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ABSTRACT

As a result of deregulation, there was a dramatic shift during the 1980s in Japan away from bank debt financing towards public debt financing: in 1975, more than 90% of the corporate debt of public companies was bank debt; in 1992 it was less than 50%. This paper presents a theory of the choice between bank debt and public debt and then examines the theory using firm-level data on borrowing sources in Japan. We find that high net worth companies are more prone to use public debt. We also find that the more successful members of industrial groups (or *keiretsu*) and less successful owner-managed firms tended to access the public debt markets. We offer a number of interpretations of these results in light of the theory.

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1. Introduction

Why do some firms borrow from banks and non-bank intermediaries, while others rely more heavily on public debt markets? Why are banks such an important source of financing in some countries, but less so in others? These questions are crucial for understanding corporate financing decisions, but they raise broader issues as well: how shocks to the banking sector affect the real economy; how monetary policy is transmitted; and how financial regulation affects the allocation of credit.

Despite the long-standing interest in these broader issues, there still only a limited understanding of the basic role of financial intermediaries. In this paper, we try to contribute with both theory and evidence. We offer a simple theoretical model of the choice between intermediated ("bank") and direct ("public") debt financing[2] and then present firm-level empirical evidence on the choice between bank debt and public debt. Our evidence is from Japan, where capital market deregulation in the 1980s has led to a dramatic shift away from bank debt towards public debt. The result has been a decline in the bank debt of public companies from more than 90% of corporate debt in 1975 to less than 50% in 1992.

The principal contribution to the theory of financial intermediation is the work Diamond (1984, 1991, 1992). Diamond (1984) shows that intermediation saves on monitoring costs. The alternative to intermediation — direct financing from individual investors — is inefficient either because monitoring costs are needlessly duplicated among individual lenders; or because monitoring is a public good that no one has an incentive to provide.

Diamond (1991) builds on the idea that banks are the most efficient corporate monitors. His model predicts that young companies, and older ones that have done poorly, will borrow from banks, while older, more successful companies will issue public debt. The reason is that older, successful companies have more "reputational capital" at stake; bank monitoring

[2]We use the term bank debt and private debt interchangeably even though private debt is often held by non-bank intermediaries such as insurance companies. The distinction between the two is not crucial for our analysis, but it is crucial for understanding the effects of monetary policy and financial regulation. See Kashyap and Stein (1993) for more discussion of their point.

is unnecessary because these firms have more to lose from being inefficient. By contrast, younger companies have not yet developed a reputation, and older, less successful companies have no reputation to lose. These firms need to be monitored.

We present a model that is generally consistent with Diamond's, but develops other empirical implications. The basis of our model is the idea that managers and shareholders may not completely agree about the kinds of investments that should be taken. In particular, we assume that managers can choose to take good projects with high financial payoffs or bad ("pet") projects with low financial payoffs, but with other benefits that only managers enjoy. We get a very different set of implications depending on how much managers care about maximizing shareholder value.

If managers place a lot of weight on shareholder concerns – an assumption implicit in Diamond's model – then we show that firms with more attractive investment opportunities (say, as measured by a high level of Tobin's Q) will be more prone to use public debt to finance investment. The reason is that managers of firms with very attractive investment opportunities will find it costly to forego these opportunities in order to take one of their pet projects; they do not need to be monitored by a bank to ensure efficient investment and will issue public debt instead. By contrast, firms with less attractive investment opportunities will only invest efficiently if they are monitored. Provided they care enough about shareholder value they will want to commit to invest efficiently by borrowing from a bank and being monitored. Thus, bank debt financing should be decreasing in Tobin's Q.

The model also implies that firms with high net worth — those with valuable assets in place or low leverage — will use public debt financing. Because they risk this net worth when they invest, the managers of these firms have a greater incentive to invest efficiently. Thus, the theory predicts that firms with good performance, valuable investment opportunities, or valuable assets are more prone to use public debt, while other firms will rely more heavily on bank financing.

These predictions are driven by the same considerations emphasized by Diamond: namely, managers that need the least monitoring — those with good investment incentives — are the most likely to issue public debt. Indeed, this idea is implicit in most accounts of the development of public capital markets: the most capitalized, most creditworthy, and most well-run firms are best suited for, and most likely to use, public debt rather than bank debt. This is why we see active public debt markets in only the most developed economies.

This basic story relies heavily on the assumption that managers place a lot of weight on shareholder value, which leads them to choose the source of financing that results in the most efficient investment. The assumption is reasonable in many instances: when there is a takeover threat; when there is effective oversight from large shareholders; or when there is a vigilant board of directors. If, however, these disciplinary mechanisms break down, and managers do not care much about shareholder value, then managers may well choose the source of financing that frees them to take their pet projects. Public debt financing, in this case, is a way of insulating management from monitoring. The managers of firms with the worst investment opportunities are also the ones that benefit least from being forced to invest efficiently. We therefore might also expect to see firms with low values of Tobin's Q issuing public debt — just the opposite of what we would see if managers place a lot of weight on shareholder value.

This prediction is related to Jensen's (1986) theory of free cash flow and leverage. His basic argument is that empire-building managers can be disciplined, and shareholder value maximized, by increasing a company's leverage — limiting the free cash flow available for wasteful investment. The problem is that empire building managers will have every incentive to keep leverage low to ensure that they can invest wastefully. The only reason that managers might choose to bond themselves through higher leverage is if they care about shareholder value — say because the firm is a takeover target. Similarly, in our model, managers will only choose to discipline themselves through bank monitoring, if they care enough about

shareholder value.

To investigate these predictions, we study the Japanese economy, where banks have been a much more important source of financing than in the (post-war) U.S. economy. In part, this reliance was due to a regulatory environment that made public debt issues difficult. These regulations were relaxed considerably during the 1980s and resulted in a dramatic shift away from bank financing towards more direct financing.

This period of deregulation provides something of a "natural experiment" for analyzing the choice between public and private debt financing. The typical problem with studies of financing behavior is that capital structure and firm characteristics are determined simultaneously, which makes causal inference almost impossible. However, in this sample, prior to deregulation, one can reasonably argue that financing choices were independent of firm characteristics — all firms had to use bank debt. Thus, one can avoid the standard simultaneity problems by using pre-deregulation firm characteristics as explanatory variables for post-deregulation financing choices.

Using this approach, we find that high net worth firms have been the most aggressive in reducing their reliance on bank debt. We find a mixed set of results regarding the effects of Tobin's Q. For the baseline sample we analyze, there appears to be no significant link between Tobin's Q and the source of financing. This is not surprising in light of the theory's ambiguous implications: for some firms (those where managers place a lot of weight on shareholder concerns), bank debt should be decreasing in Tobin's Q; for others (those where managers place little weight on shareholder concerns), bank debt should be increasing in Tobin's Q. If the sample is a mixture of the two sets of firms, it would be hard to find an empirical relationship.

We do, however, find an empirical link between Tobin's Q and bank debt once we take into account whether a firm is a member of an industrial group (or *keiretsu*). We find that bank debt financing is decreasing in Tobin's Q for group firms, but that there is a weak

positive relationship between bank debt and Tobin's Q for non-group firms. Among other interpretations, this result is consistent with the view that the managers of group firms tend to place more weight on shareholder value, perhaps because they have more active large shareholders. We also find the opposite relationship between bank debt and Tobin's Q for firms whose managers have large ownership stakes — low Q, owner managed firms are more prone to issue public debt. This finding is consistent with the view that owner-managers are more entrenched than non-owner managers and use public debt financing to avoid bank scrutiny.

The remainder of the paper is organized as follows. The next section presents a model that brings out the points discussed above. Section 3 discusses the regulatory changes in Japan that gave rise to the dramatic changes in corporate financing arrangements. We describe our data and sample selection procedure in Section 4. Our empirical results are presented in Section 5. Section 6 contains a conclusion.

2. Modelling the Choice Between Public and Private Debt

In this section, we present a simple model that generates predictions regarding the types of firms that borrow from banks and the types that borrow from public debt markets. The cornerstone of the model is the idea that it is more efficient for a financial intermediary to monitor a firm than for numerous individual lenders to monitor. The standard argument rests on the idea that if debt is diffusely held — say because lenders wish to diversify — then no individual lender has an incentive to bear the private costs of monitoring, an activity that benefits all other lenders. But, by pooling the resources of many depositors and lending to many firms, banks can hold a substantial piece of a firm's debt, yet enable investors to diversify. This overcomes the free-rider problem, giving banks the proper incentives to monitor.

While the argument is appealing — and in the end correct — it is incomplete. Since banks manage the money of others, one must ask whether banks themselves have incentives

to monitor firms. That is, who monitors the monitor? Diamond (1984) addresses this important question. In his model, there are two ways of controlling incentive problems: monitoring and contracting. An important feature of principal-agent contracting problems is that if there is little underlying uncertainty, then an agent's performance is closely linked to his behavior. Thus, agents bear little extraneous risk and they can be given high-powered incentives, which results in efficient behavior. In the context of financial markets, this means that depositors can use contracts (i.e., debt) to induce diversified banks (who are exposed to little uncertainty) to monitor at low cost, which in turn induces efficient firm behavior. By contrast, direct corporate lending by individuals leads to relatively inefficient behavior because corporate borrowers are riskier than diversified banks.[3]

Rather than model the contractual and monitoring relationships among depositors, banks, and firms, we take as given the implications of Diamond's (1984) model and simply assume that banks have an incentive to monitor, while individual lenders do not. This is the approach taken in Diamond's (1991) more recent work on private versus public debt.

To start, consider a firm with total assets of A_T, of which A_C are tangible, collateralizable assets. The remaining assets can be thought of as intangible assets such as R&D projects in process. We assume that the firm has existing debt of D_E, but that $D_E < A_C$, so that it is riskless. One can also think of $A_C - D_E$ as the firms' collaterizable net worth.

Potential investment projects generate financial payoffs of π to shareholders, as well as "private" benefits, β, that only the manager enjoys. We assume that the manager is risk neutral and his expected utility is a weighted average of the firm's financial payoffs and the private benefit. We let $\alpha \in [0, 1]$ be the weight on the financial payoffs, so that the manager's expected utility can be written as $\alpha\pi + \beta$. The parameter α is presumably

[3]The notion that it is safer to lend to banks than to firms may strike some as odd in light of recent bank failures in the United States. But, Diamond's (1984) model does not include deposit insurance, which destroys depositors' incentives to penalize banks (through higher deposit rates) if the bank makes bad loans. Diamond's model is a better description of non-bank financial intermediaries such as finance companies which raise financing from uninsured creditors. These finance companies seem to have fewer problem loans than insured banks.

positively related to the perceived threat of a takeover, or removal by large shareholders.[4] If $\alpha = 1$, the manager maximizes total value (monetary payoffs plus private benefits). If $\alpha = 0$, the manager only cares about his private benefit.

We assume that there are two types of projects in which the manager can invest. Both require an initial outlay of F and both have positive net present value. Project i pays off X with probability p_i and zero with probability $1 - p_i$, $i = 1, 2$. Project 2 has higher expected financial payoffs than Project 1: $p_2 > p_1$. However, the manager's private benefit, β, is $B > 0$ from Project 1, but nothing from Project 2.[5] We assume that it is always socially efficient to undertake Project 2:

$$(p_2 - p_1)X > B; \tag{1}$$

the extra expected financial returns from taking Project 2 exceeds the managerial benefit of Project 1.

It will be useful for our later analysis to normalize the private benefit, B. Thus, suppose that B is proportional to the scale of the project, F, and that the scale of the project is proportional to the size of the firm, A_T. Taken together, these assumptions mean that B is proportional to the size of the firm: $B = bA_T$, where $b > 0$.

Our approach to analyzing the model is as follows. First, we consider the manager's project choice when there is no monitoring. Depending on the parameter values of the model, the manager may prefer Project 1 over Project 2 or vice versa. In cases where the manager prefers the better project (Project 2), then the model implies that the manager would issue public debt and not be monitored. Then, we consider what happens if the manager would prefer the worse project absent any monitoring. We show that in some situations the manager

[4]Hostile takeovers are less common in Japan than in the United States, but Kaplan (1992) finds that managerial turnover rates are equally sensitive to performance in the two countries. An alternative assumption is that α could represent the fraction of the firm's equity held by the manager. As we will see later, however, one problem with this interpretation is that managers with a lot of equity can become entrenched and place *less* weight on shareholder concerns. See Morck, Shleifer and Vishny (1988).

[5]Alternatively, one could assume that the manager needs to take "effort" to do Project 2.

will choose to issue public debt anyway, thereby avoiding any monitoring and enabling him to take his pet project. In other cases, the manager will choose to borrow from a bank, i.e., commit to being monitored and taking the good project. The model allows us to explore how firm characteristics affect which of these outcomes occur.

First, to see that (absent monitoring) it is possible that the manager might prefer either project, suppose that the firm borrows F, promising to repay D. (The interest rate is therefore $\frac{D}{F} - 1$). If the firm defaults on its old and new debt, debtholders can liquidate all of the collateral, A_C. We assume that the existing debt is senior to the new debt. Then, the manager's payoff from taking Project 1 is:

$$\alpha\{p_1[X - D + A_T - D_E] + (1 - p_1)[A_T - A_C]\} + bA_T.$$

The manager's payoff from Project 2 is:

$$\alpha\{p_2[X - D + A_T - D_E] + (1 - p_2)[A_T - A_C]\}.$$

Therefore, the manager will make the socially efficient choice provided:

$$\alpha(p_2 - p_1)[X - D - D_E + A_C] \geq bA_T. \tag{2}$$

The critical question is whether the condition is satisfied at the value of D that earns zero profits for the new debtholders. If debtholders assume that the manager will choose Project 2, and if the old debt is senior to the new debt, the debtholders' zero- profit condition can be written as:

$$p_2 D + (1 - p_2)(A_C - D_E) = F. \tag{3}$$

Solving for D and substituting into condition (2), implies that the firm will indeed choose Project 2 if:

$$\frac{\alpha(p_2 - p_1)}{A_T}\left[X - \frac{F + D_E - A_C}{p_2}\right] \geq b \tag{4}$$

Note that even though it is socially efficient to take Project 2, i.e. $b < \frac{(p_2 - p_1)X}{A_T}$, (4) may not hold and Project 1 could be taken instead. There are two reasons why. First, if

$\alpha < 1$, the manager places too little weight on monetary payoffs and too much weight on the private benefit. Second, even if $\alpha = 1$, so that the manager maximizes total value, $\pi + \beta$, the existence of the private benefit can still induce the manager to choose Project 1. In order to finance the project, the manager has to pay out extra of cash flow in the good state to compensate creditors for their losses in default. Thus, the manager keeps little of the financial upside from Project 2, but does keep all of the private benefit from Project 1. This difference in the manager's ability to appropriate financial and private returns distorts the manager's project selection to the inefficient project.

In the case where inequality (4) holds, the manager will have the proper incentives to take the good project. Accordingly, there is no reason to try to alter managerial decisions through bank monitoring; the manager issues public debt and makes efficient investment decisions.

If the inequality (4) fails to hold, public debtholders will require a higher repayment. To see this, note that absent any monitoring the firm would choose Project 1 and debtholders would choose a level of D, say D_1, such that:

$$p_1 D_1 + (1 - p_1)[A_C - D_E] = F. \tag{5}$$

At this value of D_1, the manager would indeed choose the inefficient Project 1 and his payoff would be:

$$\alpha\{p_1 X + A_T - D_E - F\} + bA_T \tag{6}$$

Thus, in a world without bank monitoring, there could be two outcomes: firms borrow from the public debt market and choose Project 2 if (4) holds; or borrow from the public debt market and choose Project 1 if (4) does not hold.

Bank monitoring introduces a third possibility. One can think of monitoring as the process of ensuring that the good project gets taken. For example, this could be achieved by writing a detailed contract that specifies how the loan proceeds should be used. We suppose

that such monitoring is costly: the lender pays m to ensure that Project 2 is chosen. As discussed above, if there are many investors, none has an incentive to pay this monitoring cost. The only way to overcome this free-rider problem is to concentrate the debt in the hands of a few investors. Bank borrowing is one response to this problem. Depositors put their money in banks, who then lend to and monitor corporate borrowers.

Thus, suppose that the manager chooses to borrow from a bank who monitors. The repayment on this loan, which we denote by L, is set such that:

$$p_2 L + (1 - p_2)[A_C - D_E] = F + m. \tag{7}$$

The manager's payoff is therefore:

$$\alpha\{p_2 X + A_T - D_E - F - m\}. \tag{8}$$

Thus, comparing (6) and (8), the manager chooses to borrow from a bank and be monitored provided:

$$\frac{\alpha(p_2 - p_1)}{A_T}\left[X - \frac{m}{p_2 - p_1}\right] \geq b. \tag{9}$$

If the inequality is reversed, the firm issues public debt. Taken together, conditions (4) and (9) generate a set of predictions about when firms will issue public debt rather than bank debt. Firms issue public debt if either (4) holds or (9) does not hold. These conditions can be rewritten as:

$$\frac{p_2 X}{A_T} \geq \frac{p_2 b}{\alpha(p_2 - p_1)} + \frac{F}{A_T} - \frac{A_C}{A_T} + \frac{D_E}{A_T} \tag{10}$$

or

$$\frac{p_2 X}{A_T} \leq \frac{p_2 b}{\alpha(p_2 - p_1)} + \frac{p_2 m}{(p_2 - p_1)A_T}. \tag{11}$$

If, in addition, $F - A_C + D_E > \frac{p_2 m}{(p_2 - p_1)}$ - i.e. monitoring costs are not too large - then the firm will issue bank debt provided:

$$\frac{p_2 b}{\alpha(p_2 - p_1)} + \frac{p_2 m}{(p_2 - p_1)A_T} \leq \frac{p_2 X}{A_T} \leq \frac{p_2 b}{\alpha(p_2 - p_1)} + \frac{F}{A_T} - \frac{A_C}{A_T} + \frac{D_E}{A_T} \tag{12}$$

From now on we assume that monitoring costs are not too large so that the interval around $\frac{p_2 X}{A_T}$ specified in (12) exists. The above conditions are written with an empirical interpretation in mind. The expression, $\frac{p_2 X}{A_T}$, is related to Tobin's Q, the market value of the investment opportunity divided by the replacement cost of the existing assets.[6] The expression, $\frac{A_C}{A_T}$, is the proportion of the firm's assets that are collateralizable. Finally, $\frac{D_E}{A_T}$, is the firm's leverage ratio.

The model therefore can predict a non-monotonic relationship between Tobin's Q and bank debt. At high levels of Tobin's Q, the investment project is so attractive that the manager would have sufficient incentive to invest in Project 2 so that no monitoring is needed. At intermediate levels of Tobin's Q, however, the manager has no such incentive unless he borrows from a bank and is monitored. In this region, he prefers bank borrowing to issuing public debt and investing inefficiently; the added value of Project 2 is high enough to offset the bank's monitoring costs and the foregone private benefit. But, at low levels of Tobin's Q, the manager prefers to issue public debt and take his pet project because he loses little from not taking the good project.

The model also has implications regarding collateral and leverage. From condition (10) it is clear that firms are more prone to issue public debt if more of the firm's assets can be used as collateral. This is because when collateral is valuable, debt issues (of any type) are relatively safe and the repayment in the good states is lower. The manager therefore receives more of the cash flow benefits of the project and is less likely to choose Project 1. Bank monitoring is less crucial in inducing efficient project selection.

Finally, the model implies that highly leveraged firms are more prone to borrow from banks. Since new debt is relatively risky, the manager receives less of the cash flow benefits

[6]This correspondence between Tobin's Q and $\frac{p_2 X}{A_T}$ is not exact. One might include A_C in the value of the firm and thus define Tobin's Q to be $\frac{p_2 X + A_C}{A_T}$. Or, one might focus on the notion of marginal Q and define it to be $\frac{p_2 X}{F}$. Since we use the model simply to motivate our empirical analysis and do not estimate the parameters, the exact relation between Tobin's Q and the variables in the model is not critical.

from Project 2, and is therefore more prone to choose Project 1. It is more likely that bank monitoring is needed to get around this problem. Taken together, these results imply that high net worth firms are more prone to issue public debt.

These points can be seen more clearly by referring to Figure 1. On the horizontal axis we plot net worth, $\frac{A_C - D_E}{A_T}$, and on the vertical axis we plot Tobin's Q (or more precisely, $\frac{p_2 X}{A_T}$). The horizontal line is given by (11), while the sloped line is given by (10). The figure indicates that there are three regions to consider. Holding net worth fixed, an increase in Tobin's Q move the firm from the public debt region, to the bank debt region, and back to the public debt region. In addition, if Tobin's Q is not too small, increases in net worth, move the firm from the bank debt region to the public debt region.

In general, all three regions need not exist. If α is large and m is small, the lower bond financing region may not exist; because managers place so much weight on shareholder concerns and monitoring costs are low, they would never find it in their interest to issue public debt to take their pet project. In this case, we would expect to see a monotonic, decreasing relationship between bank debt financing and Tobin's Q. By contrast, if α is small, the upper bond financing region may not exist. If managers care little about shareholder value, they never have incentives to invest efficiently unless banks force them to do so. In this case, we would expect to see a monotonic, increasing relationship, between bank debt financing and Tobin's Q. Only for intermediate values of α, would we see non-monotonicities. We now use these insights to study the changes in Japanese borrowing patterns.

3. The History of Financial Deregulation in Japan

Through the mid-1970s Japanese bond markets were subject to stringent regulations. Interest rates were fixed below market rates and bond issues were severely restricted. The secondary markets for bonds were virtually non-existent, and almost all bonds were bought by financial institutions. Financial institutions also played an active role in regulating the bond markets as members of the Bond Issuance Committee (Kisaikai). The committee.

which consists of the big four securities firms (Nomura, Daiwa, Yamaichi, and Nikko) and other financial institutions in their capacity as bond trustees, determined eligibility of issuers through a detailed set of accounting criteria called the *Tekisai Kijun* (Bond Issue Criteria).

Given artificially low interest rates, demand for credit typically exceeded supply. Credit was rationed in the following way. First, bonds issued by long-term credit banks were all privately placed among financial institutions and were not subject to rationing. Second priority was given to government bonds and those issued by government-owned companies. Finally, if there was a sufficient supply of credit, private (i.e., not government-owned) companies were allowed to issue bonds provided they cleared the Bond Issue Criteria. Since the criteria favored large companies, by virtue of their size, electric utilities often ended with priority over manufacturing firms. Thus, a manufacturing firm that wanted to issue bonds, first had to clear the Bond Issue Criteria, and then hope that the supply of credit exceeded the demand for credit by the government, banks and electric utilities. Firms could not get around this rationing by issuing bonds abroad; access to foreign markets was severely restricted by the Foreign Exchange Law.

This regulatory environment changed in the late-1970s as the government began to run deficits because of slower economic growth and the expansion of the Social Security System. It proved impossible to finance these deficits in the old system in which banks and other financial institutions informally agreed to hold low-yielding government debt. Financial institutions demanded deregulation of interest rates and the creation of a secondary market for government debt. The creation of a government debt market then opened the door at the end of the decade for an expanded, less regulated, corporate debt market.

By the late 1970s, the Bond Issuance Committee stopped regulating interest rates but did continue to enforce the Bond Issue Criteria (Goto (1986), pp.111-112). Companies were also allowed to issue equity-linked bonds in addition to straight bonds. Both convertible bonds and warrant bonds became popular financing instruments during the 1980s. Com-

panies were also gradually permitted to access foreign bond markets. In 1980, the Foreign Exchange Law Reform allowed firms to issue bonds in foreign markets without explicit governmental approval. Restrictions on unsecured debt issues were also weakened during the 1980s. In 1979, only two firms satisfied the Bond Issue Criteria for domestic issues of unsecured straight bonds and unsecured convertible bonds. By 1989, about 300 companies were eligible to issue unsecured straight bonds and 500 companies were eligible to issue unsecured convertible bonds (Nomura Securities (1989)).

Collectively, these changes led many firms to substitute public sources of financing for bank borrowing as Figure 2 shows. Figure 2a plots the ratio of bank debt to total debt for all companies listed in the Tokyo Stock Exchange. The move away from bank financing accelerates in 1983 and levels off by 1990 to its current ratio of approximately 50%.

Of course, not all firms reacted to deregulation in this way; some firms accessed the public debt markets, while others continued to borrow from banks. Thus, the decade of transition provides an opportunity to investigate empirically the factors that influence the choice between bank debt and public debt. By examining individual firms' responses to deregulation, we can analyze how net worth and investment opportunities affect the source of financing.

4. Data

The starting point for our analysis is the data set of 580 Japanese manufacturing firms analyzed by Hoshi and Kashyap (1990). The Hoshi-Kashyap sample consists of all manufacturing firms that were (continuously) listed on the Tokyo Stock Exchange from April 1964 to March 1989 and were involved in neither a merger nor a spin-off. By focusing on this sample, we are able to ensure that a firm's accounting information is consistent over time. We updated the Hoshi-Kashyap data to include information on firms' capital structures as of March of 1992. We also excluded 44 firms that had no debt in either 1982

or 1992, reducing the sample to 536 firms.[7] The Data Appendix contains a more complete description of the data.

The average ratio of bank debt to total debt for these 536 firms is shown in Figure 2b. The figure suggests that the initial Hoshi- Kashyap sample is fairly similar (at least in this respect) to the universe of manufacturing firms listed on the Tokyo Stock Exchange.

Unfortunately, we are unable to use all of these 536 firms in the analysis. Although the Bond Issue Criteria were substantially relaxed during the 1980s, some restrictions were in effect until 1990 (when the accounting criteria were dropped and replaced by a single bond-rating criterion). Table 1 shows the evolution of one set of Bond Issue Criteria over the 1980s, those for domestic secured convertible bonds. (These same criteria were used to determine issuance in foreign markets, although in these markets collateral was not needed. See Industrial Bank of Japan (1987), p.258; Taiyo Kobe Mitsui Bank (1990), p.25.) As the table shows, the criteria were relaxed three times during the 1980s, but the accounting criteria were still in place even at the end of the 1980s. One can see that these criteria made it easier for larger, less leveraged, and financially healthier firms to issue bonds.

The bond issuing criteria raise empirical problems. A finding that well collateralized, low leverage, and highly profitable firms are more prone to issue public debt, could simply follow from those firms being the only ones that were eligible to issue. Thus, to deal with this problem we try to restrict the sample of firms to those with similar financing options. While restricting the sample to firms with *identical* options is the only surefire way to avoid spurious correlation, such a strategy also has a drawback: the sample would be so limited that any statistical inference would be difficult.

To balance the competing goals of having a sample of firms with roughly similar choices, yet one large enough to analyze, we restrict our attention to the firms that were allowed to

[7] We eliminated these firms because we are studying how the bank debt to total debt ratio in 1992 is influenced by several variables including the ratio in 1982. For firms with no debt, we cannot calculate either of these ratios.

issue convertible bonds in every year from 1982 to 1989. There are 112 such firms, which we refer to as Sample 1.

We focus on these firms because convertible bonds were a principal source of public debt financing throughout the decade, accounting for about 58% of all bonds issued in 1983 and close to half of all issues in each year from 1984 to 1989. Although warrant bonds issued in foreign markets were also an important source of debt financing during the 1980s, many were issued with bank guarantees. For our purposes, these bonds are similar to bank borrowing in that banks presumably have strong incentives to monitor because they must pay off bondholders if the firm defaults. Thus, we view the sample of 112 firms as the largest possible collection of firms that might reasonably be considered to have a well-specified, feasible alternative to bank financing.

To highlight the importance of controlling for the differences in the availability of financing instruments, Figure 3 compares the ratio of bank debt to total debt for these 112 firms with the remaining 424 firms whose financing choices were more restricted. Not surprisingly, the experiences of the two sets of firms have been very different. The firms that were eligible to issue convertibles throughout the decade, tended to shift their financing away from bank debt, so that by 1992 only about 30% of their debt was bank debt.[8] By contrast, the other firms continue to be more reliant on bank financing.

For robustness, we also analyze a subset of these 112 firms that, in addition, were eligible by 1989 to issue domestic *unsecured* convertible bonds. These 68 companies, which we refer to as Sample 2, had even fewer restrictions on their financing options. Thus Sample 2 should be even less susceptible to the inference problems that might arise because of variations in firms' financing options.

[8]These ratios and those reported in Figure 2 were calculated by adding up all of the bank debt for the firms and dividing by all of the debt for the firms. This weighted average, therefore, differs from the average of each firm's ratio of bank debt to total debt, which we report in Table 2.

5. Empirical Findings

Our objective in this section is to investigate the factors that make public debt financing attractive to some firms but not to others. These factors include those outlined in the theoretical model above as well as some idiosyncratic features of the Japanese system. Our basic approach is to regress the 1992 bank debt ratio (i.e the ratio of bank debt to total debt) on a number of firm characteristics in 1982. There are three important points to note about this specification.

First, by using firm characteristics from 1982 — before most of the important deregulation — we reduce simultaneity problems that typically plague empirical studies of capital structure. The standard criticism of these studies is that the explanatory variables are themselves determined by capital structure choices. Thus, one can uncover correlations in the data, but not infer any causal links. In this study, however, the explanatory variables are lagged ten years, to a period when firms could not freely issue public debt. It is difficult to argue that these variables were in any way determined by the firm's decision to use bank debt or public debt; essentially all firms had to borrow from banks.

We view this as the principal advantage of studying the impact of deregulation. Of course, the cost of lagging the explanatory variables by ten years will be some loss of power. Changes that occurred after 1982 could be helpful in explaining why a firm issued public debt in 1986, but we would be throwing away this information. We opt to err on the side of caution.

Second, we choose not to model the dynamics of a firm's financing behavior. Instead, we are assuming that by 1992 firms have fully adjusted to the deregulation that began 10 years earlier and that they have reached their "target" bank debt ratio. Based on the aggregate data, this would not seem to be an unreasonable assumption: there is a rapid decline in the bank debt ratio until 1990, after which it levels off at about 30%.[9]

[9]If we were trying to analyze the determinants of debt versus equity financing this static approach might be more problematic. The work of Auerbach (1984), MacKie-Mason (1990) and Shyam-Sunder and Myers

Finally, our empirical analysis does not take into account that many of the bonds that were issued during this period were convertible into equity. Thus, the shift away from bank debt was also a shift towards equity-linked debt instruments such as convertible and warrant bonds. This raises the concern that some of the firm characteristics that might explain public debt issuance also might explain the issuance of convertibles and warrants. We take up this issue in Section 5.[10]

5.1 Basic Regressions

Our initial regressions focus on the explanatory variables suggested by the model in Section 2: Tobin's Q, the total debt ratio (i.e, the ratio of total debt to total assets), and the financial investments ratio (i.e, the ratio of financial investments to total assets), all as of 1982. While our measures of Tobin's Q and leverage are relatively straightforward, our proxy for collateral requires some explanation. In principle, many assets can be used as collateral. However, financial investments — designated by firms as their long-term holdings of stocks and other securities — should be the highest quality collateral since these assets can be most easily liquidated. Broader measures of collateral would include assets that are less liquid and harder to value. In what follows, we primarily focus on the narrower proxy for collateral, but we also report results for a broader measure based on all fixed tangible assets.[11]

We also wanted to include a variable to account for the reputation effects outlined by Diamond, but we could think of none. To the extent, however, that Tobin's Q also measures

(1992) indicates that debt ratios fall when there are sufficient internal funds to finance investment. This fact is more consistent with a dynamic "pecking-order" model of financing, in the spirit of Myers (1984) than with a static model of the debt-equity ratio.

[10]It is sometimes argued that firms issued these equity-linked bonds to tap an overvalued stock market. However, if this were the only explanation, one might have expected such bond issuance to dry up following the recent big declines in the Tokyo Stock Market. Yet, the data do not show any increased dependence on bank financing following these declines.

[11]One issue regarding the financial investment information is that it is based on book values. This would usually understate the true value of the collateral, but should not introduce any specific biases.

how well assets-in-place are managed it could serve as a proxy for managerial reputation (Morck, Shleifer, and Vishny (1988).

Table 2 lists the 1982 and end-of-sample means of the variables that we use in the regression analysis. Table 3 breaks out some of the key variables according to whether the firm had more or less than the median bank debt ratio in 1992. Tobin's Q is basically equal for the two sets of firms. However, firms with low bank debt ratios were less leveraged and had more financial investments than firms with high bank debt ratios; both of these facts are consistent with the theory outlined above.[12]

The finding that Tobin's Q is equal across the two subsamples differs from the finding in Hsieh and Wells (1992) that firms with high Tobin's Q have less bank debt financing. We suspect that the difference is attributable to the Bond Issuance Criteria which make it easier for better firms to issue public debt. In fact, in our base sample of 536 firms (which includes many firms not eligible to issue bonds), firms with less bank debt have a much higher mean value of Tobin's Q. This suggests that it is important to take account of the Bond Issuance Criteria.

The basic regression results are reported in the first column of Table 4. As one might expect from the comparison of the means, firms with more of their assets in financial investments are less prone to rely on bank financing. This effect is reasonably large: evaluated at the means of all of the variables, a one standard deviation increase in this collateral measure above its mean of .079 to .119, decreases the bank debt ratio from 41% to 33%, an implied elasticity of 36%. In addition, the regression results support the theory's prediction regarding leverage: more leveraged firms are more prone to rely on bank financing. A one standard deviation increase in this leverage measure above its mean of .139 to .233, increases the bank debt ratio from 41% to 47%, an implied elasticity of 28%. The t-statistics shown in the table

[12]The difference in the total debt ratio is statistically significant at the 6% level and the difference in the financial investment ratio is significant at the 15% level.

indicate that both the collateral and leverage effects are statistically significant.[13]

The estimated coefficient of Tobin's Q is essentially zero: firms with better investment prospects are not more or less likely to shift financing away from banks to public sources. Of course, the theory has ambiguous implications regarding the sign of this coefficient — it depends on α and m which are not directly observable. Indeed, for intermediate values of α, the theory predicts a non-monotonic relationship between Tobin's Q and the bank debt ratio — first increasing then decreasing in Tobin's Q. We could not detect any such non-monotonicities in the data.[14]

The remaining regressions reported in Table 4 explore a number of alternative specifications. The second column reports the results of a two-sided Tobit regression which was performed because the dependent variable is constrained to be between zero and one. The results are essentially the same as the OLS results. The third column drops the 1982 bank debt ratio because the theory does not predict that it should be included. Again, the basic results do not change substantially. The estimates presented in the fourth column show the impact of controlling for industry effects by including industry dummies for each two-digit industry class. Our principle findings regarding Tobin's Q, collateral, and leverage are robust to the inclusion of these dummies.[15] Although we do not report the results, we also included in our regressions total assets to proxy for firm size. As Blackwell and Kidwell (1989) point out, there are greater fixed costs associated with public debt issues so that larger firms (with larger debt issues) might be more prone to issue public debt. The coefficient of total assets was statistically insignificant and its inclusion had no material effect on the reported results nor on any of the results that follow.

[13]The t- statistics are calculated using the usual ordinary least squares estimates of the standard errors. In testing for heteroskedasticity using the procedure suggested by White (1980), we found that we could not reject the assumption of homoskedasticity.

[14]We introduced the square of Tobin's Q and a piecewise linear term in the specification, but found that neither was significant.

[15]The inclusion of the industry dummies also does not qualitatively change the results that appear in Table 5.

The fifth column uses an alternative collateral measure, the ratio of all fixed tangible assets to total assets, on the view that other tangible assets such as land, plant, and equipment could also serve as collateral. The coefficient estimate of this alternative proxy has the wrong sign, but it is not statistically significant. One interpretation of this result might be that non-financial assets are not particularly valuable collateral. But, one might also argue that the value of the non-financial assets is measured with too much noise to be an effective proxy.

We also checked the sensitivity of the results to the use of the 1982 explanatory variables. In particular, we tried two alternative specifications: one using 1989 values of Q, collateral and leverage, and the other with time averages of these variables over the period 1983-1989. In both cases, we use the 1982 data as instruments in our estimation and found that the results were largely unaffected.

One criticism of the results is that although the 112 firms all cleared a common set of criteria there is still some heterogeneity in the financing options because some of these firms were allowed to issue an even wider variety of public debt instruments. As noted above, to deal with this criticism, we perform the same analysis on Sample 2 — the subsample of 68 firms that could also issue domestic unsecured convertible bonds in 1989.

The regression results for Sample 2 are reported in the last column of Table 4. We find roughly the same pattern and magnitude of coefficients for these firms. The effect of Tobin's Q continues to be negligible; the coefficient of the financial investments ratio is negative, although now less clearly statistically significant; and the coefficient of the total debt ratio is positive and statistically significant.

Another criticism is that our measure of public debt includes bonds that were guaranteed by banks. In some ways, these bonds may look more like bank debt than public debt. In order to see whether their inclusion affects our results, we reran the regressions reported in Table 4 for a smaller set of firms, excluding those with bank guaranteed bonds as of 1987.

The results were qualitatively the same for all of the specifications.

Thus, across the different specifications and samples it appears that collateral and leverage have the expected coefficients, while Tobin's Q does not seem to have any effect.

5.2 Group Affiliation and the Source of Financing

In previous work we have analyzed the financial role of the industrial groups (or *keiretsu*) — a loosely knit collection of firms centered around a set of core financial institutions. In addition to the product-market links among non-financial firms in the *keiretsu*, group members have had strong financial ties to the banks and insurance companies in the *keiretsu*. A large fraction of their loans come from group financial institutions, and these financial institutions also hold a large combined equity stake in group firms.

In Hoshi, Kashyap, and Scharfstein (1990a, 1990b, 1991), we argued that these close financial relationships can help get around information and incentive problems that typically plague more arms-length capital market transactions. In fact, we find that the investment of group firms appears to be less liquidity constrained than non-group firms; they are able to invest more despite cash shortfalls. We also find that financially distressed firms tend to cut back investment less and perform better after bouts of financial distress.

Given the apparent value of these financial relationships, it is worth investigating how the 52 group firms in our sample responded to deregulation as compared with the 60 non-group firms.[16] Thus, we re-estimated the basic regressions separately for group and non-group firms. In these regressions, we could not reject the hypothesis that the coefficients of the collateral and leverage proxies were the same for the two sets of firms. However, there do appear to be significant differences across the two sets of firms in the intercepts and in the coefficients of Tobin's Q. Because we have relatively few observations, we choose to combine the group and non-group firms in a single regression, but allow for differences in the

[16] Identifying a group firm is not completely straightforward; there are varying degrees of group affiliation. Our measure is based on Nakatani's (1984) classification scheme. See the Data Appendix for details.

intercepts and the coefficients of Tobin's Q. Thus, we include GROUP, a dummy variable equal to one if the firm is in a group and an interaction term between GROUP and Tobin's Q. Table 5 shows the results of this specification for both Samples 1 and 2.

We first summarize the findings and then interpret them. The coefficient of Tobin's Q is positive; it is not statistically significant in Sample 1 and significant only at the 11% level in Sample 2. The coefficient indicates that non-group firms with attractive investment opportunities rely more heavily on bank financing. In Sample 2, a one standard deviation increase in Tobin's Q above its mean, would increase the predicted bank debt ratio for non-group firms from 37% to 46%, an implied elasticity of 69%.

The negative and statistically significant coefficient of the interaction term indicates that there is a more negative relationship between Tobin's Q and bank debt for group firms than for non-group firms. The total effect of Tobin's Q on bank debt financing for group firms is the sum of the coefficients of Tobin's Q and the interaction term. The sum is negative and statistically significant at the 6% level, indicating that high Q group firms are less prone to rely on bank debt. Thus, group firms with more attractive investment opportunities are more prone to use public debt markets. The estimated effects for both samples are large. For example, in Sample 2, evaluated at the sample means, the model predicts a bank debt ratio of 33% for group firms. A one standard deviation increase in Tobin's Q above its mean of 1.65 to 2.33 would decrease the bank debt ratio to 24%, an implied elasticity of 75%.

The coefficient of the group dummy is positive in both samples. It is not statistically significant in Sample 1, but it is statistically significant in Sample 2. This positive coefficient does *not* mean that group firms borrow more from banks since we also allow for differences in the coefficients of Tobin's Q across group and non-group firms. Indeed, as the above numbers indicate, the model predicts that, at the means of the explanatory variables, group and non-group firms have roughly similar bank debt ratios — 33% for group firms and 37% for non-group firms.

Nevertheless, because bank debt is decreasing in Tobin's Q for group firms and increasing in Tobin's Q for non-group firms, the predicted bank debt ratio will tend to be lower for group firms at high levels of Tobin's Q and higher for group firms at low levels of Tobin's Q. Indeed, as the above calculations indicate, at a value of Tobin's Q one standard deviation above the mean, group firms are predicted to have a bank debt ratio of 24%, while non-group firms are predicted to have a bank debt ratio almost twice as high. At a value of Tobin's Q one standard deviation below the mean, group firms are predicted to have a bank debt ratio of 42%, while non-group firms are predicted to have a bank debt ratio of 28%.

There are two ways to interpret these results. First, the results are consistent with the model of Section 2 if one believes that managers of group firms place more weight on shareholder value than do non-group firms; the model predicts that bank debt is decreasing in Tobin's Q for high α firms, which is indeed what we find for group firms. In this interpretation, high Q group firms borrow from public debt markets because they have strong incentives to invest efficiently even without being monitored, while low Q group firms borrow from banks to commit themselves to invest efficiently. The incentive to invest efficiently is weaker for non-group firms so we would be more likely to see low Q non-group firms issuing public debt to avoid bank scrutiny.

One could plausibly argue that α might be high for group firms because they have an active set of large shareholders with whom they transact in the product and financial markets. Indeed, Kaplan and Minton (1992) find that more outside directors are appointed to the boards of group firms than to those of non-group firms and that these appointments are generally made in response to poor performance. They also find that management directors are more often replaced after an outside director is appointed. This suggests that there may be more management oversight by the boards of group firms than by those of non-group firms.

Another interpretation of these results rests on Nakatani's (1984) idea that the group

acts as an insurance mechanism — better performing firms subsidize worse performing firms through group financial institutions. However, this insurance mechanism is sustainable only when there are few outside financing opportunities. But, as markets open up and provide a cheaper source of financing to successful group firms, it would be natural to see the more successful firms take advantage of these new opportunities by replacing bank debt with public debt.

Rajan (1992) models a related idea which is also consistent with our findings. In his model, the benefit of bank financing is that an informed bank can make efficient decisions about whether to continue lending to a firm. The cost is that the bank's informed position relative to other potential creditors, ties the firm to the bank, and enables the bank to "hold up" the firm *ex post* (a point also made by Sharpe (1990)). This hold up problem then discourages firms from making *ex ante* efficient decisions. Since higher quality firms are more susceptible to such hold up problems, they will tend to issue less bank debt and more public debt. Thus, one can view the move away from bank financing by high Q group firms as a way of mitigating hold up problems.[17]

Finally, as noted above, the shift away from bank debt was also associated with a shift to equity-linked debt instruments. Stein (1993), for example, predicts that firms that are subject to more asymmetric information problems will tend to rely more heavily on convertible debt. And, in fact, Essig (1991) finds that high R&D firms (which tend to have high Q and presumably more asymmetric information problems) do issue more convertible debt. Our results also indicate a positive relationship between convertible financing and Q. The problem, however, in linking this finding to the asymmetric information explanation is that this positive relationship is true only for group firms. Unless one believes that there is more asymmetric information about group firms than non-group firms — a difficult

[17]Petersen and Rajan (1993) find that in local markets with few banks, the difference in loan rates for young and old firms is less than it is in local markets with many banks. This suggests that there may be some cross- subsidization from higher quality (older) firms to lower quality (younger) firms when higher quality firms have fewer financing alternatives.

assumption to maintain — then the asymmetric information story fails to explain the results

5.3 Owner-Managers and the Source of Financing

In this section we consider the financing choices of firms run by managers with large shareholdings in the firm.[18] Managerial ownership stakes can have mixed effects on managers' incentives. On the one hand, managerial ownership tends to align managers' interests with shareholders and should lead them to be more concerned with maximizing shareholder value. On the other hand, managers with large ownership stakes may be more difficult to remove from office and therefore may be more free to pursue non-value maximizing activities.

Indeed, Morck, Shleifer, and Vishny (1988) present evidence that suggests that both effects are at work in the United States. They show that corporate performance (as measured by Tobin's Q) is increasing in managerial ownership at levels of ownership below 5% — a fact that is consistent with the "aligning" role of managerial ownership. However, for higher levels of ownership between 5% and 25%, increases in managerial ownership are associated with worse corporate performance — a fact that is consistent with the "entrenching" view of managerial ownership.

Thus, in the context of our model, one can think of owner-managed firms as high α firms under the aligning view or as low α firms under the entrenching view. The aligning view, therefore, predicts an inverse relationship between Tobin's Q and bank debt financing for owner-managed firms. High Q owner-managed firms borrow from the public debt market because their managers have strong incentives to invest efficiently even if they are not monitored. Low Q owner-managed firms borrow from banks because they want to commit to invest efficiently.

In contrast, under the entrenching view of managerial ownership, the model predicts a

[18]The idea that owner-managed firms might exhibit different financing behavior was originally proposed by Teshima (1993). His principal focus was on explaining leverage, he did consider the choice between public and private sources, but did not take account of the bond issuance criteria.

positive relationship between Tobin's Q and bank debt financing for owner managed firms. Managers of low Q firms issue public debt to escape the scrutiny of banks so that they can take their pet projects — they do not care enough about shareholder value to borrow from a bank, be monitored and commit themselves to investing efficiently. Managers of high Q firms issue bank debt because the project is good enough to warrant such a commitment, but they do not care sufficiently about shareholder value to take the good project absent bank monitoring.

To explore these competing predictions, we identified a subsample of owner-managed firms defined as those where the president or chairman of the company was also its largest shareholder. Of the 580 firms in the original sample, there were 76 (13%) such firms. Among the 112 firms in Sample 1, 10 (9%) satisfied this criterion and among the 68 firms in Sample 2, 5 (7%) satisfied this criterion.[19]

The typical owner-manager has an ownership stake in the range of 5% to 7% of total equity. In addition, he may control more shares through foundations and other family members. Of the 10 owner-managed firms in Sample 1, 5 of the managers controlled 10% - 20% of the equity, 2 controlled more than 20%, and the remaining 3 controlled between 5% and 7%.

These managerial ownership stakes could entrench managers by making hostile takeovers more difficult. Although hostile takeover attempts are less common in Japan than in the U.S., they do occur, particularly for firms outside the network of cross-shareholdings that make accumulation of a controlling stake so difficult. Owner-managed firms tend to be outside this network so that managerial ownership could serve as a meaningful deterrent. These ownership stakes may also entrench managers by limiting the ability of other large shareholders to replace top management, a common occurrence in japan according to Kaplan

[19]We also explored a weaker definition of an owner-managed firm and the results were correspondingly weaker. In this definition, firms were considered to be managed by an owner, if the president or chairman was one of the 5 largest shareholders. Accordingly, there were 132 (23%) firms in the sample of 580 hat met this criterion; 21 (19%) in Sample 1; and 11 (16%) in Sample 2.

(1992).

In addition to these direct effects, we suspect that large managerial ownership stakes probably also proxy for managers who are particularly influential in the firm. These firms tend to be run by their founders or the founders' descendants. Indeed, Teshima (1993) argues that in owner-managed firms, decision-making tends to be top-down, in contrast to the more typical bottom-up management of Japanese companies. This top-down style may give owner-managers more leeway to take non-value maximizing projects that only they value.

The third column of Table 5 reports the results of adding to the basic Sample 1 specification two variables that pick up the effect of owner-managers: a dummy variable that takes the value one if the firm is owner managed, OWNMAN; and an interaction term of this OWNMAN and Tobin's Q. The coefficient of the owner-manager dummy is negative and the coefficient of the interaction term is positive; both are statistically significant.

The positive coefficient of the interaction term indicates that, everything else equal, when Tobin's Q increases, bank debt increases more for owner-managed firms than for nonowner-managed firms; the marginal effect of Tobin's Q on the bank debt ratio for owner-managed firms is .343 (the sum of the coefficients of Tobin's Q and the interaction term) which is statistically significant. The intercept dummy, however, works in the opposite direction so that at average values of Q, the coefficient estimates suggest that there are no significant differences in the fraction of bank debt used by owner-managed and nonowner-managed firms. The model does predict that for owner managed firms with high values of Tobin's Q (one standard deviation above the mean) the bank debt ratio will be .45 greater than the bank debt ratio at low values of Tobin's Q (one standard deviation above the mean). The results are therefore consistent with the view that managerial ownership serves to entrench managers.

The fourth column of Table 5 reports the results for Sample 2: the results are similar to

those for the larger sample. The last two columns combine the owner-manager variables with the group variables included in the first two columns. Even allowing for both effects, the basic results continue to hold for both the group variables and the owner-manager variables.

6. Conclusions

This paper presents a theory of the choice between public and private debt financing. We examine some of the theory's implications by examining the financing responses of Japanese firms to the deregulation of the public debt markets. We find that high net worth firms are more prone to use public debt financing. In addition, firms in *keiretsu* have responded to deregulation in different ways: the more successful firms have accessed the public debt markets, while the less successful firms continue rely more heavily on bank debt financing.

Aggressively interpreted, these findings carry a number of messages for the larger issues raised in the introduction. First, the results suggest that the observed durability of Japanese banking relationships has been strongly influenced by the regulatory environment. Many have argued that U.S. banking laws should be reformed to conform more closely with Japanese laws (i.e., the restrictions that prohibit commercial banks from taking an active role in corporate governance should be abolished). Our results suggest that it may not be very easy to put the genie back in the bottle; once capital markets have developed to the point where a deep corporate bond market exists, many firms may have no interest in typing-up with a bank.

Second, Japanese monetary policy has traditionally relied heavily on loan rationing as one of its tools (see Hoshi, Scharfstein and Singleton (1993)). With the changes we have documented in the customer mix of banks, it is unclear whether this channel will continue to be very potent. At the very least, the distributional impact of any future contractions in lending that might be engineered by the central bank are likely to be quite different than in

previous episodes when essentially all companies were bank dependent.[20]

The advent of bond financing could also have important consequences for the types of risks and activities Japanese banks might undertake. Until the recent deregulation, Japanese banks had been insulated from many of the competitive pressures that have allowed large corporations elsewhere in the world to cut back on their bank borrowing in favor of direct financing. As disintermediation continues in Japan, there are likely to be pressures for the banks to shrink or find new markets and products. Some analysts have argued that these same sorts of pressures played a significant role in the U.S. banking crisis.

Finally, we have not addressed the issue of how these financing choices might affect firm performance and corporate governance. As firms reduce their dependence on bank financing, they might lose some of the benefits of relationship-oriented borrowing that we documented in Hoshi, Kashyap, and Scharfstein (1990b, 1991). They may have a less ready source of financing, and creditors may be less willing to help during episodes of financial difficulty.

There is also reason to believe that the move to more arms-length financing might be assocaited with other changes in corporate governance. In the United States, where relationship financing is generally weak for large corporations, hostile takeovers and, more recently, active institutional investors have played the role of monitors. Whether similar patterns will develop in Japan remains an open question.

[20]In fact, the Bank of Japan announced that it stopped rationing as of June 1991, perhaps recognizing its limitations in the current financing environment.

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Data Appendix

The bulk of the data used in this paper come from Hoshi and Kashyap (1990) and is described in detail in their data appendix. We updated the Hoshi-Kashyap data to include 1992 information on bank borrowing and total debt using the Nikkei NEEDS financial database. We also refined the procedure used in constructing firm level estimates for the market value of land, which is one of the components of the replacement costs of a firm's assets that is used in estimating Tobin's Q. To improve the accuracy of the estimates, the new procedure uses information on physical land holdings, rather than relying solely on information on the book value of land holdings.

The new estimates were constructed according to the following algorithm. For each company, we begin with the Hoshi-Kashyap (1990) estimate of the market value of land for the fiscal year beginning in April 1973 and ending in March 1974. Subsequently, if a company reports no change in the number of hectares it owns, then we assume that the value of their land holdings increased at the same rate as the aggregate rate of inflation for commercial real estate. We used separate inflation-rate corrections for companies whose headquarters were in one of the six major metropolitan areas since urban and rural land prices have behaved somewhat differently.

In cases where a firm reported a decline in the number of hectares, we shrank our estimates of the value of land holdings in proportion to the amount of land that was sold and then corrected the remaining holding for the effect of inflation. This same type of procedure was used for cases when a firm reported an increase in the number of hectares owned, except when the reported book value of land also increased. If the reported book value of land also increased, then we assumed that the new land holdings were added to the books at market prices and that previous holdings increased at the relevant rate of inflation. Further details concerning this adjustment are available upon request. We also extended the data set by using Nakatani's (1984) classification of affiliated firms to construct the group dummy. The dummy is equal to one if the firm is in any enterprise group as determined by Nakatani or sits on the President's Council of one of these groups.

Finally, the 112 firms in Sample 1 and the 68 firms in Sample 2 were chosen by determining which firms in the original Hoshi- Kashyap sample satisfied the Bond Issue Criteria for domestic secured and unsecured convertible bonds. The issuing criteria were taken from the following sources: *Shoken-kyoku Nenpo* (*Annual Report of Securities Bureau*), 1977 and 1991, published by the Ministry of Finance; *Shoken Binran* (*Securities Handbook*) published by the Industrial Bank of Japan; *Finance Handbook*, 1987 and 1989, published by Nomura Securities; *Shin Ginko Jitsumu Koza: 8 Shoken* (*New General Lectures on Banking Business: Vol 8 Securities*), 1987, published by Industrial Bank of Japan and Kin'yu Zaisei Jijo Kenkyu-kai, Tokyo. The bond-rating criteria were those of the Japan Bond Research Insti-

tute reported in *Nikkei Newsletter on Bonds and Money*, issues 661 (5/8/89), 670 (6/27/89), 688 (10/24/89).

Table 1
Bond Issue Criteria for Domestic Secured Convertible Bonds

1. Guidelines effective from October 1976 - July 1987
   (a) Accounting Criteria
      i. A firm with net worth greater than 10 billion yen can issue if:
         A. Dividend per share in the most recent accounting period exceeds 5 yen and;
         B. Ordinary after-tax profit per share in the most recent accounting period is greater than 7 yen and;
         C. One of the following three conditions is met:
            - Net Worth ratio $\geq .15$;
            - Net Worth/Paid-in-Capital ≥ 1.2;
            - Business Profit/Total Assets $\geq .04$.
      ii. A firm with net worth greater than 6 billion yen but less than 10 billion yen can issue if:
         A. Dividend per share in the most recent accounting period exceeds 5 yen and;
         B. Ordinary after-tax profit per share in the most recent accounting period is greater than 7 yen and;
         C. Two of the following three conditions are met:
            - Net Worth ratio $\geq .2$;
            - Net Worth/Paid-in-Capital ≥ 1.5;
            - Business Profit/Total Assets $\geq .05$.
   (b) Rating Criteria (None)
2. Guidelines Effect from July 1987 to May 1989
   (a) Accounting Criteria
      i. A firm with net worth greater than 10 billion yen can issue if:
         A. Dividend per share in the most recent accounting period exceeds 5 yen and;
         B. Ordinary after-tax profit per share in the most recent accounting period is greater than 7 yen and;
         C. One of the following three conditions is met:

- Net Worth ratio $\geq$ .1;
- Net Worth/Paid in Capital $\geq$ 1.2;
- Business Profit/Total Assets $\geq$ .05.

ii. A firm with net worth greater than 6 billion yen but less than 10 billion yen can issue if:

A. Dividend per share in the most recent accounting period exceeds 5 yen and;

B. Ordinary after-tax profit per share in the most recent accounting period is greater than 7 yen and;

C. Two of the following three conditions are met:

- Net Worth ratio $\geq$ .12;
- Net Worth/Paid-in-Capital $\geq$ 1.5;
- Business Profit/Total Assets $\geq$ .06.

iii. A firm with net worth greater than 3 billion yen but less than 6 billion yen can issue if:

A. Dividend per share in the most recent accounting period exceeds 5 yen and;

B. Ordinary after-tax profit per share in the most recent accounting period is greater than 7 yen and;

C. Two of the following three conditions are met:

- Net Worth ratio $\geq$ .15;
- Net Worth/Paid-in-Capital $\geq$ 2.0;
- Business Profit/Total Assets $\geq$ .07.

(b) Rating Criteria (None)

3. Guidelines effect from May 1987 to December 1990)

(a) Accounting Criteria (Same as those in previous period)

(b) Rating Criteria
A Firm with a BB rating or higher can issue bonds if:

i. Dividend per share is greater than 5 yen and;

ii. Ordinary after-tax profit per share is greater than 7 yen.

4. Guidelines effective after December 1990

(a) Accounting Criteria (None)

(b) Rating Criteria (Same as those in previous period)

Table 2

Means of the Variables in 1982 and 1992

The sample includes all 112 publicly traded firms that were eligible to issue convertible bonds in each year from 1982-1989 and had debt oustanding in 1982. GROUP is a dummy variable equal to one if the firm is in an industrial group. OWNMAN is a dummy variable equal to one if the firm is owner managed. Standard deviations of the variables are reported in parentheses below the means. An asterisk indicates that the variable is measured in 1992.

Variables	1982	1989
Bank Debt/Total Debt	.803	.407*
	(.275)	(.343)
Tobin's Q	1.646	2.344
	(.580)	(1.63)
Total Debt/Total Assets	.139	.126
	(.094)	(.073)
Financial Investments/Total Assets	.079	.078
	(.040)	(.051)
All Tangible Assets/Total Assets	.480	.594
	(.139)	(.073)
GROUP	.464	
OWNMAN	.089	

Table 3

Means of Selected Variables Sorted by Bank Debt/Total Debt in 1992

The sample includes all 112 publicly traded firms that were eligible to issue domestic secured convertible bonds in each year from 1982-1989 and had debt oustanding in 1982. An asterisk indicates that the variable is measured in 1992.

	Below median Bank Debt/Total Debt in 1992		Above median Bank Debt/Total Debt in 1992	
Variables	1982	1989	1982	1989
Bank Debt/Total Debt	.716	.120*	.889	.693*
Tobin's Q	1.667	2.513	1.624	2.168
Total Debt/Total Assets	.114	.123	.164	.129
Financial Investments/Total Assets	.085	.083	.073	.074

Table 4

Regression Results:

The Propensity to Use Bank Debt Rather than Public Debt

Dependent Variable: Bank Debt/Total Debt in 1992

Sample 1 includes all 112 publicly traded firms that were eligible to issue domestic secured convertible bonds in each year from 1982-1989 and had debt oustanding in 1982. Sample 2 includes the 68 firms in Sample 1 that could also issue domestic unsecured convertible bonds in 1989. All the regressors are as of 1982. t-statistics are in parentheses below the coefficient estimates. The regressions all include intercepts, though they are not reported. The results in the fourth column (marked with an asterisk) include industry dummies.

Variables (in 1982)	Sample 1	Sample 1	Sample 1	Sample 1*	Sample 1	Sample 2
Bank Debt/Total Debt	.315	.498		.249	.407	.219
	(2.78)	(3.31)		(2.21)	(3.95)	(1.63)
Tobin's Q	-.003	.011	-.013	-.002	-.016	-.019
	(0.05)	(0.17)	(0.24)	(0.03)	(0.41)	(0.29)
Total Debt/Total Assets	.807	1.03	.957	.823	.794	.958
	(2.52)	(2.63)	(2.93)	(2.63)	(2.46)	(2.03)
Financial Investments/Total Assets	-1.84	-1.92	-2.34	-2.14		-1.44
	(2.33)	(1.99)	(2.95)	(2.72)		(1.44)
All Tangible Assets/Total Assets					-.013	
					(.09)	
σ^2 from Tobit		.371				
		(12.6)				
$\bar{R}^2$	.17		.12	.27	.14	.10
Number of Observations	112	112	112	112	112	68

Table 5

Regression Results with Group Affiliation and Management Ownership

The Propensity to Use Bank Debt Rather than Public Debt

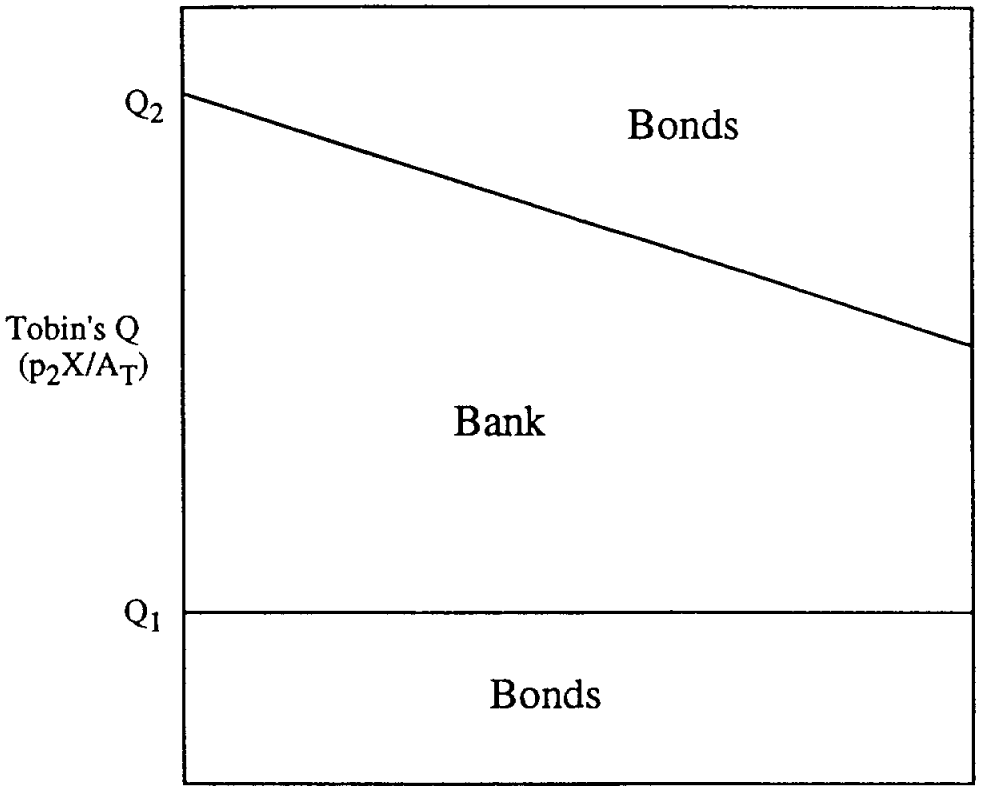
Dependent Variable: Bank Debt/Total Debt in 1992

Sample 1 includes all 112 publicly traded firms that were eligible to issue domestic secured convertible bonds in each year from 1982-1989 and had debt oustanding in 1982. Sample 2 includes the 68 firms in Sample 1 that could also issue domestic unsecured convertible bonds in 1989. All the regressors are as of 1982. GROUP is a dummy variable equal to one if the firm is in an industrial group. OWNMAN is a dummy variable equal to one if the firm is owner-managed. t-statistics are in parentheses below the coefficient estimates.

Variables (in 1982)	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2
Constant	.095	-.081	.204	.208	.128	.036
	(0.57)	(0.38)	(1.41)	(1.28)	(.771)	(.17)
Bank Debt/Total Debt	.325	.210	.359	.289	.356	.272
	(2.96)	(1.58)	(3.18)	(2.20)	(3.22)	(2.07)
Tobin's Q	.074	.154	.048	-.046	.028	.106
	(1.11)	(1.63)	(.86)	(.74)	(.39)	(1.13)
Total Debt/Total Assets	.743	1.17	.825	.837	.760	1.036
	(2.34)	(2.47)	(2.60)	(1.84)	(2.42)	(2.25)
Financial Investments/Total Assets	-1.57	-1.50	-1.513	-1.398	-1.283	-1.451
	(2.04)	(1.55)	(1.91)	(1.46)	(1.65)	(1.54)
GROUP	.240	.460			.187	397
	(1.36)	(2.09)			(1.04)	(1.85)
GROUP x Tobin's Q	-.221	-.305			-.189	-.262
	(2.17)	(2.52)			(1.80)	(2.20)
OWNMAN			-.732	-1.469	-.628	-1.296
			(2.29)	(.53)	(1.98)	(2.48)
OWNMAN x Tobin's Q			.391	.923	.301	.796
			(2.36)	(2.81)	(1.80)	(2.45)
$\bar{R}^2$	.22	.17	.20	.18	.23	.22
Number of Observations	112	68	112	68	112	68

Figure 1

The Relationship Among Bank Financing, Bond Financing, Tobin's Q and Net Worth



$$Q_1 = \frac{p_2 m}{(p_2-p_1)A_T} + \frac{p_2 b}{\alpha(p_2-p_1)}$$

$$Q_2 = \frac{p_2 b}{\alpha(p_2-p_1)} + \frac{F}{A_T}$$

Figure 2a. Bank Debt / Total Debt (All TSE Manufacturing Firms)

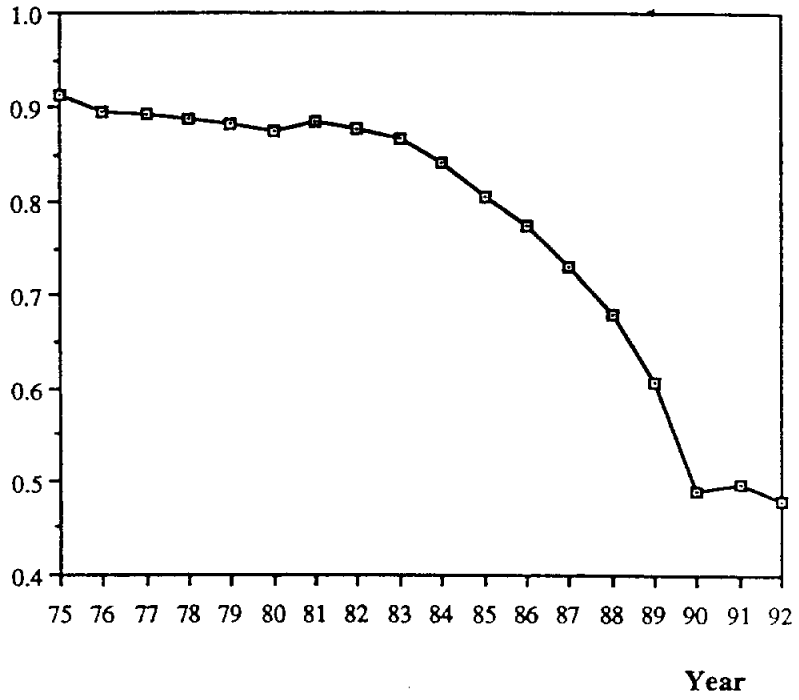


Figure 2b. Bank Debt / Total Debt (536 firms in our sample)

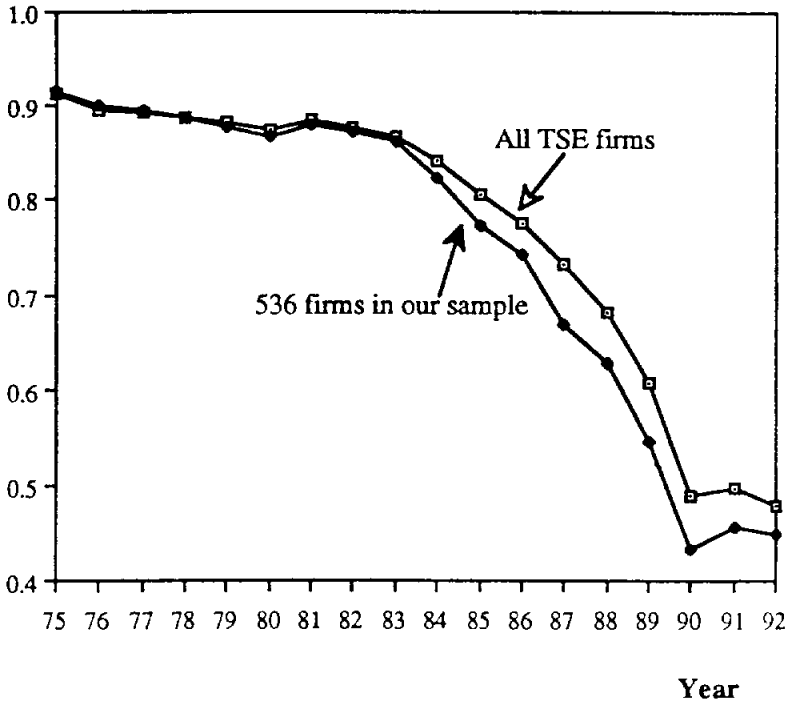


Figure 3. Bond Issue Criteria and Bank Debt / Total Debt