}$  is the same as in equation (1).  $\mathbf{X}$  includes leverage at the beginning of fiscal year  $t$ , tangible fixed assets at the beginning of fiscal year  $t$ , operating incomes in fiscal year  $t$ , and firm size at the beginning of fiscal year  $t$ .

We use three types of treatment dummy. The first treatment dummy has a value of one if firms do not belong to the wholesale, retail, or service industries, and a value of zero otherwise. This dummy focuses on the change in definition 1, shown in Table 2 (hereafter, Treatment1). The second treatment dummy has a value of one if firms belong to the wholesale industry, and a value of zero otherwise. This dummy focuses on the change in definition 2, shown in Table 2 (hereafter, Treatment2). The third treatment dummy has a value of one if firms belong to the retail and service industries, and a value

of zero otherwise. This dummy focuses on the changes in definitions 3 and 4, shown in Table 2 (hereafter, Treatment3).

In addition, we add variables indicating the registered capital gap ( $R\_Capital\_Gap$  in Equation 2), which is defined as the natural logarithm of the cap on registered capital in the SME Basic Act before 1999 minus a firm's registered capital at the beginning of fiscal year  $t$ . We define three types of registered capital gap, depending on the cap on registered capital.  $R\_Capital\_Gap1$  is defined as the natural logarithm of 100 million yen minus a firm's registered capital at the beginning of fiscal year  $t$ .  $R\_Capital\_Gap2$  is defined as the natural logarithm of 30 million yen minus a firm's registered capital at the beginning of fiscal year  $t$ .  $R\_Capital\_Gap3$  is defined as the natural logarithm of 10 million yen minus a firm's registered capital at the beginning of fiscal year  $t$ . If firms do not increase their registered capital so that they can continue to satisfy the SME requirements, the treated firms with a smaller registered capital gap increase their lower registered capital.

If treated firms increase their registered capital after the change in the definitions of SMEs in 1999, the coefficient of  $Treatment_i \times Policy_t$  is positive. Because treated firms with registered capital close to the cap under the definition of SMEs have less incentive to increase their registered capital, we predict that the coefficient of  $Treatment_i \times R\_Capital\_Gap_{i,t}$  is negative. In addition, if the incentive to increase registered capital is weakened by the cap set in the definition of SMEs, firms will increase their registered capital after the revision of the Act relaxed the cap. Therefore, because the effects of  $Treatment_i \times R\_Capital\_Gap_{i,t}$  are smaller after the change in the definition of SMEs, we predict that the coefficient of  $Treatment_i \times R\_Capital\_Gap_{i,t} \times Policy_t$  is negative. The coefficient of  $R\_Capital\_Gap_{i,t}$  controls the effects of  $R\_Capital\_Gap_{i,t}$  on  $\Delta R\_Capital_{i,t}$  for both treated and control groups. We control the effects of  $Treatment_i$  by industry fixed effects and those of  $Policy_t$  by year fixed effects.



## 4.3 Consequences of Changes in Registered Capital

### 4.3.1 Hypothesis

As a consequence of increasing registered capital and acquiring additional equity capital, firms can increase their inventory and/or capital investment, which induces asset growth of firms. As these actions enhance firm value, we predict that the change in the SME registered capital requirements will lead to firm growth.<sup>12</sup> If this prediction is supported, low levels of registered capital, caused by the cap in the definition of SMEs, impede firm growth by decreasing acquisitions of equity capital. On the other hand, firms can use other financial sources to finance investment opportunities, such as bank loans. In this case, the effects of additional registered capital on firm growth are not significant.

In addition, we investigate the effects of equity issues on debt finance. If registered capital constraints are severe for small businesses, they will use other financial sources, including bank loans. As a result, we consider that, prior to the changes in the SME Basic Act, firms would have used debt rather than equity beyond the level that was optimal. If this is accurate, the coefficient of additional equity on total debt growth will be negative. On the other hand, if the relationship between equity issues and debt finance is complementary, the coefficient of additional equity will be positive. The reason for this positive relationship is that firms with equity issues would become more creditworthy, and the supply of bank loans would increase.

### 4.3.2 Equation

To investigate the consequence of additional equity capital, we estimate the following regression:

$$Growth_{i,t} = \gamma_1 \Delta R\_Capital_{i,t} + \mathbf{Y}_{i,t} \gamma_2 + \mu_t + \nu_i + \xi_{i,t} \quad (3)$$

---

<sup>12</sup>The consequence of additional equity capital is not only firm growth. Ou and Haynes (2006) argue that firms avoid defaulting on loans as additional equity capital mitigates liquidity shortages.

$$\Delta R\_Capital_{i,t}^* = \mathbf{Z}_{i,t}\omega_1 + \mathbf{X}_{i,t}\omega_2 + \phi_t + \pi_i + \tau_{i,t} \quad (4)$$

$$\Delta R\_Capital_{i,t} = 1 \text{ if } \Delta R\_Capital_{i,t}^* > 0$$

$$\Delta R\_Capital_{i,t} = 0 \text{ otherwise}$$

where  $x_{i,t} \sim N(0, \sigma^2)$ ,  $\tau_{i,t} \sim N(0, \sigma^2)$ , and  $Cov(\xi_{i,t}, \tau_{i,t}) = \rho \neq 0$ .  $\nu_i$  and  $\pi_i$  are industry fixed effects of 48 industries and  $\mu_t$  and  $\phi_t$  are year fixed effects from FY1991 to FY2007.

We use two proxies of growth, asset growth and debt growth. Asset growth is defined as the annual change in total assets from the beginning to the end of fiscal year t, which is normalized by total assets at the beginning of fiscal year t. Debt growth is defined as the annual change in total debts from the beginning to the end of fiscal year t, which is normalized by total assets at the beginning of fiscal year t. We use the additional registered capital dummy as a proxy of  $\Delta R\_Capital_{i,t}$ .  $\mathbf{Y}_{i,t}$  includes cash holdings at the beginning of fiscal year t, leverage at the beginning of fiscal year t, tangible fixed assets at the beginning of fiscal year t, operating income in fiscal year t, and firm size at the beginning of fiscal year t. As we argued above,  $\Delta R\_Capital_{i,t}$  is determined by many variables, which include the level of a firm's registered capital and the change in the definition of SMEs. Therefore, because  $\Delta R\_Capital_{i,t}$  is a nonrandom variable, we should control for an endogeneity issue. We use a treatment effects model to mitigate any endogeneity bias. We estimate the parameter vectors using a maximum-likelihood method. In equation (4), we employ variables ( $\mathbf{X}_{i,t}$ ) in equation (1) and (2). In addition, we employ several types of  $\mathbf{Z}_{i,t}$ . One is  $R\_Capital\_Dummy_{i,t}^j$  in equation (1). The other is  $Treatment_i \times Policy_t$ ,  $Treatment_i \times R\_Capital\_Gap_{i,t}$ ,  $Treatment_i \times R\_Capital\_Gap_{i,t} \times Policy_t$ ,  $R\_Capital\_Gap_{i,t}$  in equation (2).

## 5 Estimation Results

### 5.1 Cap on Registered Capital

Table 4 shows summary statistics for each of the variables. As we omit outliers, the minimum and maximum of each variable are not extreme values. Table 3 shows the mean values of each dummy. Table 5 shows the estimation results for equation (1) using the additional R\_capital dummy and the amount of additional R\_capital. As the additional R\_capital dummy is a binary variable, we employ a maximum-likelihood probit model. Furthermore, as Table 4 shows, the amount of additional R\_capital has a lower limit of zero. Therefore, we employ a tobit model. In column (1), we show the estimation results using the additional R\_capital dummy. The benchmark is observations with 10 million yen or less of registered capital. The estimated coefficient for the R\_capital dummy from 20M to 50M is negative and statistically significant at the 1% level, suggesting that firms with 50 million yen or less of registered capital are less likely to increase their registered capital. The estimated coefficients of the R\_capital dummy for 60M, 80M, and 100M are also negative and statistically significant at the 1% or 10% levels. Focusing on magnitude, the estimated negative coefficient of the R\_capital 100M is highest, although the estimated coefficients for over 100M are positive and statistically significant (apart from the coefficient for 150M). Column (2) shows the estimation results of the tobit regression using the amount of additional R\_capital as a dependent variable. The signs of the estimation results are almost the same as those in column (1). In terms of magnitude, although the estimated negative coefficient of R\_capital 100M is not the highest, it remains high compared with similar level R\_capital dummies.

To compare the estimated coefficients of R\_capital dummies, Figure 1 (using the additional R\_capital dummy as a dependent variable) and Figure 2 (using the amount of additional R\_capital as a dependent variable) show bar graphs of the estimated coefficients of the R\_capital dummies. We show the estimated coefficients of the R\_capital dummies

using all firms in Table 5. In addition, we show the estimated coefficients of R\_capital dummies for the three separate categories of industries in Figures 1 and 2. Figures 1 and 2 show that the impacts of almost all R\_capital dummies are negative for the 50M or less R\_capital dummies. This implies that firms with 10 million yen or less of registered capital are very small firms. As Berger and Udell (1998) argue, they rely on insider equity because external finance is less available than it is for larger firms, owing to information asymmetry. On the other hand, firms with between 10 and 50 million yen of registered capital can use external finance, so their estimated coefficients are negative compared with firms with 10 million or less of registered capital. Focusing on the over 60M R\_capital dummies, we see that the estimated coefficients are positive or nearly zero, but then, for the 100M R\_capital dummies, they turn negative. In the area of the graph showing the over 100M R\_capital dummies, almost all the estimated coefficients are positive because these firms are creditworthy and can use external equity. Moreover, the graph suggests that there is a large gap between firms with 100 million yen of registered capital and those with over 100 million yen of registered capital.

In sum, these results imply that firms with 100 million yen of registered capital or less increase registered capital less than larger firms, whereas these effects are small in firms with over 100 million yen of registered capital. As the cap in registered capital for SMEs is set at 100 million yen in the Corporation Tax Act and SME Basic Act (for manufacturing and other industries before 1999), these negative effects on additional registered capital are caused by the incentive to retain SME status. Table 5 shows that the estimated coefficients of cash holdings, leverage, and firm size are positive, whereas those of tangible fixed assets and operating income are negative. All estimated coefficients are statistically significant at the 1% level. These results suggest that highly leveraged firms increase equity capital to mitigate the cost of high leverage. In addition, larger firms can increase equity capital because their information gap is less serious. The negative coefficients for tangible fixed assets suggest that firms with high collateral assets can increase bank loans,

so they increase their additional equity less than do firms with fewer collateral assets.

## 5.2 Changes in Requirements under the SME Basic Act

In the previous subsection, we show that firms increase registered capital less if a firm's registered capital is 100 million yen or less. We interpret this as indicating that firms increase their registered capital less to remain within the SME requirements and retain their SME status. However, the results could also be interpreted as indicating that it is difficult for firms with 100 million yen or less of registered capital to increase their registered capital because they are SMEs that face serious information asymmetry with investors. Therefore, we conduct another test focusing on an exogenous event, which is the change in the definition of SMEs in the SME Basic Act. If SMEs limit their registered capital to remain within the SME requirements, rather than being because of information asymmetry, they will increase their registered capital after the relaxation of these constraints following revision of the SME Basic Act.

Table 6 shows the estimation results for treatment1. We limit observations to firms with 100 million or less of registered capital at the beginning of the fiscal year. Columns (1) and (2) show the estimation results for policy, which has a value of one if the year is after FY2000. To check robustness, we also show the results for the policy variable that has a value of one if the year is 1999. Column (1) shows the estimation results of the probit estimation using the additional R\_capital dummy as a dependent variable. The estimated coefficient of  $\text{treatment1} \times \text{policy}$  is positive and statistically significant at the 1% level, implying that treated firms increase their registered capital more after the change in the cap on registered capital that occurred under the SME Basic Act. The estimated coefficient of  $\text{treatment1} \times \text{R\_capital gap1}$  is positive and statistically significant at the 1% level. This suggests that treated firms are less likely to increase registered capital if their registered capital is close to the cap before the change in the SME Basic Act. On the other hand, the estimated coefficient of  $\text{treatment1} \times \text{R\_capital gap1} \times \text{policy}$  is negative

and statistically significant at the 1% level. Furthermore, the estimated marginal effect of  $\text{treatment1} \times \text{R\_capital gap1}$  is 0.0079, whereas that of  $\text{treatment1} \times \text{R\_capital gap1} \times \text{policy}$  is  $-0.017$ , suggesting that the positive effects of the distance to the cap under the SME Basic Act before 1999 are insignificant after the relaxation of the cap. In sum, these results support our hypothesis that SMEs have a disincentive to graduate from SME status and increase registered capital after the change in the definitions of SMEs. The estimated coefficient of  $\text{R\_capital gap1}$  is positive and statistically significant, suggesting that all firms with a smaller gap between their registered capital and the cap increase registered capital less. Recall that under the Corporation Tax Act, the cap for SMEs is 100 million yen of registered capital, which is same as the cap under the SME Basic Act for  $\text{treatment1}$  before 1999. The positive coefficient of  $\text{R\_capital gap1}$  suggests that firms do not have an incentive to increase their registered capital if it is close to the cap under the Corporation Tax Act.

Column (2) shows the estimation results using the amount of additional  $\text{R\_capital}$  as a dependent variable. The estimated coefficients of  $\text{treatment1} \times \text{policy}$  and  $\text{treatment1} \times \text{R\_capital gap1}$  are positive and statistically significant at the 1% level. The estimated coefficient of  $\text{treatment1} \times \text{R\_capital gap1} \times \text{policy}$  is negative and statistically significant at the 1% level. These results are similar to those in column (1), implying that firms increase registered capital more after the change in the definitions of SMEs. This effect is larger if a firm's registered capital is close to the cap on registered capital. Column (2) also shows the estimated coefficient  $\text{R\_capital gap1}$ , which is not statistically significant. This suggests that the result for  $\text{R\_capital gap1}$  is not robust. Columns (3) and (4) show the estimation results using the policy variable that has a value of one if the year is after FY1999. The estimation results of  $\text{treatment1} \times \text{policy}$ ,  $\text{treatment1} \times \text{R\_capital gap1}$ , and  $\text{treatment1} \times \text{R\_capital gap1} \times \text{policy}$  are similar to those in columns (1) and (2). The results of the estimated coefficients for control variables are similar to those in Table 5, apart from those for tangible fixed assets.

Table 7 shows the estimation results using treatment2. Definitions of dependent and control variables in each column are the same as those in Table 6. We limit observations to firms with registered capital of 30 million yen or less at the beginning of the fiscal year, which satisfy the requirements for registered capital under the SME Basic Act before 1999. Although the level of the cap for treatment1 and treatment2 is different under the SME Basic Act, the estimation results are similar to those in Table 6. The estimated coefficients of  $\text{treatment2} \times \text{policy}$  and  $\text{treatment2} \times \text{R\_capital gap2}$  are positive and those of  $\text{treatment2} \times \text{R\_capital gap2} \times \text{policy}$  are negative, and all are statistically significant at the 1% level. These suggest that treated firms increase their registered capital less before the relaxation of the cap. In particular, these effects are larger for treated firms with registered capital that is close to the cap. After relaxing the cap in 1999, this effect is weakened. This implies that the cap set in the definitions of SMEs under the SME Basic Act is a significant constraint on firms' additional equity capital.

Table 8 shows the estimation results using treatment3. We limit observations to firms that satisfy the requirement for registered capital under the SME Basic Act before 1999 (firms with 10 million yen or less of registered capital at the beginning of the fiscal year). The definitions of dependent and control variables are the same as those in Table 6. Similarly to the results in Tables 6 and 7, the estimated coefficients of  $\text{treatment3} \times \text{policy}$  and  $\text{treatment3} \times \text{R\_capital gap3}$  are positive and those of  $\text{treatment3} \times \text{R\_capital gap3} \times \text{policy}$  are negative. These coefficients are statistically significant at the 1% level. These results suggest that the estimated results for the treatment and registered capital gap are robust.

## 5.3 Effects of Additional Equity on Growth

### 5.3.1 Asset growth

Table 9 shows the estimation results for equation (3) using asset growth as a dependent variable. Equation (4) in column (1) is estimated using variables in column (1) of Table 5;

that in column (2) is estimated using variables in column (1) in Table 6; that in column (3) is estimated using variables in column (1) in Table 7; and that in column (4) is estimated using variables in column (1) in Table 8. Estimated coefficients in equation (4) are similar to estimated results of each probit model.

Estimated results in Table 9 show that the estimated coefficients of the additional registered capital dummy are positive and statistically significant at the 1% level. These results are robust because we obtain similar results if we employ different variables in equation (4). Estimated  $\rho$  is positive and statistically significant at the 1% level; the assumption of  $\text{corr}(\nu_i, \pi_i) \neq 0$  is therefore supported.

The estimated coefficients of cash holdings are positive and statistically significant at the 1% level. These results suggest that firms with high liquidity increase firm size more. The estimated coefficients of leverage are negative and statistically significant at the 1 or 5% level. Because highly leveraged firms are generally financially distressed, the performance of firms is lower if leverage is high. The coefficients of tangible assets are negative and statistically significant at the 1% level. Tangible asset is a proxy for collateral asset. We predict that the effects of tangible assets are positive on firm performance because collateral assets mitigate credit constraint for small businesses. However, this prediction is not supported in the results of Table 9. The estimated coefficients of operating income are positive and statistically significant at the 1% level. Because profitable firms have more good investment opportunities, they increase more assets. The estimated coefficients of firm size are negative and statistically significant at the 1% level.

### 5.3.2 Debt growth

Table 10 shows the estimation results for equation (3) using debt growth as a dependent variable. The variables in the first-stage equation in each column are the same as those in Table 9. The estimated coefficients of the additional registered capital dummy are positive in column (1) and negative in columns (2), (3), and (4). The coefficients are



all statistically significant at the 1% level. The magnitude of the coefficients becomes larger as the column numbers become smaller, whereas firm size (proxied by the level of registered capital) becomes smaller as the column numbers become larger. This indicates that the effects of equity issues on debt finance are positive for larger firms but negative for smaller firms. This implies that the relaxation of the registered capital constraint results in lower leverage for smaller firms. For larger firms, equity issues and debt finance are complements.

### 5.3.3 Distressed firms

To investigate the effects of additional equity more precisely, we focus on two particular cases, distressed firms and industries with high volatility. First, we describe the estimation results using the subsample of distressed firms.

According to the trade-off theory of capital structure, the bankruptcy cost is high if firms use high levels of debt finance. Therefore, highly leveraged firms might not achieve an optimal capital structure. If the registered capital constraint is significant, firms cannot issue new equity without losing their SME status. Consequently, they face difficulties in adjusting the leverage level to the target. In addition, because of the debt overhang problem, distressed firms face difficulties in financing investment opportunities using bank loans. To mitigate this credit constraint, they need to use equity to finance their investment opportunities. However, under the registered capital constraint, financially distressed firms do not issue equity in order to keep their SME status.

In sum, we predict that financially distressed firms will increase their additional registered equity after the relaxation of the registered capital requirement, instead of decreasing their debt finance, whereas nondistressed firms will not decrease debts. Following Opler and Titman (1994), we use dummy variables to indicate whether a firm's leverage is in the top two deciles of its industry in a particular year as a proxy of financial distress (hereafter, we refer to the variable as the *Distress* dummy). Table 11 shows the estimated

effects of additional registered capital on total asset growth (Panel A) and total debt growth (Panel B) as dependent variables using the treatment effects model. We divide the sample into two subsamples, financially distressed firms (distress=1) and nonfinancially distressed firms (distress=0). In the first-stage equation, we use the same variables as those in Tables 9 and 10. In Panel A, the estimated coefficient of additional registered capital is positive and statistically significant at the 1% level for both subsamples of firms. This implies that distressed and nondistressed firms increase their assets. On the other hand, the estimation effects for debt growth are mixed. Panel B shows that the estimated coefficients of additional registered capital are all negative and statistically significant at the 1% level for financially distressed firms. On the other hand, if we focus on nonfinancially distressed firms, the coefficient is negative only in column (4). Additionally, in column (4), the negative magnitude of the coefficients is larger for financially distressed firms. These results support the fact that financially distressed firms decrease their debts after increasing their equity. As firms increase additional equity after the relaxation of the registered capital requirement, the change of requirements for SMEs has some effects on the adjustment of the capital structure by financially distressed firms.

#### **5.3.4 Earnings volatility**

As Titman and Wessels (1988) show, the volatility of earnings decreases the optimal level of leverage. This is because lenders are paid only contractual interest when borrowers earn high cash flows, even though the credit risk is high. Therefore, lenders do not offer credit to firms with high volatility. Instead, equity providers prefer to finance high risk, high return investments, so the optimal leverage level is lower. However, under the registered capital constraint, firms finance investments using debt even if equity issues are optimal. Therefore, we expect that, after the relaxation of the requirement, firms with high earning volatility will decrease debts by increasing additional equity. We test this hypothesis by dividing the sample into industries with high volatility and low volatility.

In this paper, we calculate earnings volatility (defined as the standard deviation of operating incomes to total assets using data of the past 10 years)<sup>13</sup> in each year. Our database includes all large firms (firms with capital of one billion yen or more), so we can calculate earnings volatility for many large firms. However, the earnings volatility for smaller firms cannot be calculated because our data do not contain panel data for smaller firms. Therefore, we use industry earnings volatility, calculated using the subsample of large firms. Industry earnings volatility is defined as the median value of the earnings volatility of large firms in the medium category in the industrial classification. We use industry earnings volatility (which is industry level data) as a proxy for the earnings volatility of a firm.

To test our hypothesis, we divide the sample into two subsamples, firms with industry earnings volatility in the top tertile (high volatility) and those with volatility in the bottom tertile (low volatility). We predict that firms with high volatility will decrease debts by increasing equity after the relaxation of the registered capital constraint.

The estimation results are shown in Table 12. In both subsamples, i.e., for firms with high and low volatility, the coefficients of additional registered capital are positive and statistically significant at the 1% level (Panel A). The magnitude of the coefficients is larger for firms with high volatility, indicating that the effects on asset growth are large for those firms. Focusing on the effects on total debt growth, we see that the estimated coefficients of additional registered capital are negative for firms with high volatility. This implies that firms decrease debts if they increase registered capital. On the other hand, in Panel B, the estimated coefficients of additional registered capital are positive, with the exception of those in column (4) (although they are not statistically significant in column (3)). This suggests that the subsample of low volatility firms, in contrast to the high volatility firms, do not decrease debts when they increase their registered capital. In sum, these estimation results support our hypothesis that firms with high volatility

---

<sup>13</sup>This definition is used in Titman and Wessels (1988).

decrease debts after the relaxation of the registered capital requirements allow them to adjust their capital structure.

## 5.4 Discussion

### 5.4.1 Policy dummy

The coefficients of the interaction variable for the treatment dummies for FY1999 and FY2000 and the policy variables are positive and statistically significant in all tables. However, we do not test whether these positive effects exist for policy dummy variables for other fiscal years. To test the other years around the changing of the SME Basic Act, we reestimate equation (2) including policy dummies for five fiscal years before and after the pseudo shock year. If the years around the change in the SME Basic Act have positive effects, the estimation results support our hypothesis for shock year dummies close to FY1999.

Table 13 shows the estimation results using policy dummies from FY1996 to FY2002. Panel A shows the estimation results using treatment1, Panel B shows those using treatment2, and Panel C shows those using treatment3. In all panels, the magnitude of coefficients of  $\text{treatment} \times \text{policy}$ ,  $\text{treatment} \times \text{R\_capital gap}$ , and  $\text{treatment} \times \text{R\_capital gap} \times \text{policy}$  is large around FY1999. However, focusing on FY1996 and FY2002, we see that those estimated coefficients are statistically insignificant or their magnitude is small. In sum, only the estimation results for the years around FY1999 support our hypothesis.

### 5.4.2 Other factors?

We investigate the effects of the SME Basic Act by using year dummies for FY1999 or 2000. However, the estimation results may be measuring the effects of other events, not the change in the SME Basic Act. We now consider whether other events have affected our estimated results. First, Hokkaido Takushoku Bank and Yamaichi Securities, two of the largest financial institutions in Japan, went bankrupt in November 1997. After

the collapse of these financial institutions, many papers (for example Kuttner and Posen, 2001) argue that a credit crunch took place and credit availability worsened in small businesses around 1999. Therefore, this shock is likely to have had some impact on the financial activities and firm performance of small businesses in Japan. However, this shock is common among all industries; therefore, heterogeneous responses across manufacturing, wholesale, retail, and service industries are not explainable by the effects of the shock.

Second, related to the first point, the total value of public credit guarantees increased substantially after October 1998 to mitigate the negative effects of the credit crunch, which was an important event for small businesses in Japan. As Uesugi et al. (2010) argue, the public credit guarantee program during the shock enhanced credit availability for small businesses. If credit-guaranteed loans are a substitute for new equity issues, the additional registered capital decreases after the increase in the total value of public credit guarantees. However, small businesses in all industries can use this program; therefore, the commencement of this program does not have any effects on the treatment dummy.

## 6 Conclusion

In this paper, we have investigated whether firms have a disincentive to graduate from being SMEs to become large firms. To test this hypothesis, we employed two empirical strategies. First, we showed that firms with 100 million yen of registered capital are less likely to increase their registered capital. As SMEs are defined under the Corporation Tax Act and the SME Basic Act as firms with registered capital of 100 million yen or less, such firms have an incentive to meet the SME requirements and retain their SME status. Second, we showed that, after the relaxation of the definitions of SMEs under the SME Basic Act, firms were more likely to increase their registered capital. This effect is larger if a firm's registered capital is close to the cap set in the SME definition. This implies that the registered capital requirement is an effective constraint on the accumulation of additional equity capital.

We also showed that additional registered capital has positive effects on firm growth (in terms of the growth rate of a firm's total assets). As the requirements for registered capital in the definitions of SMEs have negative effects on additional registered capital, the SME requirements impede firm growth for SMEs.

Our study has important implications for SME policies. As noted, SME policies can be important for mitigating market failure. However, the menu of SME policies adopted in Japan impedes firm growth. Governments should therefore be cautious about implementing an excessive range of policies to support SMEs.

## References

- Acs, Z., Szerb, L., March 2007. Entrepreneurship, Economic Growth and Public Policy. *Small Business Economics* 28 (2), 109–122.
- Berger, A. N., Udell, G. F., 1998. The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking & Finance* 22, 613–673.
- Craig, B. R., Jackson, W. E., Thomson, J. B., 2007. Small firm finance, credit rationing, and the impact of sba-guaranteed lending on local economic growth. *Journal of Small Business Management* 45 (1), 116–132.
- García-Santana, M., Pijoan-Mas, J., 2014. The reservation laws in India and the misallocation of production factors. *Journal of Monetary Economics* 66, 193 – 209.
- Garicano, L., Lelarge, C., Reenen, J. V., 2016. Firm Size Distortions and the Productivity Distribution: Evidence from France. *American Economic Review* 106 (11), 3439–79.
- Goto, Y., 2014. Macro-performance of Small and Medium Enterprises (in Japanese). Nikkei Publishing Inc., Tokyo.
- Gourio, F., Roys, N., 2014. Size-dependent regulations, firm size distribution, and reallocation. *Quantitative Economics* 5 (2), 377–416.
- Guner, N., Ventura, G., Xu, Y., 2008. Macroeconomic implications of size-dependent policies. *Review of Economic Dynamics* 11 (4), 721 – 744.
- Guner, N., Ventura, G., Yi, X., August 2006. How costly are restrictions on size? *Japan and the World Economy* 18 (3), 302–320.
- Honjo, Y., Harada, N., 2006. SME policy, financial structure and firm growth: Evidence from Japan. *Small Business Economics* 27 (4), 289–300.

- Kang, J. W., Heshmati, A., 2008. Effect of credit guarantee policy on survival and performance of smes in republic of Korea. *Small Business Economics* 31 (4), 445–462.
- Kuttner, K. N., Posen, A. S., 2001. The great recession: Lessons for macroeconomic policy from Japan. *Brookings Papers on Economic Activity* 64 (2001-2), 93–186.
- Mankiw, N. G., August 1986. The allocation of credit and financial collapse. *Quarterly Journal of Economics* 101 (3), 455–70.
- OECD, 2013. SME and entrepreneurship financing: The role of credit guarantee schemes and mutual guarantee societies in supporting finance for small and medium-sized enterprises, Final Report, Paris: Centre for Entrepreneurship, SMEs and Local Development.
- OECD, 2016. Japan: Boosting growth and well-being in an ageing society.
- Oh, I., Lee, J.-D., Heshmati, A., Choi, G.-G., 2009. Evaluation of credit guarantee policy using propensity score matching. *Small Business Economics* 33 (3), 335–351.
- Ono, A., Uesugi, I., Yasuda, Y., 2013. Are lending relationships beneficial or harmful for public credit guarantees? Evidence from Japan's emergency credit guarantee program. *Journal of Financial Stability* 9 (2), 151 – 167.
- Opler, T. C., Titman, S., 1994. Financial distress and corporate performance. *Journal of Finance* 49 (3), 1015–40.
- Ou, C., Haynes, G. W., 2006. Acquisition of additional equity capital by small firms – findings from the national survey of small business finances. *Small Business Economics* 27 (2), 157–168.
- Storey, D. J., 1994. *Understanding the Small Business Sector*. Thomson Learning, London.
- Storey, D. J., 2008. *Entrepreneurship and sme policy*, World Entrepreneurship Forum 2008 Edition, available at:  
<http://www.world-entrepreneurship-forum.com/Publications/Articles> .



Titman, S., Wessels, R., 1988. The determinants of capital structure choice. *The Journal of Finance* 43 (1), 1–19.

Uesugi, I., Sakai, K., Yamashiro, G. M., 2010. The effectiveness of public credit guarantees in the Japanese loan market. *Journal of the Japanese and International Economies* 24 (4), 457–480.

Table 1: List of Major SME Policies in Japan

Management Support	Assists those planning to start a business or venture owners trying to improve their operations in financing and obtaining relevant information. Assists SMEs undergoing business innovation in financing, handling taxes, and cultivating markets. Supports collaboration between SMEs to enter new areas of business by providing subsidies, advice, and financing assistance. Supports SMEs in their efforts to revitalize their business through the SME Revitalization Support Committee. Supports SMEs with human resources development and the resolution of business challenges by implementing the Small and Medium-sized Enterprise Consultants system, offering training, and dispatching experts. Provides information and advice to help SMEs to move production overseas or find markets abroad. Promotes fair subcontracting practices and the development of small and medium-sized subcontractors and thereby increases the opportunity for SMEs to win contracts. Assists SMEs in maintaining stable operations by supporting them during bankruptcy, new pandemic influenza, and earthquakes and other natural disasters, as well as by assisting them to develop business continuity plans. Helps small companies to prepare for business closure and retirement, and SMEs to prepare for the bankruptcy of their major customers. Provides managerial and financial support to small businesses with 20 or fewer employees (five or fewer for those in the commerce or service sector). Supports R&D and human resources development at SMEs with key manufacturing technologies. Selects “300 of Japan’s Exciting Monozukuri (Manufacturing) SMEs.” Assists SMEs committed to technological development, IT utilization, and higher energy efficiency by providing subsidies, financial assistance, and relevant information. Supports SMEs with intellectual property strategies by implementing measures to protect intellectual property and measures to combat damage caused by counterfeiting. Dispatches experts to assist SMEs in addressing difficult or specialized business challenges (e.g., launch of new operations or business succession) and otherwise helps SMEs directly or via support institutions.
Financial Support	Supports SMEs whose business stability is threatened by external factors (e.g., a major customer’s restricted operations or application for rehabilitation procedures, the impact of a disaster, or the failure of the main bank) by making additional credit guarantees available. Makes loans to SMEs temporarily facing cash flow problems owing to a radical change in the business environment, the bankruptcy of a major customer, or the streamlining of the main bank.
Fiscal Support	Gives information and advice on various tax measures to support SMEs.
Taxation	Gives information and advice on “SME accounting,” which helps SMEs to enhance their capability to analyze management, ensure financing, and increase order intake.
Accounting	Gives information and advice on the new Companies Act, which additionally includes systems that bring significant benefits to SMEs, such as the accounting adviser system.
Companies Act	Gives information and advice on measures to support SMEs’ smooth business succession.
Business succession	
Commerce and Regional Support	Supports efforts to improve the attractiveness of small and medium merchants, shopping districts, and city centers. Invigorates regional industries, such as locally based industries and traditional handicraft industries, by providing subsidies and low-interest loans. Comprehensively assists business activities conducted by organic partnerships between SMEs and those engaged in agriculture/forestry/fisheries through the effective use of their business resources. Actively supports and increases the publicity for attractive regional products.

Source: Website of the Small and Medium Enterprise Agency (<http://www.chusho.meti.go.jp/sme-english/outline/04/01.html>).

Note: This table shows the list of SME policies implemented by the Ministry of Economy, Trade and Industry (METI) in Japan.

Table 2: Definition of SMEs under the Corporation Tax Act and the SME Basic Act in Japan

Panel A: Definition under the Corporation Tax Act

Industry	Registered Capital	Employees
All	100 million or less	No requirement

Panel B: Definition under the SME Basic Act

	Before 1999		After 2000	
	Registered Capital	Employees	Registered Capital	Employees
Definition 1	100 million or less	300 or fewer	300 million or less	300 or fewer
Definition 2	30 million or less	100 or fewer	100 million or less	100 or fewer
Definition 3	10 million or less	50 or fewer	50 million or less	50 or fewer
Definition 4	10 million or less	50 or fewer	50 million or less	100 or fewer

Note: This table shows the definitions of SMEs under the Corporation Tax Act (in Panel A) and the SME Basic Act (in Panel B). “Manufacturing etc.” includes all industries except the wholesale, retail, and service industries.

Table 3: Definitions of R\_Capital Dummy

Dummy variable	Definition	N	Mean
R_capital 20M	equals one if a firm's registered capital is 10 to 20 million yen	306,353	0.087
R_capital 30M	equals one if a firm's registered capital is 20 to 30 million yen	306,353	0.062
R_capital 40M	equals one if a firm's registered capital is 30 to 40 million yen	306,353	0.027
R_capital 50M	equals one if a firm's registered capital is 40 to 50 million yen	306,353	0.057
R_capital 60M	equals one if a firm's registered capital is 50 to 60 million yen	306,353	0.015
R_capital 70M	equals one if a firm's registered capital is 60 to 70 million yen	306,353	0.010
R_capital 80M	equals one if a firm's registered capital is 70 to 80 million yen	306,353	0.016
R_capital 90M	equals one if a firm's registered capital is 80 to 90 million yen	306,353	0.012
R_capital 100M	equals one if a firm's registered capital is 90 to 100 million yen	306,353	0.054
R_capital 110M	equals one if a firm's registered capital is 100 to 110 million yen	306,353	0.006
R_capital 120M	equals one if a firm's registered capital is 110 to 120 million yen	306,353	0.009
R_capital 130M	equals one if a firm's registered capital is 120 to 130 million yen	306,353	0.005
R_capital 140M	equals one if a firm's registered capital is 130 to 140 million yen	306,353	0.005
R_capital 150M	equals one if a firm's registered capital is 140 to 150 million yen	306,353	0.013
R_capital 200M	equals one if a firm's registered capital is 150 to 200 million yen	306,353	0.046
R_capital 300M	equals one if a firm's registered capital is 200 to 300 million yen	306,353	0.075
R_capital 400M	equals one if a firm's registered capital is 300 to 400 million yen	306,353	0.061
R_capital 500M	equals one if a firm's registered capital is 400 to 500 million yen	306,353	0.087

Note: This table shows the definitions of R\_Capital Dummies used in Table 5.

Table 4: Summary Statistics

Variable	N	mean	sd	min	p1	p50	p99	max
Additional R_Capital Dummy	306,353	0.046	0.210	0.000	0.000	0.000	1.000	1.000
Amount of Additional R_capital	306,353	4.141	46.125	0.000	0.000	0.000	100.000	1500.000
Treatment1 $\times$ R_Capital Gap1	211,915	2.600	2.129	0.000	0.000	3.932	4.615	4.615
R_Capital Gap1	211,915	4.026	1.169	0.000	0.000	4.511	4.615	4.615
Treatment1	211,915	0.646	0.478	0.000	0.000	1.000	1.000	1.000
Treatment2 $\times$ R_Capital Gap2	152,997	0.262	0.855	0.000	0.000	0.000	3.434	3.434
R_Capital Gap2	152,997	2.857	0.897	0.000	0.000	3.045	3.434	3.434
Treatment2	152,997	0.097	0.295	0.000	0.000	0.000	1.000	1.000
Treatment3 $\times$ R_Capital Gap3	107,332	0.527	0.990	0.000	0.000	0.000	2.398	2.398
R_Capital Gap3	107,332	1.575	1.129	0.000	0.000	2.397	2.398	2.398
Treatment3	107,332	0.308	0.462	0.000	0.000	0.000	1.000	1.000
Cash Holdings	306,353	0.180	0.184	0.000	0.000	0.122	0.882	1.000
Leverage	306,353	0.785	0.407	0.000	0.000	0.796	2.357	3.360
Tangible Fixed Assets	306,353	0.339	0.271	0.000	0.000	0.286	0.967	2.200
Operating Income	306,353	0.007	0.110	-0.709	-0.448	0.019	0.249	0.334
Firm Size	306,353	4.464	4.629	-13.816	-5.787	5.999	10.491	14.372
Total Asset Growth	303,356	0.025	0.221	-0.993	-0.452	-0.003	0.932	1.706

Note: This table shows the summary statistics of the variables used in the econometric analysis.

Table 5: Estimation Results for Effects on Additional Registered Capital

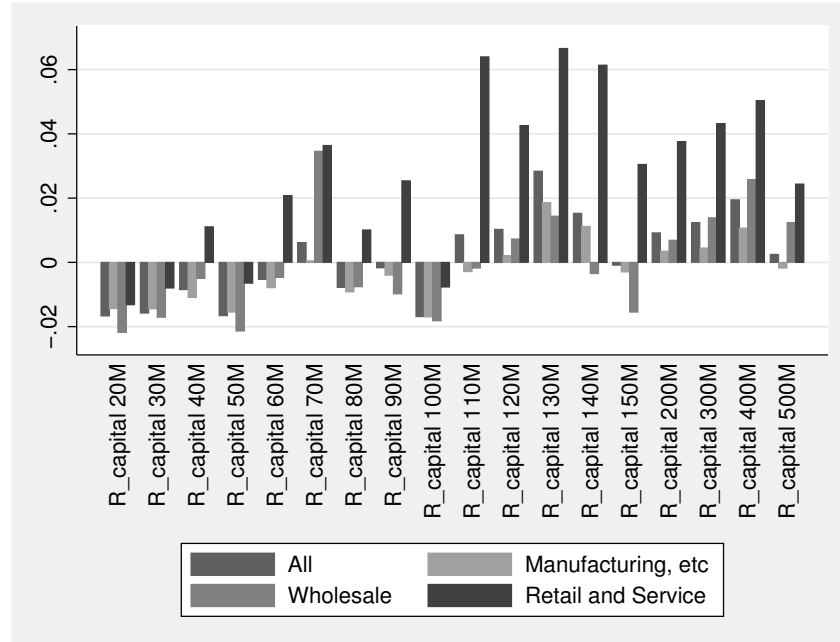
Proxy of Dependent Variable	Dummy	Amount
Industry	All	All
R_capital 20M	-0.0167*** (0.001)	-55.4291*** (4.889)
R_capital 30M	-0.0158*** (0.001)	-51.4031*** (5.666)
R_capital 40M	-0.0085*** (0.002)	-19.7155** (7.683)
R_capital 50M	-0.0166*** (0.001)	-49.9706*** (6.187)
R_capital 60M	-0.0053* (0.003)	-2.4591 (10.066)
R_capital 70M	0.0062 (0.004)	33.8065*** (11.383)
R_capital 80M	-0.0078*** (0.003)	-11.3949 (10.190)
R_capital 90M	-0.0017 (0.003)	15.5089 (11.096)
R_capital 100M	-0.0169*** (0.001)	-30.2832*** (6.678)
R_capital 110M	0.0086* (0.005)	49.4246*** (14.012)
R_capital 120M	0.0103** (0.004)	59.3763*** (11.937)
R_capital 130M	0.0284*** (0.006)	99.7992*** (14.340)
R_capital 140M	0.0153** (0.006)	64.1389*** (15.417)

[Continue to the next page]

R_capital 150M	-0.0009 (0.003)	32.8672*** (10.944)
R_capital 200M	0.0092*** (0.002)	64.8393*** (5.818)
R_capital 300M	0.0124*** (0.002)	77.9329*** (4.885)
R_capital 400M	0.0195*** (0.002)	109.0838*** (5.653)
R_capital 500M	0.0025* (0.001)	71.2375*** (5.304)
Cash Holdings	0.0135*** (0.002)	48.6720*** (7.337)
Leverage	0.0131*** (0.001)	47.3439*** (2.848)
Tangible Fixed Assets	-0.0140*** (0.002)	-50.7015*** (5.524)
Operating Income	-0.0056* (0.003)	-24.4912** (10.928)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Observations	306,353	306,353
Log-likelihood	-54,271	-135,197

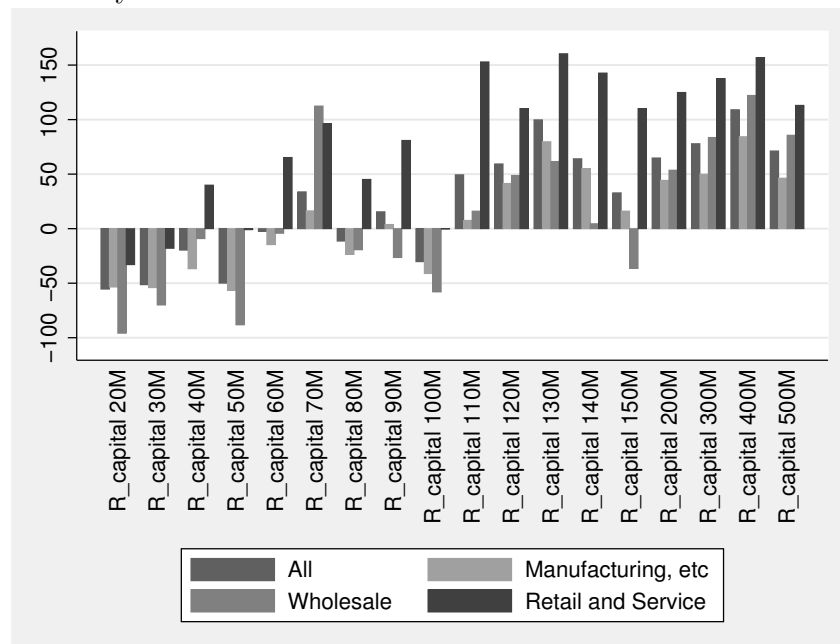
Note: This table presents estimates of probit and tobit regressions with the additional R\_capital dummy and the amount of additional R\_capital as dependent variables. The additional R\_capital dummy (shown as “Dummy” in the table) is a dummy variable that has a value of one if registered capital is larger at the end of fiscal year  $t$  than it is at the beginning of fiscal year  $t$ . Additional R\_capital (shown as “Amount” in the table) is the difference in registered capital at the end of fiscal year  $t$  from that at the beginning of fiscal year  $t$ . Definitions of R\_capital dummies are shown in Table 3. Leverage is defined as the book value of debt divided by the book value of assets at the beginning of fiscal year  $t$ . Tangible fixed assets are defined as the ratio of a firm’s tangible fixed assets to total assets at the beginning of fiscal year  $t$ . Cash holdings are defined as the ratio of a firm’s cash holdings to total assets at the beginning of fiscal year  $t$ . Operating incomes are defined as operating income in fiscal year  $t$ , normalized by total assets at the beginning of fiscal year  $t$ . Firm size is defined as the natural logarithm of total assets at the beginning of fiscal year  $t$ . Seven year dummies from FY1992 to FY2007 and 43 industry dummies are included. The reference year is FY1991. The marginal effects of each variable are shown in this table. Estimated robust standard errors are shown in parentheses. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Figure 1: Magnitude of Estimated Marginal Effects of R\_Capital Dummies on Additional R\_capital dummy, by Industry



Note: This figure shows the estimated marginal effects of R\_capital dummies on R\_capital dummy using the probit estimation. The estimated result for all firms is shown in column (1) of Table 5. Other results are not reported in any table.

Figure 2: Magnitude of Estimated Coefficients of R\_Capital Dummies on Additional R\_capital, by Industry



Note: This figure shows the estimated coefficient of R\_capital dummies on additional R\_capital using the tobit estimation. The estimated result for all firms is shown in column (2) of Table 5. Other results are not reported in any table.



Table 6: Estimation Results for the Effects of Changing the Definitions of SMEs on the Manufacturing Industry

	(1)	(2)	(3)	(4)
Dependent Variable	$\Delta R\_Capital$			
Proxy of Dependent Variable	Dummy	Amount	Dummy	Amount
Period of Policy	FY2000	FY2000	FY1999	FY1999
Treatment1 $\times$ Policy	0.0607*** (0.008)	44.6983*** (9.491)	0.0644*** (0.008)	47.5291*** (9.473)
Treatment1 $\times$ R.Capital Gap1	0.0079*** (0.001)	7.5846*** (1.821)	0.0087*** (0.001)	8.2930*** (1.893)
Treatment1 $\times$ R.Capital Gap1 $\times$ Policy	-0.0117*** (0.001)	-12.3648*** (2.153)	-0.0125*** (0.001)	-12.9180*** (2.155)
R.Capital Gap1	0.0039*** (0.001)	0.5967 (1.051)	0.0039*** (0.001)	0.6026 (1.052)
Cash Holdings	0.0113*** (0.002)	16.3263*** (3.874)	0.0113*** (0.002)	16.3449*** (3.876)
Leverage	-0.0106*** (0.002)	-17.4111*** (2.914)	-0.0106*** (0.002)	-17.4154*** (2.915)
Tangible Fixed Assets	0.0153*** (0.001)	24.2394*** (1.723)	0.0153*** (0.001)	24.2549*** (1.723)
Operating Income	-0.0047 (0.003)	-14.2366*** (4.903)	-0.0047 (0.003)	-14.3296*** (4.905)
ln (Total Assets)	0.0013*** (0.000)	2.6508*** (0.189)	0.0013*** (0.000)	2.6554*** (0.189)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	211,915	211,915	211,915	211,915
Log-likelihood	-33,662	-75,731	-33,651	-75,726

Note: This table presents estimates of probit and tobit regressions with the additional R.capital dummy and the amount of additional R.capital as dependent variables. The additional R.capital dummy (shown as “Dummy” in the table) is a dummy variable that has a value of one if registered capital is larger at the end of fiscal year  $t$  than at the beginning of fiscal year  $t$ . Additional R.capital (shown as “Amount” in the table) is the difference in registered capital at the end of fiscal year  $t$  from that at the beginning of fiscal year  $t$ . Treatment1 has a value of one if firms do not belong to the wholesale, retail, or service industries, and a value of zero otherwise, in order to focus on the change in Definition 1, shown in Table 2. Policy has a value of one if the year is after FY2000 in columns (1) and (2), and after FY1999 in columns (3) and (4). R.Capital Gap1 is defined as the natural logarithm of 100 million yen minus a firm’s registered capital at the beginning of fiscal year  $t$ . Definitions of other independent variables are shown in the note to Table 5. The marginal effects of each variable are shown in this table. Estimated robust standard errors are shown in parentheses. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Table 7: Estimation Results for the Effects of Changing the Definitions of SMEs on the Wholesale Industry

	(1)	(2)	(3)	(4)
Dependent Variable	$\Delta R\_Capital$			
Proxy of Dependent Variable	Dummy	Amount	Dummy	Amount
Period of Policy	FY2000	FY2000	FY1999	FY1999
Treatment2 $\times$ Policy	0.1369*** (0.050)	42.8303*** (12.266)	0.1579*** (0.053)	47.3516*** (12.401)
Treatment2 $\times$ R_Capital Gap2	0.0075** (0.004)	6.1207** (2.864)	0.0089** (0.004)	7.0089** (3.042)
Treatment2 $\times$ R_Capital_Gap2 $\times$ Policy	-0.0227*** (0.005)	-15.8084*** (4.325)	-0.0245*** (0.005)	-16.2209*** (4.236)
R_Capital Gap2	0.0178*** (0.001)	12.0114*** (1.596)	0.0178*** (0.001)	12.0056*** (1.591)
Cash Holdings	0.0105*** (0.002)	9.4428*** (2.972)	0.0104*** (0.002)	9.4315*** (2.972)
Leverage	-0.0102*** (0.002)	-9.0010*** (1.962)	-0.0102*** (0.002)	-9.0098*** (1.962)
Tangible Fixed Assets	0.0135*** (0.001)	10.9166*** (1.323)	0.0135*** (0.001)	10.9181*** (1.323)
Operating Income	0.0027 (0.003)	0.5368 (2.618)	0.0027 (0.003)	0.5284 (2.619)
ln(Total Assets)	0.0031*** (0.000)	2.8718*** (0.310)	0.0031*** (0.000)	2.8726*** (0.310)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	152,997	152,997	152,997	152,997
Log-likelihood	-24,693	-53,349	-24,689	-53,347

Note: This table presents estimates of probit and tobit regressions with the additional R\_capital dummy and the amount of additional R\_capital as dependent variables. The additional R\_capital dummy (shown as “Dummy” in the table) is a dummy variable with a value of one if the registered capital is larger at the end of fiscal year  $t$  than at the beginning of fiscal year  $t$ . Additional R\_capital (shown as “Amount” in the table) is the difference in registered capital at the end of fiscal year  $t$  from that at the beginning of fiscal year  $t$ . Treatment2 has a value of one if firms belong to the wholesale industry and a value of zero otherwise, which enables us to focus on the change in Definition 2, shown in Table 2. Policy has a value of one if the year is after FY2000 in columns (1) and (2), and after FY1999 in columns (3) and (4). R\_Capital Gap2 is defined as the natural logarithm of 30 million yen minus a firm’s registered capital at the beginning of fiscal year  $t$ . Definitions of other independent variables are shown in the note to Table 5. The marginal effects of each variable are shown in this table. Estimated robust standard errors are shown in parentheses. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Table 8: Estimation Results for the Effects of Changing the Definitions of SMEs on the Retail and Service Industries

	(1)	(2)	(3)	(4)
Dependent Variable	$\Delta R\_Capital$			
Proxy of Dependent Variable	Dummy	Amount	Dummy	Amount
Period of Policy	FY2000	FY2000	FY1999	FY1999
Treatment3 $\times$ Policy	0.0424*** (0.007)	18.6272*** (4.054)	0.0426*** (0.007)	18.0320*** (3.768)
Treatment3 $\times$ R_Capital Gap3	0.0051*** (0.001)	3.7254*** (1.274)	0.0056*** (0.001)	4.0521*** (1.316)
Treatment3 $\times$ R_Capital_Gap3 $\times$ Policy	-0.0159*** (0.001)	-12.3369*** (2.122)	-0.0162*** (0.001)	-12.4107*** (2.114)
R_Capital Gap3	0.0588*** (0.001)	37.6600*** (5.925)	0.0589*** (0.001)	37.6746*** (5.929)
Cash Holdings	0.0256*** (0.002)	17.3489*** (4.316)	0.0256*** (0.002)	17.3579*** (4.319)
Leverage	-0.0118*** (0.002)	-8.5559*** (1.988)	-0.0118*** (0.002)	-8.5353*** (1.987)
Tangible Fixed Assets	0.0122*** (0.001)	8.7605*** (1.534)	0.0122*** (0.001)	8.7617*** (1.534)
Operating Income	-0.0148*** (0.003)	-8.9269*** (2.765)	-0.0149*** (0.003)	-8.9312*** (2.765)
ln(Total Assets)	0.0155*** (0.000)	10.3081*** (1.584)	0.0155*** (0.000)	10.3107*** (1.585)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	107,332	107,332	107,332	107,332
Log-likelihood	-14,245	-37,610	-14,241	-37,607

Note: This table presents estimates of probit and tobit regressions with the additional R\_capital dummy and the amount of additional R\_capital as dependent variables. Additional R\_capital dummy (shown as “Dummy” in the table) is a dummy variable with a value of one if registered capital is larger at the end of fiscal year t than at the beginning of fiscal year t. The additional R\_capital (shown as “Amount” in the table) is the difference in registered capital at the end of fiscal year t from that at the beginning of fiscal year t. Treatment3 has a value of one if firms belong to the retail and service industries and a value of zero otherwise, which enables us to focus on the change in Definition 3, shown in Table 2. Policy has a value of one if the year is after FY2000 in columns (1) and (2), and after FY1999 in columns (3) and (4). R\_Capital Gap2 is defined as the natural logarithm of 10 million yen minus a firm’s registered capital at the beginning of fiscal year t. Definitions of other independent variables are shown in the note to Table 5. The marginal effects of each variable are shown in this table. Estimated robust standard errors are shown in parentheses. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Table 9: Estimated Results of Treatment Effects Regression for Additional Registered Capital on Asset Growth

	(1)	(2)	(3)	(4)
Dependent Variable	Total Asset Growth	Total Asset Growth	Total Asset Growth	Total Asset Growth
Additional R_capital Dummy	0.1202*** (0.003)	0.0897*** (0.004)	0.0649*** (0.005)	0.0398*** (0.006)
Cash Holdings	0.0179*** (0.003)	0.0190*** (0.004)	0.0225*** (0.005)	0.0287*** (0.005)
Leverage	-0.0183*** (0.001)	-0.0142*** (0.001)	-0.0104*** (0.002)	-0.0040** (0.002)
Tangible Assets	-0.0276*** (0.002)	-0.0274*** (0.002)	-0.0266*** (0.003)	-0.0293*** (0.003)
Operating Income	0.3750*** (0.005)	0.3748*** (0.006)	0.3768*** (0.006)	0.3727*** (0.007)
Firm Size	-0.0031*** (0.000)	-0.0031*** (0.000)	-0.0030*** (0.000)	-0.0028*** (0.000)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	303,356	209,471	150,945	105,592
Log-likelihood	-15,220	-16,428	-18,960	-12,564
Variables in First-Stage Equation	Column (1) of Table 5	Column (1) of Table 6	Column (1) of Table 7	Column (1) of Table 8

Note: This table provides the estimates from the treatment effects model with the additional R\_capital dummy and total asset growth as the dependent variables. Definitions of all variables are in the notes accompanying Tables 5–8. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Table 10: Estimated Results of Treatment Effects Regression for Effects of Additional Registered Capital on Debt Growth

	(1)	(2)	(3)	(4)
Dependent Variable	Total Debt Growth	Total Debt Growth	Total Debt Growth	Total Debt Growth
Additional R_capital Dummy	0.0121*** (0.003)	-0.0164*** (0.004)	-0.0453*** (0.005)	-0.0657*** (0.006)
Cash Holdings	-0.0028 (0.003)	0.0005 (0.004)	0.0036 (0.005)	0.0102* (0.005)
Leverage	-0.0159*** (0.001)	-0.0131*** (0.002)	-0.0104*** (0.002)	-0.0056*** (0.002)
Tangible Assets	-0.0261*** (0.002)	-0.0255*** (0.002)	-0.0247*** (0.003)	-0.0258*** (0.003)
Operating Income	-0.2102*** (0.006)	-0.2103*** (0.006)	-0.2154*** (0.007)	-0.2257*** (0.008)
Firm Size	-0.0022*** (0.000)	-0.0024*** (0.000)	-0.0025*** (0.000)	-0.0025*** (0.000)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	303,385	209,456	150,919	105,576
Log-likelihood	-16,656	-19,260	-21,936	-15,621
Variables in First-stage Equation	Column (1) of Table 5	Column (1) of Table 6	Column (1) of Table 7	Column (1) of Table 8

Note: This table provides the estimates from the treatment effects model with the additional R\_capital dummy and total debt growth as the dependent variables. Definitions of all variables are in the notes accompanying Tables 5–8. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Table 11: Estimated Coefficients of Additional Registered Capital, Divided by the Distress Dummy

Panel A: Estimated coefficients on total asset growth					
Dependent Variable	Subsample	(1)	(2)	(3)	(4)
Total asset growth	Distress=1	0.0833*** (0.007)	0.0708*** (0.008)	0.0579*** (0.009)	0.0472*** (0.011)
	Observations	70,738	54,724	43,709	35,042
	Distress=0	0.1335*** (0.004)	0.1004*** (0.005)	0.0723*** (0.006)	0.0412*** (0.007)
	Observations	232,618	154,747	107,236	70,550

Panel B: Estimated coefficients on total debt growth					
Dependent Variable	Subsample	(1)	(2)	(3)	(4)
Total debt growth	Distress=1	-0.0700*** (0.007)	-0.0896*** (0.008)	-0.1097*** (0.009)	-0.1178*** (0.011)
	Observations	70,581	54,613	43,626	34,977
	Distress=0	0.0449*** (0.003)	0.0232*** (0.005)	-0.0057 (0.005)	-0.0309*** (0.006)
	Observations	232,804	154,843	107,293	70,599

Note: This table provides the estimates from the treatment effects model with the additional R.capital dummy, and total assets or debt growth as the dependent variables. Definitions of all variables are in the notes accompanying Tables 5–8. Control variables and variables in the first-stage equation are the same as those in Tables 9 and 10. To save space, we do not show the estimated results for the control variables. Distress is defined by a dummy variable that has a value of one if a firm’s leverage is in the top two deciles of its industry in a particular year. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Table 12: Estimated Coefficients of Additional Registered Capital, Divided by Industry Earning Volatility

Panel A: Estimated coefficients on total asset growth					
Dependent Variable	Subsample	(1)	(2)	(3)	(4)
Total asset growth	High volatility	0.1282*** (0.006)	0.0803*** (0.007)	0.0546*** (0.008)	0.0335*** (0.009)
	Observations	86,812	60,085	42,334	31,376
	Low volatility	0.0981*** (0.006)	0.0774*** (0.008)	0.0535*** (0.009)	0.0248** (0.011)
	Observations	89,516	59,866	42,840	27,882
Panel B: Estimated coefficients on total debt growth					
Dependent Variable	Subsample	(1)	(2)	(3)	(4)
Total debt growth	High volatility	-0.0091* (0.005)	-0.0449*** (0.006)	-0.0740*** (0.007)	-0.0875*** (0.008)
	Observations	86,829	60,074	42,325	31,372
	Low volatility	0.0192*** (0.006)	-0.0055 (0.008)	-0.0328*** (0.009)	-0.0564*** (0.011)
	Observations	89,520	59,860	42,832	27,870

Note: This table provides the estimates from the treatment effects model with the additional R.capital dummy, and total assets or debt growth as the dependent variables. Definitions of all variables are in the notes accompanying Tables 5–8. Control variables and variables in the first-stage equation are the same as those in Tables 9 and 10. To save space, we do not show the estimated results for the control variables. The high volatility dummy has a value of one if a firm’s industry earning volatility is in the top tertile. The low volatility dummy has a value of one if a firm’s industry earning volatility is in the bottom tertile. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Table 13: Estimation Results for the Effects of Policy Dummies for FY1996 to FY2002

Panel A		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable		$\Delta R\_Capital$ (Dummy)						
Period of Policy		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
Treatment1 $\times$ Policy		-0.0046 (0.008)	0.1126*** (0.015)	0.1514*** (0.019)	0.1432*** (0.019)	0.1257*** (0.017)	0.0596*** (0.010)	-0.0012 (0.004)
Treatment1 $\times$ R_Capital Gap1		0.0036** (0.001)	0.0121*** (0.002)	0.0137*** (0.002)	0.0136*** (0.002)	0.0130*** (0.002)	0.0089*** (0.001)	0.0028*** (0.001)
Treatment1 $\times$ R_Capital Gap1 $\times$ Policy		0.0008 (0.002)	-0.0183*** (0.002)	-0.0228*** (0.002)	-0.0216*** (0.002)	-0.0194*** (0.002)	-0.0113*** (0.001)	-0.0005 (0.001)
R_Capital Gap1		0.0061*** (0.001)	0.0060*** (0.001)	0.0059*** (0.001)	0.0054*** (0.001)	0.0043*** (0.001)	0.0022*** (0.001)	0.0008 (0.000)
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		140,990	137,953	135,604	134,102	133,178	132,325	131,291
Log-likelihood		-26700	-24816	-23357	-22182	-21191	-18146	-13692
Panel B		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable		$\Delta R\_Capital$ (Dummy)						
Period of Policy		FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
Treatment2 $\times$ Policy		0.0338 (0.037)	0.4883*** (0.135)	0.6057*** (0.133)	0.3516*** (0.112)	0.2710*** (0.101)	0.0749* (0.043)	-0.0067 (0.006)
Treatment2 $\times$ R_Capital Gap2		0.0036 (0.006)	0.0271*** (0.008)	0.0295*** (0.008)	0.0179*** (0.006)	0.0159*** (0.006)	0.0072* (0.004)	-0.0007 (0.002)
Treatment2 $\times$ R_Capital Gap2 $\times$ Policy		-0.0088 (0.008)	-0.0506*** (0.009)	-0.0576*** (0.009)	-0.0395*** (0.007)	-0.0330*** (0.007)	-0.0140*** (0.005)	0.0019 (0.003)
R_Capital Gap2		0.0284*** (0.002)	0.0258*** (0.002)	0.0219*** (0.001)	0.0185*** (0.001)	0.0157*** (0.001)	0.0088*** (0.001)	0.0029*** (0.001)
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		103,835	101,398	99,432	97,819	96,538	95,123	93,538
Log-likelihood		-20,452	-19,045	-17,871	-16,832	-15,859	-12,863	-8,790



Panel C

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Period of Policy	$\Delta R\_Capital$ (Dummy)						
Treatment3 $\times$ Policy	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
Treatment3 $\times$ Policy	-0.0108*** (0.004)	0.0441*** (0.009)	0.0663*** (0.011)	0.0675*** (0.011)	0.0684*** (0.011)	0.0416*** (0.008)	0.0062*** (0.003)
Treatment3 $\times$ R-Capital Gap3	-0.0017 (0.002)	0.0065*** (0.001)	0.0058*** (0.001)	0.0054*** (0.001)	0.0060*** (0.001)	0.0048*** (0.001)	0.0008 (0.001)
Treatment3 $\times$ R-Capital Gap3 $\times$ Policy	0.0068*** (0.002)	-0.0187*** (0.002)	-0.0219*** (0.002)	-0.0219*** (0.002)	-0.0207*** (0.002)	-0.0136*** (0.001)	-0.0021** (0.001)
R_Capital Gap3	0.0828*** (0.002)	0.0746*** (0.002)	0.0661*** (0.002)	0.0589*** (0.002)	0.0530*** (0.001)	0.0396*** (0.001)	0.0248*** (0.001)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	72,680	71,357	70,433	69,401	69,009	68,118	66,666
Log-likelihood	-11,832	-10,832	-10,097	-9,566	-9,118	-7,195	-4,621

Note: This table presents estimates of probit and tobit regressions with the additional R\_capital dummy as dependent variables. The additional R\_capital dummy (shown as "Dummy" in the table) is a dummy variable that has a value of one if registered capital is larger at the end of fiscal year t than at the beginning of fiscal year t. Definitions of independent variables are shown in the note to Tables 5, 6, 7, and 8. The marginal effects of each variable are shown in this table. Estimated robust standard errors are shown in parentheses. The symbols \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.