The Political Economy of SME Financing and Japan’s Regional Bank Problems∗

Chongwoo Choe
Australian Graduate School of Management
University of New South Wales

Please send all correspondence to:
Chongwoo Choe
Australian Graduate School of Management
University of New South Wales
Sydney, NSW 2052, AUSTRALIA
(Phone) +61 2 9931 9528
(Fax) +61 2 9931 9326
(Email) c.choe@agsm.edu.au

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Abstract

The regional bank problems in Japan can be summarized as accumulating non-performing loans, the lack of diversification and attendant portfolio risk, and the absence of effective competition. This paper argues that the regional bank problems should be addressed in conjunction with the financing of small and medium enterprises (SMEs) and the political interests of the central and regional governments. The political interests may necessitate funding suboptimal investment projects of regional SMEs or keeping non-performing SMEs alive. Through close ties with regional banks, the governments can influence the banks’ financing decisions either explicitly or implicitly. In particular, loan repayment guarantees are shown to reduce the banks’ incentives to screen loan applications and harm competition by deterring entry of other banks. This paper offers some policy implications in solving Japan’s regional bank problems.

KEY WORDS: Japanese regional banks, small and medium enterprises, political economy, loan repayment guarantee

JEL CLASSIFICATION: G21, G28, R51
1. Introduction

Over the past years, there has been some progress in rehabilitating Japan’s banking sector. The major banks have reduced the stock of their non-performing loans (NPLs) from 8.4 percent of total lending in March 2002 to 4.7 percent in September 2004 (OECD, 2005).

For the first time in many years, the top six banks, excluding Resona, had reported a combined net profit of 944 billion yen for the period of April - September, 2003, thanks to economic recovery and rising stock prices. Despite decreasing NPLs among large city banks, however, regional banks have been slow in disposing of their bad loans, culminating in the nationalization of Ashikaga Bank in November 2003. As of September 2003, regional banks carry 44 percent of Japan’s NPLs, accounting for 4.6 percent of their total loans. Concerns over the slow progress in restructuring regional banks have been echoed in the comments by, among others, the OECD and the IMF.

What are the main problems regional banks are facing? Why have regional banks been slow in reform? What are the obstacles and how can they be addressed? This paper attempts to offer some insight to these questions.

The problem of regional banks is inextricably linked to small and medium enterprises (SMEs) in the region. The survival of regional SMEs is in turn closely related to the political interests of local governments. It is thus imperative to understand the nature of relationships among regional banks, SMEs, and local governments. As of March 31, 2004, there are 64 regional banks in Japan.

Unlike large city banks whose customers are relatively large corporations, regional banks focus their business mainly on retail banking and the majority of their loan customers are SMEs in the region. Although the definition of SMEs varies in different countries, SMEs employ roughly a half of the US and two-thirds of the

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(1) For the year to March 2004, NPLs have decreased from 5.3 percent of all loans to 2.9 percent at Mitsubishi Tokyo Financial Group, from 8.4 percent to 5.0 percent at Sumitomo Mitsui Financial Group, and from 6.3 percent to 4.4 percent at Mizuho (“Better, not well”, The Economist, May 27, 2004).


(3) Since 1989, 65 new regional banks were created from what used to be referred to as ‘Sogo Banks’. These secondary regional banks perform more or less the same functions as the original 64 regional banks.

(4) See Schaede (2004), for example.
EU workforce. SMEs rely heavily on bank financing. Their share of bank debt to total debt in G10 countries is around double that of large firms and, in some countries, exceeds 60 percent of all debt. Large part of SMEs’ bank debt is from small regional banks (Takats, 2004). In Japan, SMEs account for 99.7 percent of all enterprises (4.69 million enterprises in 2001), represent 70.2 percent of all employment (29.96 million people in 2001), and their employees constitute 80 percent of voters. In return, SMEs account for 70 to 80 percent of the revenue for Japan’s regional banks. Table 1 shows the breakdown of total loans to SMEs from various financial institutions.

— Table 1 goes about here. —

How is SME financing different from that of larger corporations? First, there are scale economies in lending: per unit cost of screening and monitoring a loan decreases as the size of loan increases. If firm size is positively related to loan size, then the average cost of serving SMEs is larger than that for larger firms. Second, banks suffer more from acute information asymmetry with SMEs than with larger firms, which again necessitates larger screening and monitoring costs. Information asymmetry is also one of the factors that keep SMEs from using direct financing. To an extent, such costs of information asymmetry can be reduced through relationship banking or collateralized loans. While banks have resorted to such mechanisms in Japan, the government’s loan repayment guarantee has been the most influential - and controversial - in SME financing. We discuss this below.

The close ties between regional banks and local governments play an important role in the relationship between regional banks and local SMEs. Regional banks are the designated financial institutions of local governments, which implies that tax payments, government transfers, public officials’ salaries, and other public funds represent stable sources of cash flow into regional banks. Regional banks also assist with the promotion of regions through their activities as underwriters of municipal bonds and other financing. In return, it is suggested that regional banks cannot ignore the political influence by central and local governments (Shimizu,

Regional SMEs are the primary beneficiary of such political influence. The governmental support of SMEs is driven by various political and economic reasons. SMEs, as the main provider of employment, comprise the majority of constituents - voters - and the key source of fiscal income for regional governments. Moreover, closure of NPLs would result in unemployment which would go against Japan’s existing ‘social contract’ and dampen the problem of its insufficient welfare system (Schaede, 2004, 2005). Such political influence may explain why regional banks are led to extend loans to SMEs that would otherwise be unable to obtain loans, and roll over loans they know would not be collected, leading to a phenomenon that Caballero et al. (2004) dubbed ‘bankrupt banks lending to bankrupt firms’.

The governmental support of SMEs takes various forms ranging from special loan programs through government financial institutions(6) to credit guarantee and credit insurance programs. As the credit guarantee and insurance programs have been the most controversial, it is necessary to discuss them in detail. The credit guarantee program aims to supplement insufficiency in credit and security of SMEs and facilitate fund supply through the guarantee of loan debts by the Credit Guarantee Corporations (CGCs). SMEs pay 1 percent insurance premium for the guarantee and banks in return charge a lower interest rate. Guarantees by CGCs are further reinsured by Japan Finance Corporation for Small Business and Medium Enterprise (JASME).(7) While these guarantee and insurance programs are policy of the central government,(8) anecdotal evidence suggests that local governments exercise influence in the implementation of these programs. The CGCs are often under pressure from local governments to lower their standards of risk evaluation and, once SMEs receive approval from the CGCs, regional banks almost always extend loans to them. Regional banks are also under the influence of local governments to extend loan periods to local SMEs and roll over debt in

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(6) These low-interest loans are offered by three government financial institutions listed in Table 1.

(7) The CGC is funded by central, local governments, regional banks, and other organizations. There are 52 CGCs, one in each of 47 prefectures and five municipalities. The total outstanding guarantee of liability is 31.1 trillion yen as of the end of March 2004, and the contracted amount for underwritten insurance from April 2003 to March 2004 is 14.3 trillion yen (source: http://www.chusho.meti.go.jp/).

(8) The CGSs have been established following the Credit Guarantee Association Law and the insurance of the credit guarantee falls under the Small Business Credit Insurance Law.
hard times (Shimizu, 2005).

What do all these mean for regional banks? First, granted that regional banks are under the influence from local and central governments, their operation may not be entirely driven by profit motives. Government loan guarantee and insurance programs reduce regional banks’ incentives to screen loan applications from SMEs. Second, the symbiotic relationship between local governments, regional banks and regional SMEs implies that regional banks lack incentives to diversify into other regions. The consequence is that the regional banks’ asset base is largely concentrated in the regions where they are based, raising concern for their portfolio risk.\(^{(9)}\) The absence of incentives to diversify into other regions also implies that each regional bank enjoys some monopoly power in its locality. Indeed Uchida and Tsutsui (2005) provide evidence that, while competition among Japanese city banks has improved during the last quarter of the 20th century, regional banks are not yet subject to effective competition.

This paper presents a simple model that illustrates the regional bank problem in Japan as described above. We consider two regions each served by a regional bank. Each region is populated with many SMEs each with an investment project, which is private information. The government in each region has political interest in supporting as many local SMEs as possible, or equivalently in our model, boosting aggregate investment in the region. To this end, the government offers loan repayment guarantees to its regional bank.\(^{(10)}\) The regional bank can screen at some cost individual loan applications from the SMEs and offer discriminatory loan interest rates, or offer a non-discriminatory loan interest rate without screening. To the extent that each regional bank offers loans to a wide cross-section of businesses in its region, the bank can pool away idiosyncratic risks of its local loan clients. However, each region may be represented by only a few industries and undiversifiable common risks may remain significant.

\(^{(9)}\) Ashikaga Bank’s business was mostly in traditional deposit and lending, concentrated in Tochigi prefecture. Even for some regional banks with enviable performance, lack of diversification is an issue. For example, Fukuoka Bank’s business lending is heavily concentrated in many unstable local retailers. Hiroshima Bank does business in a region dominated by Mazda, a car-maker in trouble, and Fujita, a construction company heavy with debts (“Outsmarting their city cousins”, The Economist, April 4, 2002).

\(^{(10)}\) Loan repayment guarantees are offered to local SMEs. As long as local SMEs turn to their regional bank for external financing, we could think of the guarantees extended to the regional bank.
We first focus on the single region and the bank’s incentives to screen loan applications. If the screening cost is sufficiently large, then the bank does not screen any loan applications and the resulting aggregate investment is below the first-best level. In case of perfect, costless screening, the bank operates as a monopoly with perfect price discrimination, implying that the aggregate investment is at the first-best level. To the extent that screening is costly, the aggregate investment remains suboptimal. The regional government’s loan repayment guarantee is shown to increase the level of aggregate investment, but decreases the bank’s incentives to screen loan applications.

Next we consider the case where the bank in region 1, called bank 1, enters the other region, called region 2, which is also served by another regional bank as a local monopoly, called bank 2. The entry into the other region has two types of potential benefits. First, by expanding its loan portfolio into a different region, bank 1 can reduce its portfolio risk. The second type of benefit is bank 1’s additional profit from region 2. Of course this type of benefit depends on the nature of post-entry competition. Such benefits are traded off against the reduced profit in its own region, should bank 2 enter region 1 in retaliation. We look at a polar case of Bertrand competition in the post-entry game. As is well known, Bertrand competition pushes profits to zero for both banks. Nonetheless, bank 1 may choose to enter region 2 because of diversification benefits. However, the loan repayment guarantee offered to bank 2 by the government in region 2 tilts the paying field in favor of bank 2, thereby working as an entry deterrent.

The rest of the paper is organized as follows. Section 2 describes the basic model. Sections 3 and 4 study the regional bank’s financing decision with and without the loan repayment guarantee. Section 5 discusses how the loan repayment guarantee affects the bank’s entry decision to the other region. Concluding remarks and some policy implications are offered in Section 6.

2. The Model

The financing of regional SMEs differs from that of large corporations in several ways. First, while SMEs’ projects are subject to both the idiosyncratic and common risks, given the size of their operation, the common risk often dominates:
the success of SMEs in a region depends on the whole economic condition of the region. Second and related, regional SMEs enjoy positive externalities from the level - and composition - of the aggregate investment made in the region. For example, the profitability of an automobile part manufacturer is affected by the presence of a steel mill, which is in turn affected by the availability of power. Third, informational asymmetry is acute between SMEs and their financiers, making direct financing a less feasible option compared to intermediated financing.

Our basic model is cast in the setting that captures the above features. We consider two regions indexed by \( n = 1, 2 \). Each region has a regional government, a continuum of firms, a continuum of uninformed investors, and a regional bank. There is universal risk neutrality. Each firm is identified with an investment project and is denoted by \( i \in [0, 1] \), where \( i \) is uniformly distributed. Only the firm knows the project it has, which outsiders can learn at screening cost \( c \) per project.

Each project requires one unit of external funding. The return from project \( i \) is \( A_n h_n(i) \) with probability \( p_n(I_n) \) and zero otherwise, where \( I_n \) is the level of aggregate investment in region \( n \). Thus the firm’s operation is subject only to the common risk. Define \( H_n(I_n) \equiv \int_0^{I_n} h_n(i) di \). For \( n = 1, 2 \), we maintain the following assumptions.

**Assumption 1**: \( p_n'(I_n) > 0 \) and \( p_n''(I_n) \leq 0 \) for all \( I_n \geq 0 \).

**Assumption 2**: \( p_n''(I_n)H_n(I_n) + 2p_n'(I_n)h_n(I_n) + p_n(I_n)h_n'(I_n) < 0 \) for all \( I_n \geq 0 \).

**Assumption 3**: \( h_n'(i) < 0 \) and \( p_n(I_n)h_n(I_n) \) is decreasing in \( I_n \).

Assumption 1 implies that there are positive externalities from the aggregate investment in each region. Assumption 2 ensures that the relevant optimization problem is strictly concave. The first part of Assumption 3 implies that the distribution of ‘good’ firms is necessarily left-tailed. Given this assumption, the level of aggregate investment \( I_n \) coincides the location of the marginal firm. Then the second part of Assumption 3 can be interpreted as stochastic diminishing return: the expected return from the marginal investment decreases in \( I_n \).

Each regional government is interested in the level of aggregate investment in its own region. Since the level of aggregate investment and the measure of firms whose projects are funded coincide, this behavioral assumption reflects the government’s preference arising from political concerns. While several different tools
can be employed to serve the government’s political interest, we will focus only on the loan repayment guarantee program. The guarantee can be explicit as in the loan repayment guarantee backed up by the Credit Guarantee Corporations, or implicit as SMEs may anticipate the government’s bailout in bad times. The implicit guarantee could be a by-product of past experience. As long as the implicit guarantee is anticipated by both the banks and SMEs, there is no difference in their behavior whether the guarantee is explicit or implicit. All the other parties maximize their expected return. The net rate of return on risk-free asset is normalized to zero.

3. Financing without Loan Repayment Guarantee

3.1. The first-best benchmark

Since the externalities do not flow from one region to the other, the first-best outcome can be described separately for each region, which allows us to suppress the subscript $n$ in what follows. The first-best outcome is the aggregate investment level $I^*$ that maximizes the net expected return,

$$R(I) \equiv \int_0^I Ah(i)p(I)di - I = Ap(I)H(I) - I$$  \hspace{1cm} (1)$$

where we recall $H(I) \equiv \int_0^I h(i)di$. Since $R(I)$ is strictly concave by Assumption 2, the first-order necessary and sufficient condition for $I^*$ being an interior optimum is

$$p'(I^*)H(I^*) + p(I^*)h(I^*) = \frac{1}{A}. \hspace{1cm} (2)$$

Since $p(I)h(I)$ is decreasing in $I$ by Assumption 3, the first-best outcome leads to financing all the projects $i \leq I^*$.

3.2. Direct financing

In this section, we briefly show that direct financing leads to aggregate investment below the socially optimal level. The relevant parties in this case are firms
and uninformed investors.\(^{(11)}\) As the analysis is the same for each region, we will drop the subscript \(n\) below. Suppose direct financing takes the form of corporate bond. Also assume that the return is not publicly observable ex post. Otherwise, return-contingent debt contracts should be possible. The implication is that the bond market charges a uniform spread \(s\) over the risk-free rate to all the firms.

The equilibrium in the bond market is determined by two conditions. First, in setting the bond spread, the market conjectures the level of aggregate investment, which turns out to be consistent with the measure of firms whose projects are actually funded. Second, no arbitrage implies that the expected net return from the bond market is zero. In making project choice decisions, firms take the level of aggregate investment and the bond spread as given.

Let \(i_m\) be the marginal firm that just breaks even by undertaking the project. Then

\[
Ah(i_m) - (1 + s) = 0 \quad \text{or} \quad h(i_m) = \frac{1 + s}{A}.
\]  

(3)

Let \(I^d\) be the level of aggregate investment expected by the bond market. Then the equilibrium in the bond market implies

\[
p(I^d)(1 + s) = 1 \quad \text{or} \quad p(I^d) = \frac{1}{1 + s}.
\]  

(4)

An equilibrium is a pair \((I^d, s)\) that satisfies (3), (4), and \(I^d = i_m\), the latter being the consequence of \(h'(i) < 0\). Therefore, the level of aggregate investment in equilibrium is determined by

\[
p(I^d)h(I^d) = \frac{1}{A}.
\]  

(5)

The comparison of (2) and (5) shows that the level of aggregate investment under direct financing is below the socially optimal level. This follows from Assumption 3: since \(p'(I)H(I) + p(I)h(I) > p(I)h(I)\) at all \(I\), we must have \(I^d < I^*\).

\(^{(11)}\) Investors can remain uninformed either because each of them cannot afford the screening cost \(c\) or because the incentive to free-ride on others’ screening activity can be dominant.
Thus direct financing leads to underinvestment since individual firms do not take into account the positive externalities of their investment, $p'(I)H(I)$. This is shown in Figure 1.

— Figure 1 goes about here. —

3.3. Bank financing

Three parties interact in this case. The bank collects funds from investors by issuing deposit contracts, which it provides to firms. As the analysis is the same in both regions, again we suppress the subscript $n$. An equilibrium is $(I, r^D, r^i : i \in [0, I^b])$ such that $I$ is the level of aggregate investment undertaken, $r^D$ is the net interest rate on deposit, and $r^i$ is the net interest rate charged to firm $i$. Whether the bank can charge different $r^i$’s depends, of course, on the bank’s ability to tell apart different firms. Again we suppose that the level of aggregate investment expected by investors is correct in equilibrium.

3.3.1. Bank financing without screening

As a polar case, suppose the screening cost is prohibitively large so that the bank does not screen loan applications. In this case what the bank could do at best is to offer a menu of loan contracts to firms so that different types of firms would self-select intended types of contracts. Given the net interest rate $r^i$ intended for type $i$ firm, these self-selection constraints can be written as

$$Ah(i) - (1 + r^j) \geq Ah(i) - (1 + r^j) \quad \forall i \neq j,$$

or

$$r^i = r \quad \forall i.$$  (6)

Without screening, the bank thus acts as a nondiscriminatory monopolist. Given (6) and the level of aggregate investment $I$, the participation constraints for investors and firms are:

(Investors) \quad p(I)(1 + r^D) \geq 1, \quad \text{or} \quad p(I)(1 + r^D) \geq 1; \quad (7)

(Firms) \quad Ah(i) - (1 + r) \geq 0 \quad \forall i \quad \text{whose project is funded.} \quad (8)
The bank’s profit function is

\[\pi^{ns}(I, r^D, r) = \int_0^I p(I) \left\{ (1 + r) - (1 + r^D) \right\} di\]  

(9)

and the optimization problem is to maximize (9) subject to (7) and (8). At the solution, (7) is binding and (8) is binding for the marginal firm \(i = I\), so that the profit function can be written in terms of \(I\) only:

\[\pi^{ns}(I) = AIp(I)h(I) - I.\]  

(10)

Denote the equilibrium level of aggregate investment by \(I^{ns}\). Then we must have

\[d[p(I^{ns})h(I^{ns})] + p(I^{ns})h(I^{ns}) = \frac{1}{A}.\]  

(11)

Invoking the assumption \((ph)' < 0\), it is clear that the bank financing in this case results in the level of aggregate investment lower than that in direct financing, the interest rate charged to firms higher than the bond spread, and the return to investors higher than the return on bond: \(I^{ns} < I^d\) and \(r > r^D > s\). Again this is shown in Figure 1. The result is to be expected since a nondiscriminatory monopoly leads to a price higher than that under a competitive market. As a result, the level of aggregate investment and the probability of success are lower. Since investors demand a higher premium to compensate for the higher risk, the return on deposit is higher than the competitive bond spread.

3.3.2. Bank financing with screening

If the bank screens loan applications, then it can design discriminatory loan contracts to extract rents that would otherwise accrue to firms. Consider the following timing of moves. The bank first announces the deposit interest rate \(r^D\), its commitment to an all-or-nothing screening schedule,\(^{(13)}\) and the loan interest

\(^{(12)}\) To simplify matters, we assume away the bank’s costs other than the screening cost.

\(^{(13)}\) We assume that the bank commits to screening all loan applications or none at all. After loan applications have been received, the bank carries out screening as committed. With such a commitment, there is the usual problem of time inconsistency: given the bank’s commitment, some firms reveal their types truthfully, which undoes the need to screen loan applications ex post.
rate \( r^i \) for each \( i \) whose loan application has been screened. Given the bank’s announcement, investors make their deposit decisions and firms decide whether or not to apply for loans.

If investors expect the level of aggregate investment \( I \), then the equilibrium deposit interest rate is determined by \( p(I)(1 + r^D) = 1 \). If the bank screens firm \( i \), then it would charge the loan interest rate \( r^i \) such that \( Ah(i) - (1 + r^i) = 0 \). Since the measure of firms applying for loans is equal to \( I \), the cost of screening is \( cI \).\(^{(14)}\) Thus the bank’s problem is to choose \((I, r^D, r^i : i \in [0, I])\) to maximize the following profit function:

\[
\pi^s(I, r^D, r^i) = \int_0^I p(I) \left\{ (1 + r^i) - (1 + r^D) \right\} di - cI \\
= \int_0^I p(I) \left\{ Ah(i) - \frac{1}{p(I)} \right\} di - cI \\
= Ap(I)H(I) - (1 + c)I.
\]

Notice that the above profit function is equal to \( R(I) - cI \) where \( R(I) \) is the net expected return for the first-base case as in (1). Denote the equilibrium level of aggregate investment by \( I^s \). Then it is straightforward to see that \( I^s \leq I^* \) for all \( c \geq 0 \) with equality if and only if \( c = 0 \). The intuition is simple. If the screening cost is zero, then the bank acts as a perfectly discriminatory monopoly, which leads to a socially efficient level of investment. If the screening cost is positive, then the bank charges higher loan interest rates to cover the cost, leading to the level of aggregate investment lower than the first-best one.

Let us now turn to the bank’s screening decision. In the previous section, we analyzed the case of no screening. Denote the equilibrium profit by \( \pi^{ns} \) in case of no screening, and by \( \pi^s(c) \) in case of screening. It is easy to see that \( \pi^s(c) \) is decreasing in \( c \) and \( \pi^s(0) = R(I^*) > \pi^{ns} \). Therefore we have

**Proposition 1:** There is a value of screening cost \( \hat{c} \) such that \( \pi^{ns} = \pi^s(\hat{c}) \).

\(^{(14)}\) Since firms do not enjoy any rent once their loan applications have been screened, firms \( i \leq I \) do not have incentives to apply for loans. Likewise, firms \( i > I \) may apply for loans only to be refused by the bank after screening, which can increase the bank’s screening cost above \( cI \). A slight modification of the model can handle such a problem of indeterminacy. For example, imperfect screening may leave some rent to firms with ‘good’ projects, giving them incentives to apply for loans. In addition, one can introduce a cost for firms in preparing loan applications, which would discourage those firms whose loan applications would be rejected from applying.
(i) For \( c \leq \hat{c} \), the bank screens all loan applications and charges discriminatory loan interest rates. In equilibrium, the level of aggregate investment \( I^s \) is determined by \( R'(I^s) = c \), the deposit interest rate \( r^D \) is determined by \( 1 + r^D = 1/p(I^s) \), and the loan interest rates \( (r^i)_i \) are determined by \( Ah(i) = 1 + r^i \) for all \( i \leq I^s \).

(ii) For \( c > \hat{c} \), the bank does not screen loan applications and charges a non-discriminatory loan interest rate. In equilibrium, the level of aggregate investment \( I^{ns} \) is determined by \( I^{ns}(p(I^{ns})h(I^{ns}))' + p(I^{ns})h(I^{ns}) = 1/A \), the deposit interest rate \( r^D \) is determined by \( 1 + r^D = 1/p(I^{ns}) \), and the loan interest rate \( r \) is determined by \( Ah(I^{ns}) = 1 + r \).

### 4. Financing with Loan Repayment Guarantee

Suppose each regional government introduces a loan repayment guarantee program. The guarantee could be either explicit or implicit. As mentioned before, even in case of implicit guarantee, all that matters is that all the relevant parties anticipate the guarantee to become effective ex post when necessary. We assume that the guarantee program is applicable only when the firm makes a positive return but is unable to meet the loan repayment. Thus firms still face the possibility of bankruptcy with probability \( 1 - p(I) \) if the level of aggregate investment is \( I \).\(^{(15)}\)

In practice, the repayment guarantee implies that the government pays the bank the difference between the loan interest rate and what the firm can pay. For example, if the loan interest rate is \( r \) and firm \( i \)'s return is \( Ah(i) < 1 + r \), then the government pays \( 1 + r - Ah(i) \) to the bank. However, this requires that \( Ah(i) \) be verifiable, which is counter to our assumption. We thus assume that the government pays \( r^g \) regardless of the types of the firms.\(^{(16)}\)

In this sense, the repayment guarantee we study is some hybrid of loan subsidy and repayment guarantee. Notice also that the repayment guarantee is not necessary if the bank

\(^{(15)}\) A blanket guarantee in all contingencies will make the problem of bank financing trivial and is rarely used.

\(^{(16)}\) A more complete approach would be to consider the regional government’s problem of choosing an optimal value of \( r^g \) to achieve its own objective subject to various constraints including the budget constraint of running the repayment guarantee program. An example of the government’s objective is to maximize the number of operating SMEs or, equivalently in the current model, the level of aggregate investment as it will be positively related to the size of the employed electorate in the region.
screens loan applications and charges discriminatory interest rates. Again the analysis is the same for both regions so we will focus on a single region without using the subscript \( n \).

Denote the deposit interest rate by \( r^D \), the non-discriminatory loan interest rate by \( r \), and the level of aggregate investment by \( I \). The guarantee program does not change the participation constraint for investors: \( 1 + r^D = 1/p(I) \). For firms, the participation constraint changes to \( Ah(i) - (1 + r - r^g) \geq 0 \) for all \( i \in [0, I] \). Since the bank’s optimization problem implies that the firm’s participation constraint will be binding only for the marginal firm, we have \( Ah(I) = 1 + r - r^g \). Then the bank’s profit function is

\[
\pi^g(I, r^D, r) = \int_0^I p(I) \left\{ (1 + r) - (1 + r^D) \right\} di \\
= \int_0^I p(I) \left\{ (Ah(I) + r^g) - \frac{1}{p(I)} \right\} di \\
= AIp(I)h(I) + Ip(I)r^g - I.
\] (13)

Note that the above profit function is the same as the one without screening (Eq. (10)) if \( r^g = 0 \). Denote by \( I^g \) the level of aggregate investment that maximizes the profit function in (13), and the maximum profit by \( \pi^g \). Comparing the profit functions in (13) and (10), the following result is immediate.

**Proposition 2**: Suppose \( r^g \geq 0 \). Then, compared to the case without screening and repayment guarantee, the level of aggregate investment is higher \( (I^g \geq I^{ns}) \) and the bank’s profit is larger \( (\pi^g \geq \pi^{ns}) \). As \( r^g \) increases, the level of aggregate investment \( I^g \) increases.

**Proof**: From (10) and (13), we have \( \pi^g(I) = \pi^{ns}(I) + Ip(I)r^g \geq \pi^{ns}(I) \) for all \( I \geq 0 \) with equality if and only if \( r^g = 0 \). The first-order condition for \( I^g \) to maximize (13) leads to

\[
(p(I^g)h(I^g))'I^g + p(I^g)h(I^g) = \frac{1}{A} - \frac{(I^g p(I^g))'r^g}{A} \leq \frac{1}{A}.
\]

Comparing the above with the first-order condition (11) for \( I^{ns} \), we have \( I^g \geq I^{ns} \) since \((ph)' < 0 \). For the second part, observe that \( \pi^g = \pi^g(I^g) \geq \pi^g(I^{ns}) \geq \pi^{ns}(I^{ns}) \).
\( \pi^{ns}(I^{ns}) = \pi^{ns} \) where the first inequality follows from the definition of \( I^g \) and the second inequality is due to \( \pi^g(I) \geq \pi^{ns}(I) \) for all \( I \geq 0 \). The last part follows from totally differentiating the first-order condition for \( I^g \) to maximize (13):

\[
\frac{dI^g}{dr^g} = -\frac{I^g p'(I^g) + p(I^g)}{AI^g(p(I^g)h(I^g))'' + 2A(p(I^g)h(I^g))' - (I^g p(I^g))'' r^g} > 0
\]

since the denominator is negative due to the second-order condition for maximization and \( p' > 0 \). □

The implication of the above proposition is that the loan repayment guarantee increases the level of aggregate investment and the bank’s profit when it does not screen loan applications. This reduces the bank’s incentive to screen loan applications by decreasing the threshold screening cost below which the bank chooses to screen loan applications, were there no loan repayment guarantee. This is shown in Figure 2. Without the loan repayment guarantee, \( \hat{c} \) is the threshold screening cost below which the bank screens loan applications and charges discriminatory interest rates. With the repayment guarantee in place, the threshold screening cost decreases to \( c^g \) and so does the the bank’s incentive to screen loan applications.

— Figure 2 goes about here. —

Two conclusions can be drawn regarding the effect of the loan repayment guarantee. First, it reduces the bank’s incentive to screen loan applications, increasing the potential for non-performing loans. Second, the guarantee induces the bank to finance more projects than it would otherwise do if there were no guarantee. This again increases the potential for non-performing loans. With the (implicit) guarantee withdrawn ex post, more SMEs would be in trouble than when no guarantee was anticipated.

**Corollary:** The loan repayment guarantee reduces the bank’s incentive to screen loan applications, increases the level of aggregate investment and the potential for non-performing loans.

5. Competition and Loan Repayment Guarantee
We now consider the case where each regional bank can enter the other region and compete with the incumbent. In particular we study how the loan repayment guarantee affects the competitive interaction of the banks. To this end, we assume that each regional bank can freely enter the other region and post-entry competition is à la Bertrand. To simplify matters, we assume that the banks face a perfectly elastic supply of deposits at the exogenously given interest rate $r^{D}$ so that they compete only on loan interest rates.$^{(17)}$ Specifically we consider the following timing. Initially each bank decides whether or not to enter the other region. In the region where entry occurred, two banks simultaneously make screening decisions and announce loan interest rates. If entry did not occur, then only the incumbent makes its screening decision and announces loan interest rates. Next, firms choose a bank they prefer and make loan applications. We assume that the two banks share the market equally in case they offer the same interest rates. We also assume that, even if a bank earns zero profit from operation in the region, it chooses to stay in the region possibly for strategic reasons. Moreover, diversifying into a different region may reduce the bank’s portfolio risk even if its expected profit is zero. As the analysis in both regions is the same, we will consider only region 1 and bank 2’s entry decision.

Consider first the case where there is no loan repayment guarantee. Suppose bank 2 entered region 1. An equilibrium consists of the two banks’ screening decisions, loan interest rates offered, and the level of aggregate investment. Suppose first both banks choose not to screen loan applications and offer non-discriminatory interest rates $r_{n}, n = 1, 2$. Then competitive undercutting of each other will lead to $r_{1} = r_{2} = r^{D}$. As neither bank can improve on this outcome unilaterally, an equilibrium in this case consists of no screening, $r_{1} = r_{2} = r^{D}$, and the level of aggregate investment determined by $A_{1} h(I) = 1 + r^{D}$. Suppose now both banks commit to screening loan applications and offer interest rates $r_{n}^{i}$. Note that,

$^{(17)}$ This assumption may not be all that unrealistic. Regional banks have a significant surplus of deposits over loans. Their problem is more of a difficulty to find profitable borrowers, rather than depositors who would patronize the banking service even when the interest rate is close to zero (Shimizu, 2005).

$^{(18)}$ To be precise, post-entry competition is double Bertrand (Stahl, 1988; Yanelle, 1989) in that the banks compete on both the deposit and loan interest rates. Double Bertrand competition will not change our main argument regarding the bank’s entry decision, although it will lead to different equilibrium interest rates.
given the deposit interest rate \( r^D \), the maximum level of aggregate investment \( I \) is determined by \( A_1 h(I) = 1 + r^D \). Suppose \( A_1 h(i) - (1 + r^D_i) = 0 \) for all \( i \leq I \). Then \( r^D_i > r^D \) for all \( i < I \). To this, bank 2’s best response is to undercut \( r^D_1 \) by offering \( r^D_2 \in [r^D, r^D_1) \). Bank 1 then undercuts bank 2, to which bank 2 reacts by further undercutting, which will eventually lead to \( r^D_1 = r^D_2 = r^D \) for all \( i \leq I \). Therefore neither bank has the incentive to screen loan applications. Finally, a similar argument shows that there cannot be an asymmetric equilibrium in which only one bank screens loan applications.

Suppose now the government in region 1 provides the loan repayment guarantee \( r_1^g > 0 \) to its regional bank, i.e., bank 1. If bank 2 enters region 1, then the previous argument shows that bank 2 does not have incentives to screen loan applications. It would offer a non-discriminatory interest rate \( r_2 \). Given this, bank 1 does not screen loan applications either. If bank 1 offers a non-discriminatory interest rate \( r_1 \), then firm \( i \) chooses bank \( n \) by selecting \( \min\{1 + r_1 - r_1^g, 1 + r_2\} \). For any \( r_1^g > 0 \), bank 1 can always match bank 2’s offer and monopolize the loan market. Since bank 2’s minimum loan interest rate is \( r_2 = r^D \), Bertrand competition will lead to bank 1 monopolizing the market by offering \( r_1 = r^D + r_1^g - \epsilon \) for arbitrarily small \( \epsilon > 0 \). Thus bank 2 stays away from region 1. Along the equilibrium path where bank 1 remains as a monopoly in the region, its screening decision will be as described previously. To summarize, the loan repayment guarantee plays the role as an indirect subsidy to the regional bank, thereby tilting the playing field in its favor and deterring potential entrants.

**Proposition 3**: (i) If there is no loan repayment guarantee, then there is a unique symmetric Bertrand equilibrium where neither bank screens loan applications and offers the non-discriminatory loan interest rate equal to the deposit interest rate. (ii) If there is a loan repayment guarantee offered only to the incumbent, then the entry by another bank is deterred, and the incumbent’s screening decision is as in Proposition 1.

6. Conclusion

Despite the sign of rehabilitation in the Japanese banking sector, the problems of regional banks continue to remain as a major concern. The regional bank
problems can be summarized as accumulating non-performing loans, the lack of diversification and attendant portfolio risk, and the absence of effective competition. This paper has argued that the regional bank problems should be addressed in conjunction with the financing of regional SMEs and the political interests of the central and regional governments. The political interests may necessitate funding suboptimal investment projects of regional SMEs and keeping non-performing SMEs alive. Through close ties with regional banks, the governments can influence the banks’ financing decisions either explicitly or implicitly. In particular, the loan repayment guarantee has been shown to reduce the bank’s incentives to screen loan applications, lead to more investment projects being financed than without the guarantee, and harm competition by deterring entry of other banks.

We conclude the paper by offering some discussions on policy implications. As has been stressed, at the core of the problem lies small and medium enterprise financing and accompanied political interests. If the political interests can be set aside, then an obvious solution might be to remove the loan repayment guarantee, both explicit and implicit, and let the market mechanism work. However, this may go against the main reasons for supporting SMEs in the first place.\(^{(19)}\) One could argue, however, that the loan repayment guarantee is not the best way to provide a safety net to SMEs as the guarantee distorts regional banks’ incentives to screen and monitor, much akin to the behavior of foreign investors during the Asian crisis of the late 1990s. While we have not modelled the details of SMEs’ operation, it is easy to understand that the guarantee could also lead to moral hazard on the part of SMEs. Instead of the loan repayment guarantee that creates distortion at regional banks, the government can deal directly with SMEs by using non-distortionary policy measures such as lump-sum grant or direct provision of necessary resources. The crucial point is that the support of SMEs should be direct

\(^{(19)}\) The support of SMEs is due to the vital roles SMEs play for the Japanese economy: they create new businesses, promote market competition, provide job opportunities, and vitalize regional economy. On the other hand, they may lack necessary resources, management expertise, etc., and be more prone to adverse business conditions compared to larger firms. Accordingly, the “Small and Medium Enterprise Basic Law” was enacted in 1963 mainly to promote the growth and development of SMEs, and correcting the economic and social disadvantages of SMEs. In the 1999 Amendment of the Law, the focus has been shifted and SME policy stands on three pillars: promoting business innovation and start-ups; strengthening the management base of SMEs; and facilitating adaptation to economic and social changes. The last pillar provides justification to such policy measures as the credit guarantee.
as much as possible and separated from regional banks. That way, the distortions at the level of regional banks mentioned above can be avoided.

As for regional banks, our analysis shows the importance of improvement in banking technology, which, in our model, can be understood to reduce screening costs. This would increase the banks’ incentives to screen and price loans according to accompanied risks, thereby leading to a more efficient allocation of financial resources. Nevertheless, regional banks’ operation lacks regional diversification, raising their portfolio risk as a concern. To some extent, regional banks may be able to reduce their portfolio risk by branching into other regions. The flip side is that competition following branching may erode their bottom line, endangering the stability of the regional banking system. An alternative is consolidation among regional banks. While some argue that banking consolidation is harmful for small businesses since larger banks tend to target larger borrowers due to organizational diseconomies, empirical evidence is mixed. While more work needs to be done, what is certain is that larger, consolidated regional banks would not shun profitable regional SMEs simply for the sake of size. As argued by Berger et al. (2005), what matters in the relationship between bank consolidation and SME financing is not the size but rather the organizational structure of the consolidated bank.

References


(20) Some regional banks have been innovative in embracing new technologies, even outpacing the big city banks. In 2000, Fukuoka Bank and Hiroshima Bank crunched together their computer systems, combining Fukuoka’s accounting system with Hiroshima’s investment system. Other banks have been invited to join the venture, which is expected to cut systems costs by one-third (“Outsmarting their city cousins”, The Economist, April 4, 2002).

(21) The relationship between competition and financial stability is by no means straightforward: competition may or may not decrease stability. See, for example, Allen and Gale (2000, 2003).

(22) See, for example, Berger et al. (1999) for a review.

(23) Berger et al. (1998) show that small business lending decreases after banking consolidation. Peek and Rosengren (1998), and Strahan and Weston (1998) show it is not necessarily the case.


Table 1: Total Outstanding Loan to SMEs (at the end of December 2003)

<table>
<thead>
<tr>
<th>Financial Institutions</th>
<th>Total outstanding loans to SMEs (trillion yen)</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Private Financial Institutions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City Banks</td>
<td>79.2</td>
<td>30.45</td>
</tr>
<tr>
<td>Main Regional Banks</td>
<td>66.8</td>
<td>25.68</td>
</tr>
<tr>
<td>Secondary Regional Banks</td>
<td>23.7</td>
<td>9.11</td>
</tr>
<tr>
<td>Trust Banks and Long-term Credit Banks</td>
<td>12.6</td>
<td>4.84</td>
</tr>
<tr>
<td>Shinkin Banks</td>
<td>41.8</td>
<td>16.07</td>
</tr>
<tr>
<td>Credit Cooperatives</td>
<td>9.2</td>
<td>3.54</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>233.3</td>
<td>89.70</td>
</tr>
<tr>
<td><strong>Government Financial Institutions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan Finance Corporation for Small &amp; Medium Enterprise</td>
<td>7.6</td>
<td>2.92</td>
</tr>
<tr>
<td>National Life Finance Corporation</td>
<td>9.2</td>
<td>3.54</td>
</tr>
<tr>
<td>Shoko Chukin Bank</td>
<td>10.0</td>
<td>3.84</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>26.8</td>
<td>10.30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>260.1</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Small and Medium Enterprise Agency (http://www.chusho.meti.go.jp)
Figure 1: Aggregate Investment Levels under Various Financing Arrangements
Loan screening with repayment guarantee

Figure 2: Loan Repayment Guarantee and the Bank’s Incentives to Screen Loan Applications