IS BANK-CENTERED CORPORATE GOVERNANCE WORTH IT? A CROSS-SECTIONAL ANALYSIS OF THE PERFORMANCE OF JAPANESE FIRMS DURING THE ASSET PRICE DEFLATION

Jun-Koo Kang
René M. Stulz

Working Paper **6238**

NBER WORKING PAPER SERIES

IS BANK-CENTERED CORPORATE GOVERNANCE WORTH IT? A CROSS-SECTIONAL ANALYSIS OF THE PERFORMANCE OF JAPANESE FIRMS DURING THE ASSET PRICE DEFLATION

Jun-Koo Kang
René M. Stulz

Working Paper 6238
http://www.nber.org/papers/w6238

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 1997

Is Bank-Centered Corporate Governance Worth It? A Cross-Sectional Analysis of the Performance of Japanese Firms during the Asset Price Deflation

Jun-Koo Kang and René M. Stulz

NBER Working Paper No. 6238
October 1997
Corporate Finance

ABSTRACT

This paper examines the determinants of firm stock-price performance from 1990 to 1993 in Japan. During that period of time, the typical firm on the Tokyo Stock Exchange lost more than half its value and banks experienced severe adverse shocks. We show that firms whose debt had a higher fraction of bank loans in 1989 performed worse from 1990 to 1993. This effect is statistically as well as economically significant and holds when we control for a variety of variables that affect performance during this period of time. We find that firms that were more bank-dependent also invested less during this period than other firms. This evidence points to an adverse effect of bank-centered corporate governance, namely that firms suffer when their banks are experiencing difficulties.

Jun-Koo Kang
School of Business
Korea University
Sungbuk-ku, Anam-Dong 5-1
Seoul 136-701
KOREA

René M. Stulz
Fisher College of Business
The Ohio State University
1775 College Road
Columbus, OH 43210-1399
and NBER
stulz@cob.ohio-state.edu

1. Introduction.

The heart of the Japanese corporate governance system is the main bank.[1] A firm's main bank is a large shareholder that provides the firm with loans and diverse financial services. It helps the firm access capital markets, sometimes by providing financial guarantees and underwriting the firm's securities. It monitors the firm's management and intervenes at times of poor performance. The main bank typically sends directors to the firm's board in periods of distress to help the firm improve its performance. At times, it acts like a management consultant, providing information and advice to management. While the influence of main banks may have fallen over the last twenty years, it is still large enough to sharply distinguish the Japanese corporate governance system from the corporate governance system of Anglo-saxon countries.

A bank-centered corporate governance system like Japan's is often viewed as having strong advantages over a capital-market centered system like the Anglo-saxon system. In the Anglo-saxon system, banks play a small role in disciplining management. The mechanisms used in that system involve managerial incentives, active boards with outsiders, proxy contests, and takeovers. When these mechanisms fail, the markets in which the firm sells can force the firm to become more efficient.

Many have argued that neither managerial incentives nor corporate boards work well enough in disciplining management, so that intervention through capital markets is of crucial importance in the Anglo-saxon system. Intervention through the capital markets has its own difficulties, however. The large premia earned by targets suggest that it occurs only when the gains from intervention are extremely large, making takeovers a rather blunt instrument of corporate control.

---

[1] See Aoki and Patrick (1994) for a collection of studies on the main bank system.

Perhaps the key difference between the two mechanisms of corporate control is how information is transmitted between the firm and outsiders who monitor the firm. The main bank acquires information continuously about the firm and can intervene quickly and informally. Management can provide the main bank with confidential information that allows it to assess the performance of the firm better. In a capital market based system, small interventions are typically ruled out. Investors find it worthwhile to acquire large positions to affect the firm's strategy only when the gains from doing so exceed the substantial costs resulting from free-rider problems and have to be prepared to acquire the firm. Because outside investors do not have access to the information that management has, information asymmetries play a key role in the decisions of outside investors as well as in those of management. Outside investors have to assess management based on publicly available information, perhaps forcing management to pay too much attention to how outsiders interpret its actions. This led Thurow (1992) and others to argue that "the United States has organized a system that is the exact opposite of that of Germany and Japan. Those countries have organized a system (business groups) to minimize the influence of impatient shareholders, while the United States has organized a system (fund dominance) to maximize the influence of impatient shareholders."[2]

Do we really know that bank-centered corporate governance is superior? The evidence is mixed. On the positive side, Hoshi, Kashyap and Scharfstein (1991) show that the Japanese style of corporate governance makes investment of firms less sensitive to firm liquidity. Importantly, Kaplan and Minton (1994) and Kang and Shivdasani (1997) show that main banks intervene before the onset of financial distress, thereby confirming the view that a bank-centered corporate governance system allows for earlier and more measured intervention than a capital-market based system. Kang (1993) also provides evidence that Japanese firms with strong bank ties seem to

---

[2]. Thurow (1992), p. 136.

make more profitable acquisitions. At the same time, however, it is not clear that keiretsu firms invest more productively or grow more than other firms. For instance, Weinstein and Yafeh (1997) argue that close bank ties increase access to capital for Japanese firms, but not profitability. Further, according to Hall and Weinstein (1996), Japanese firms are not slower in cutting R&D during periods of financial distress than American firms.

As Rajan (1992) and others have pointed out, however, bank financing has both advantages and disadvantages. Because bank financing makes the bank well-informed about the firm, it tends to make the firm hostage to the bank and hence enables the bank to extract rents. While this problem can occur whenever bank financing is present, the fact that Japanese firms typically had fewer sources of outside finance because of regulation could have made this problem even worse. Until recently, it was uncommon for firms to change main banks and many firms were not allowed to access capital markets because they did not meet security issuance requirements.

There is, however, another cost of reliance on bank financing, which is that when the bank does poorly and the firm has no alternative sources of funding, the firm has to cut investment even when it could invest profitably. Evidence that a borrower's firm value depends on bank health has been shown for the U.S. by Slovin, Sushka and Polonchek (1993). Historically, Japan's economic performance and its banks' financial health were such that this was not an issue. However, in the 1990s, Japan's economic performance has been poor and the financial health of Japanese banks has been sufficiently precarious that an infamous Japan premium has been attached to the Japanese banks's euro-yen financing. This raises the question of whether bank-dependence has been costly for Japanese firms in the recent past.

In this paper, we explore the impact of bank dependence on firm performance in Japan during the 1990's. We show that firms that were more bank-dependent suffered significantly larger

wealth losses during the first three years of the 1990's when the Japanese stock market fell dramatically. One way to understand the importance of this effect is as follows. The typical firm on the Tokyo Stock Exchange (TSE) experienced a loss of about 57 percent from 1990 to 1993. Keeping all other firm characteristics unchanged, we find that the return of a firm with no bank loans exceeds the return of a firm with only bank debt financing by about 26 percent. Importantly, this is not a leverage effect. What matters for the performance of Japanese firms in the early 1990's is the fraction of their financing in the form of bank loans rather than their leverage.

In an earlier paper, Gibson (1995) explores the impact of main bank health on investment of Japanese firms for the period from mid-1991 to mid-1992. His study focuses on the impact of the identity of the main bank rather than on the importance of bank loans for firms. He shows that the identity of the main bank affects investment. However, this effect does not seem to be associated with the financial health of the main bank as captured by its credit rating. For instance, two banks rated AA-, Daiwa Bank and Asahi Bank, have significant effects on investment of equal magnitude but opposite sign. Our study does not use the identity of the main bank as an explanatory variable but rather bank-loan dependence. We take the view that the whole banking sector in Japan was experiencing difficulties, so that high bank dependence was costly for a firm irrespective of main bank identity.[3] We show that firms that were more bank-dependent cut investment back more substantially during the 1990-1993 period.

The paper proceeds as follows. In section 2, we motivate our approach to evaluate the adverse effects of the bank-centered system. In section 3, we provide an empirical model that helps understand the cross-sectional variation in stock performance in Japan from 1990 to 1993 without taking into account governance characteristics. In section 4, we show how governance

---

[3] In future work, it would be interesting to pursue the issue of whether bank-loan dependence differs across main banks in a way that could explain the main bank coefficients in the Gibson (1995) study.

characteristics help understand the cross-sectional variation in stock performance over that period. In section 5, we investigate whether bank financing affected investment directly. Section 6 presents concluding remarks.

2. Banks, the crash, and firm value.

The hypothesis we want to test is that poor bank performance is costly to borrowing firms in a bank-centered system. The motivation for this hypothesis is straightforward. In a bank-centered system, firms obtain most of their external financing from banks with which they have established a relationship. These banks are particularly knowledgeable about their borrowers and can monitor these borrowers closely because they provide other financial services to them. If banks are forced to curtail lending for whatever reason, their borrowers will have to turn to more expensive sources of external finance. If the banking sector as a whole faces difficulties, firms can only turn to the capital markets for funding.

Using the capital markets for external funding presents several difficulties. First, even though the banks that finance the firm are doing poorly, investors cannot be sure that these banks are limiting their lending to the firm because they have to curtail lending in general rather than because they have adverse information about the firm's value. Second, capital market investors will not have access to the information that the bank has and are therefore likely to discount firm value to protect themselves. Third, as the firm changes its mix of financing, it becomes less dependent on bank monitoring. Since a bank-centered system does not have the monitoring from the capital markets that the U.S. has, this means that the firm becomes less closely monitored. Fourth, the firm may be highly levered because the flexibility of bank financing enables it to restructure debt easily if it experiences difficulties and hence decreases the costs of financial distress associated with leverage. However, capital market financing does not have the same

flexibility. This means that the firm's existing level of leverage may be excessive if the firm has to rely on capital market financing in the future.

With these arguments, firm value should fall when a firm's banks experience difficulties that force them to contract credit growth. At the same time, however, if the borrowers are doing poorly, one expects banks to do poorly also since their assets lose value. This raises an issue of causation: do firms do poorly because banks are doing poorly or are banks doing poorly because borrowers are failing? In the case of Japan, important exogeneous factors forced banks to tighten credit. Credit growth fell dramatically from an average annual growth rate of 17 percent from 1986 to 1990 to an annual growth rate of 6.7 percent from the fourth quarter of 1990 to the fourth quarter of 1991. For manufacturing firms, bank credit fell from 1990 to 1991. Hickock and Osler (1995) argue that "The catalyst for the slowdown in credit growth in 1991 (...) was a tightening in monetary policy." (p. 438). A major source of banking problems was the fall in land prices which seems to have been a largely exogenous phenomenon. Hickock and Osler (1995) argue that "Problems with credit losses from 1989 on, many associated with real estate loans, badly hurt bank balance sheets and, therefore, bank credit availability. Estimates of the magnitude of the problem loans eventually ranged as high as (...) 16 percent of total bank credit outstanding to the private sector." (p. 439.) The last problem facing the banking industry was the introduction of the BIS capital adequacy rules adopted in 1988.[4] It is therefore plausible to view the Japanese experience as one where banks experienced a negative external shock that decreased their ability to lend to firms. With this view and the above arguments, firms that were more bank-dependent are expected to have suffered more from bank difficulties.

Our hypothesis that bank distress is costly to borrowers has the following implication for

---

[4] Marsh and Paul (1997) argue that the BIS rules were the major determinant of the loan problems of Japanese banks.

Japan. Banks became progressively weaker during the 1990 to 1993 period. One would therefore expect that more bank-dependent firms, everything else equal, lost more value during that period of time because the value of their bank relationships fell and they had to give up valuable investment projects. Our test of the hypothesis is therefore that greater bank dependence is associated with poorer stock market performance over the period where banks experienced adverse shocks.

It is important to emphasize that our experiment does not imply the existence of a profitable trading strategy. With efficient markets, the successive adverse shocks that affect Japanese banking during the period that we look at were not forecastable. Hence, the losses in borrower value that we document could not be anticipated.

3. The cross-sectional determinants for firm performance during the Japanese crash.

Throughout the study, we use the PACAP database. We eliminate utilities and financial companies. Our main sample consists of 1,380 firms for which return data is available for the period 1986 to 1993. In addition, we require the firm to have stock prices available in monthly files for at least 24 months from 1986 to 1989 and at least 24 months from 1990 to 1993. Requiring data to be available for the whole period creates a survival bias. However, for Japan, this is essentially a non-issue because so few firms drop out of the exchanges. During the period 1986 to 1993, only 30 firms delist from the Tokyo Stock Exchange. This is a trivial number in comparison to our sample of 1,380 firms. We use buy-and-hold returns.

The 1,380 firms in our sample experience an average loss in equity value of 51.72 percent and a median loss in value of 57.03 percent during the 1990 to 1993 period (the crash period). In other words, the typical firm lost slightly more than half its value. This large wealth loss followed an equally large increase in value during the second half of the 1980s. From the beginning of

1986 to the end of 1989 (the boom period), the average wealth gain is 238.08 percent and the median wealth gain is 208.06 percent. As a result, the typical firm doubled in value from 1986 to 1989 and lost slightly more than this wealth gain from 1990 to 1993.

It is interesting to note that there is less cross-sectional variation in the 1990-1993 period than in the 1986-1989 period. From 1986 to 1989, the firm with the lowest returns loses 48.47 percent and the firm with the highest gain has a return of 2,034.97 percent. The standard deviation of returns is 188.91 percent, which is 79 percent of the mean return. In contrast, from 1990 to 1993, the worst loss is 98.11 percent and the largest gain is 160.25 percent. The standard deviation for returns is 24.49 percent, which is about 47 percent of the average return. This is consistent with the existence of important common factors across firms during the 1990-1993 period.

In the remainder of this section, we attempt to understand better the cross-sectional variation in returns during the 1990-1993 period. We therefore pursue the strategy of regressing returns during the 1990-1993 period on variables that are expected to affect firm returns differently during that period. We consider two alternative explanations of the crash that can be investigated cross-sectionally.[5] One explanation is the bubble explanation. With this explanation, for some reason, stock prices increased too much in the 1980s and the crash was a correction. This explanation implies that there should be a relation between a firm's stock price increase in the second half of the 1980s and the fall in the beginning of the 1990s. The second explanation is that there was a shock to investment opportunities, so that investments made in the second half of the 1980s ceased to be profitable. With this hypothesis, expected cash flows fell unexpectedly and/or discount rates increased unexpectedly.

---

[5] See French and Poterba (1991) for an analysis of the equity valuation of Japanese companies in the late 1980s.

Table 1. Cross-sectional implications of the bubble hypothesis.
The data for this table is obtained from the PACAP database. Financial firms and utilities are excluded from the sample. Firms are required to be in the database from 1986 to 1993. The returns are buy-and-hold returns. The industry classification is the PACAP classification. The book-to-market ratio and the price-earnings ratio are measured at the end of 1989.

Samp le (Sample size)	Constant (t-statistic)	1986-1989 returns (t-statistic)	Book-to-market (t-statistic)	Price-earnings ratio (t-statistic)	Adjusted R-square
All (1380)	-0.44 (-42.84)	-0.03 (-9.54)			0.06
Agriculture, forestry, etc. (16)	-0.50 (-7.20)	-0.05 (-2.68)			0.29
Construction (110)	-0.31 (-6.31)	-0.03 (-2.37)			0.04
Manufacturing (927)	-0.45 (-36.07)	-0.03 (-7.10)			0.05
Real estate (19)	-0.47 (-11.64)	-0.09 (-4.84)			0.55
Wholesale and retail (148)	-0.39 (-11.74)	-0.05 (-4.86)			0.13
Service (38)	-0.47 (-8.11)	-0.04 (-1.71)			0.05
Transportation and communication (80)	-0.49 (-19.58)	-0.03 (-5.98)			0.31
All (1305)	-0.58 (-28.06)	-0.02 (-5.50)	0.42 (8.10)	-0.00003 (-1.29)	0.11

We turn first to the bubble hypothesis, which implies a reversal. It is important to note, however, that firms that did better in the second half of the 1980s could do worse subsequently simply because of the contrarian effects in stock returns that have been emphasized in the asset pricing literature. The first regression in table 1 regresses crash returns on boom returns. The coefficient on past returns is quite significant. The R-square is 6.19 percent. To put things in perspective, consider the impact of a one-standard deviation greater than the mean return during the late 1980s. As we just saw, the standard deviation was 188.91 percent. This amounts to an additional loss of 6 percent. Such an effect is not strong evidence of a bursting bubble, but it is perfectly consistent with the contrarian literature.

In the next regressions, we examine this reversion effect at the industry level. It turns out that for most industries, the reversal effect explains little. However, there are spectacular exceptions. Past returns explain a large proportion of cross-sectional variation for agriculture, real estate, and transportation.[6] Real estate is the industry where past returns explain the most. The adjusted R-square of the regressions is 55.42 percent. The R-squares for agriculture and transportation are respectively 29.14 percent and 30.56 percent. Somewhat surprisingly, the R-square for construction is quite low even though it would seem to be an industry related to real estate. Nevertheless, it seems from this that land prices may have been more subject to a reversal effect than stock prices. To pursue further the hypothesis that the negative returns were the result of possible irrational exuberance during the 1980s, we add two valuation variables measured at the end of the 1989, namely the price-earnings ratio and the book-to-market ratio. The book-to-market ratio is the one used in the asset pricing literature, namely the book value of equity divided by the market value of equity. The median price-earnings ratio for our sample at that time is 56.94.

---

[6] Agriculture includes forestry, fishery and mining. Transportation includes communication.

The median book-to-market ratio is 0.25. The regression shows that the price-earnings ratio is not statistically significant. Further, the coefficient is extremely small. The coefficient shows that a firm with double the median price-earnings ratio would have had lower returns of less than 0.20 percent. In contrast, the book-to-market coefficient is extremely significant and its economic significance is similar to the economic significance of past returns in the earlier regression. One standard deviation of the book-to-market coefficient is 0.13. Consequently, a firm that has a higher book-to-market coefficient by one standard deviation has a higher return of 5.7 percent.

We now turn to the second possible explanation. This explanation does not focus on reversals, but rather on a shock to either expected cash flows or their discount rate. This hypothesis implies a larger fall in value for more highly levered firms; in contrast, firms with more cash would have a lower decrease in the value of their equity. This is because the whole firm except for cash loses value, but the impact of this loss in a levered firm is more severe on equity as leverage increases. We therefore use debt to total assets as a measure of leverage. We also control for a forecast of cash flow, using past cash flow divided by total assets. If firms lose valuable investment opportunities, then firms where assets in place are more important should experience less of a negative return. We have data on security holdings for investment purpose. To the extent that these holdings are shares, we would expect security holdings to affect stock returns adversely since with this explanation share prices fall more than the present value of cash flows from operations. We control for the firm's ownership as a further control for whether the firm holds shares of other firms. We would expect some symmetry in share holdings, so that firms that hold more shares of other firms also have more of their shares held by other firms. We therefore control for ownership by other corporations as well as ownership by financial institutions. It is often argued that keiretsu appartenance makes firms less sensitive to adverse shocks. We include an explanatory variable for keiretsu appartenance. This variable is extremely broad since it includes

both vertical and horizontal keiresu appartenance. Finally, we control for size of total assets. One would expect larger firms to be more established so that they might suffer less from a shock to investment opportunities. Obviously, one might find other motivations for firm size and some of the other variables we use and we will discuss some of these later. Our main objective in including these various variables is to capture as much of the cross-sectional variation as possible. We also include as explanatory variables the variables used in table 1. All explanatory variables are measured using 1989 data.

Table 2 shows the means and standard deviations of the explanatory variables as well as the estimated regression. The explanatory variables have generally the expected sign, but not all of them are significant. In particular, debt to total assets, corporate ownership and financial ownership are not significant. In contrast, keiretsu appartenance has a significantly negative coefficient. It turns out that the definition of the keiretsu matters for the inferences one draws from the regression. When we use the narrower definition of bank-oriented keiretsu, keiretsu is no longer significant but both ownership measures are significant. Though the various variables are generally significant, their overall effect in explaining the cross-section of returns is limited. The R-square of the regression is 0.15 in contrast to 0.11 in the earlier regression. Further, a standard deviation change in the explanatory variables never accounts for more than a 5% change in the return and in most cases accounts for about half that.

So far, we have not taken into account bank dependence. The most successful variables in our analysis are variables associated with value - firms with equity that appreciated the most and that are valued the most relative to book are the firms with the worst performance in the period from 1990 to 1993. These "value" variables explain about 11% of the cross-sectional variation in returns. In addition to the regressions reported in table 2, we investigated a number of different variables. If recent investment opportunities are those that lost value, firms that

Table 2. Change in fundamentals and stock returns.

The data for this table is obtained from the PACAP database. Financial firms and utilities are excluded from the sample. Firms are required to be in the database from 1986 to 1993. The returns are buy-and-hold returns. We use a broad definition of keiretsu, so that both horizontal and vertical keiretsus are included. Debt includes both public debt and loans. All explanatory variables are measured using 1989 data.

Explanatory variable	Mean of explanatory variable (Standard deviation)	Estimated coefficient (t-statistic)
Constant		-0.73 (-8.58)
Equity return for 1986-1989	2.38 (1.88)	-0.02 (-4.60)
Keiretsu appartenance dummy variable	0.49 (0.50)	-0.04 (-2.50)
Logarithm of total assets	11.06 (1.34)	0.02 (3.91)
Ownership by other corporations	0.32 (0.18)	-0.10 (-1.63)
Ownership by financial companies	0.34 (0.16)	-0.11 (-1.42)
Debt to total assets	0.65 (0.18)	-0.08 (-1.36)
Book to market ratio	0.26 (0.13)	0.32 (4.76)
Price-earnings ratio	100.3 (314.2)	0.00001 (-0.52)
Cumulative cash flow from 1986 to 1989 to total assets	0.18 (0.11)	0.20 (2.53)
Investment securities to total assets	0.07 (0.06)	-0.36 (-2.63)
R-square		0.15

invested more recently should lose more value. We therefore computed a measure of investment over 1986 to 1989, namely the change in total assets. This variable did not have a significant coefficient. We also included ownership by individual investors since firms with more individual investors might have been more affected by sentiment than other investors. We also added the market value of equity as an additional explanatory variable to control for the size effect, but again with no success. Finally, we considered the issue that firms with more export sales might have suffered from the unexpected appreciation of the yen and controlled for export sales. Export sales is not significant.

4. The role of bank dependence.

In this section, we explore the impact of bank dependence at the end of 1989 on stock returns during the crash period. As shown in table 2, debt to total assets is 0.65 on average with a standard deviation of 0.18. The median is not very different from the mean, since it is 0.66. When we turn to the part of debt that is made of loans, we find that loans to total assets has a mean of 0.21 and a median of 0.16. Firms can have non-bank debt as well as bank debt. PACAP reports loans as opposed to bank loans, but most loans for Japanese firms are bank loans. To check this, we looked at other data sources to obtain bank loans directly for a subsample of firms and generally the reported bank loans are similar to the loans reported by PACAP. The standard deviation of loans to total assets is 0.19 and is about the same as the standard deviation of debt to total assets. The fact that the standard deviation of loans to total assets is so large indicates that there is a large spread in that ratio across firms with many firms that have little bank debt and also many firms that have a large amount of bank debt. While all the firms have positive debt, so that the lowest ratio of debt to total assets is 0.10, a number of firms including firms with more debt are also likely to be firms with more bank debt. The ratio of loans to debt has a mean of 0.2849

with a standard deviation of 0.2235. This ratio has a minimum of 0 and a maximum of 0.9595. The correlation of bank loans to total debt is 0.59 with debt to total assets.

We first consider the effect of bank loans by comparing firms with bank loans to firms without bank loans. In other words, we use firms without bank loans as the control group for firms with bank loans. Table 3 provides this comparison both for the boom and the crash periods. In both periods, the stock return performance of firms without banks loans is significantly different from the stock return performance of firms with bank loans. The difference is also economically significant. During the crash, firms without bank loans lose 13 percent of their value less than firms with bank loans. At the same time, however, firms with bank loans had substantially higher returns during the boom period. Since we saw earlier that firms that did better during the boom period perform worse later, multivariate regressions are necessary to assess better the relation between performance and bank loans during the crash period.

Table 4 shows multivariate regressions. In the first regression of table 4, we replace debt to total assets by loans to total assets in the regression of table 2. There is a strongly significant negative relation between returns and loans to total assets. The coefficient is -0.26 with a t-statistic of -5.86 in contrast to the coefficient on debt to total assets which was -0.08 and insignificant. Note that this coefficient implies that a one-standard deviation increase in loans to total assets represents a worsening of performance of slightly more than 5 percent over the three-year period. In contrast, the effect of a one standard deviation change of the book to market ratio is slightly more than 4 percent in that regression. The R-square of the regression is 0.17 rather than 0.14 in table 2. The other regression coefficients are roughly unchanged. If we add debt to total assets to that regression, both variables are significant but debt to total assets has a positive sign. We do not reproduce this regression.

To further explore the impact of possible credit constraints on firm value, we show a

Table 3. Comparison of returns for firms with loans and without loans in 1989.
The data for this table is obtained from the PACAP database. Financial firms and utilities are excluded from the sample. Firms are required to be in the database from 1986 to 1993. The returns are buy-and-hold returns. The sample comprises 1198 firms with loans and 141 firms without loans. The t-statistic for the comparison assumes unequal variances since the equality of variances for the two subsamples is rejected.

	Firms with loans (t-statistic)	Firms without loans (t-statistic)	Difference (t-statistic)
1986-1989	245.47% (44.42)	172.05% (12.65)	73.42% (5.00)
1990-1993	-53.07% (-77.61)	-40.36% (-17.24)	-12.71% (-5.21)

regression where we add a measure of liquid assets. Liquid assets are defined as cash plus tradeable securities. In that regression, loans to total assets has a significant negative coefficient and debt to total assets has a positive significant coefficient. Since the coefficient of loans to total assets is fairly similar to what it is in the first regression, it is reasonable to think that the results indicate that public debt has a different impact on firm returns than bank debt. We will consider this issue in more detail later. The positive significant coefficient on liquid assets indicates that firms that had more liquid assets before the crash were better able to cope with the difficulties in obtaining funds. An alternative approach is to control for leverage and then consider the effect of the ratio of bank debt to total debt on returns. This is the third regression in table 4. In that regression, loans to total debt is highly negatively significant. The other regression coefficients differ little from those of the first regression. This regression shows that the composition of debt matters strongly. We also estimated the regressions in table 4 controlling for industry effects using dummy variables for the industries used in table 1. In the last column of the table, we report estimates controlling for industry effects. We leave out the coefficients for the industry dummy variables. Only one of the industry dummy variables, the one for manufacturing, is significant. It has a coefficient of 0.13 with a t-statistic of 2.63. The coefficient estimates for the other variables are similar when we control for industry effects.

In table 4, we estimate a regression where we add a proxy for access to capital markets. In Japan, most public debt financing takes the form of convertible debt. Firms that have issued such debt before the crash period are presumably firms with greater access to capital markets. We therefore use the ratio of the book value of convertible debt to total assets in 19891 as an explanatory variable. In the first regression, we use convertible debt to total assets but not loans

Table 4. The role of bank debt.

The data for this table is obtained from the PACAP database. Financial firms and utilities are excluded from the sample. Firms are required to be in the database from 1986 to 1993. The returns are buy-and-hold returns. We use a broad definition of keiretsu, so that both horizontal and vertical keiretsus are included. Debt includes both public debt and loans. Loans include both bank loans and non-bank loans. All explanatory variables are measured using data available at the end of 1989.

Explanatory variable	Estimated coefficient (t-statistic)			
Constant	-0.71 (-9.14)	-0.85 (-8.93)	-0.77 (-8.08)	-0.76 (-7.35)
Equity return for 1986-1989	-0.02 (-4.24)	-0.02 (-4.06)	-0.02 (-3.96)	-0.02 (-4.54)
Keiretsu appartenance	-0.04 (-2.80)	-0.04 (-2.74)	-0.04 (-2.68)	-0.04 (-2.22)
Logarithm of total assets	0.03 (3.88)	0.02 (2.55)	0.02 (2.23)	0.01 (1.89)
Ownership by other corporations	-0.07 (-1.17)	-0.12 (-1.87)	-0.12 (-1.92)	-0.11 (-1.73)
Ownership by financial companies	-0.10 (-1.30)	-0.12 (-1.45)	-0.12 (-1.48)	-0.10 (-1.21)
Debt to total assets		0.27 (3.53)	0.19 (2.72)	0.13 (1.88)
Loans to total assets	-0.26 (-5.86)	-0.35 (-6.24)		
Loans to total debt			-0.26 (-6.54)	-0.21 (-5.03)
Book to market ratio	0.25 (4.15)	0.37 (5.37)	0.38 (5.47)	0.35 (4.95)
Price-earnings ratio	-0.00 (-0.05)	0.00 (0.68)	0.00 (0.69)	0.00 (0.67)
Cumulative cash flow from 1986 to 1989 to total assets	0.14 (1.90)	0.26 (3.03)	0.25 (2.92)	0.33 (3.65)
Investment securities to total assets	-0.34 (-2.55)	-0.20 (-1.30)	-0.16 (-1.08)	-0.11 (-0.74)

Liquid assets to total assets		0.13 (1.81)	0.11 (1.47)	0.12 (1.62)
R-square	0.17	0.19	0.19	0.21

to total debt. Convertible debt has a significant positive coefficient that is quite large. Consequently, firm performance during the crash period is an increasing function of the ratio of book value of convertible debt to total assets. In the next regression, we allow for an effect of bank loans. Bank loans is significant, but convertible debt loses its significance. Obviously, bank loans and convertible debt are negatively related. A firm whose debt is all in the form of bank loans cannot have convertible debt. Yet, what these regressions suggest is that convertible debt in the first regression seems to proxy for bank loans. Since the Yen appreciated dramatically at the beginning of the 1990s, part of the difficulties of the firms might have been associated with their decreased competitiveness on export markets. For a subset of 436 firms, we have information on exports. The coefficient on exports to total sales is not significant. Controlling for convertible debt or exports has no impact on the coefficient on bank loans to total debt.

Could there be an alternative explanation for our results? Hickock and Osler (1995) argue in their article that the crash prevented firms from using the equity market for financing and consequently made bank finance a more important source of financing. This reasoning would predict worse performance for firms with high leverage since these firms would be most restricted in raising funds. Firms with low leverage could use bank financing more easily than firms with high leverage irrespective of the ratio of bank loans to total debt. In our regressions, leverage is much less important than loans as a determinant of stock returns over the period we examine and once we control for bank loans there is no evidence of a negative effect of leverage. Another possibility is that some unobserved fundamental variables that affect firm value happen to be correlated with

Table 5. The role of bank-debt when controlling for convertible debt and exports.

The data for this table is obtained from the PACAP database. Financial firms and utilities are excluded from the sample. Firms are required to be in the database from 1986 to 1993. The returns are buy-and-hold returns. We use a broad definition of keiretsu, so that both horizontal and vertical keiretsus are included. Debt includes both public debt and loans. Loans include both bank loans and non-bank loans. All explanatory variables are measured using 1989 data.

Explanatory variable	Estimated coefficient (t-statistic)		
Sample size	861	861	437
Constant	-0.80 (-8.22)	-0.77 (-8.07)	-0.88 (-6.38)
Equity return for 1986-1989	-0.02 (-3.81)	-0.02 (-3.89)	-0.02 (-2.27)
Keiretsu appartenance	-0.03 (-2.09)	-0.04 (-2.62)	-0.01 (-0.36)
Logarithm of total assets	0.02 (3.13)	0.02 (2.24)	0.01 (1.24)
Ownership by other corporations	-0.14 (-2.09)	-0.12 (-1.93)	-0.15 (-1.39)
Ownership by financial companies	-0.15 (-1.78)	-0.12 (-1.51)	-0.14 (-1.05)
Debt to total assets	0.02 (0.31)	0.19 (2.67)	0.33 (2.97)
Loans to total debt		-0.26 (-6.14)	-0.29 (-3.93)
Book to market ratio	0.38 (5.37)	0.38 (5.47)	0.48 (3.91)
Price-earnings ratio	-0.00 (-0.09)	0.00 (0 .7 0)	0.00 (0.66)
Cumulative cash flow from 1986 to 1989 to total assets	0.24 (2.74)	0.25 (2.87)	0.20 (1.36)

Investment securities to total assets	-0.31 (-2.03)	-0.17 (-1.11)	-0.12 (-0.51)
Liquid assets to total assets	0.10 (1.37)	0.10 (1.38)	0.21 (1.71)
Exports to sales			0.006 (0.08)
Convertible debt to total assets	0.28 (2.23)	0.04 (0.35)	-0.07 (-0.40)
R-square	0.15	0.19	0.13

bank loans and are not captured by the various variables we control for in our regressions. For instance, it might be that firms with more bank loans held more land and/or more shares for long-term investment. However, such firms would have performed better from 1986 to 1989 and we control for performance from 1986 to 1989. We also control for the book-to-market ratio.

4. Did bank dependence affect investment?

So far, we have seen that firms with greater bank dependence suffered greater losses during the Japanese crash. The effect is both statistically and economically significant. We now consider whether bank dependence had an effect on investment during that period of time. If the weakening of banks caused firms that were highly bank-dependent to be credit-constrained, then bank dependence should be negatively related to investment from 1990 to 1993. We are limited in our choice of proxies for investment by data constraints. We use the growth in fixed assets from 1990 to 1993 normalized by fixed assets in 1990. We first regress our investment proxy on book to market, cumulative net income from 1990 to 1993, and sales growth from 1988 to 1989, and liquid assets divided by fixed assets in 1989. This regression is reported in table 6. We then add loans to total debt as an explanatory variable in the second regression. Loans to total debt is

significantly negative at the 10% level, indicating that investment is related to the composition of debt. This evidence is consistent with the view that more bank-dependent firms had to contract investment more. To investigate the robustness of the result, we report a third regression where we control for leverage. Surprisingly, leverage has a significant positive coefficient. While we do not report the results in table 6, we also investigated the impact on our main result of various alternative specifications. In particular, we added depreciation to net income for the subset of firms for which depreciation is available. We used sales growth from 1986 to 1989 instead of sales growth from 1988 to 1989. Finally, we controlled for Keiretsu appartenance. Keiretsu appartenance has a negative insignificant coefficient. None of these changes affect our main result.

6. Conclusion.

We have shown in this paper that bank-dependence affects firms adversely during the 1990 to 1993 period in Japan when bank balance sheets were weak. This evidence points to an important cost of bank finance, namely that a firm can be constrained from investing in valuable projects because the banks it relies on to provide financing cannot do so and because, as a result of its reliance on banks, it does not have good financing alternatives. At a time when many are arguing that government policy should foster bank-centered corporate governance, it is important to understand that bank dependence makes firms more sensitive to shocks affecting the banking sector.

Table 6. Investment and bank dependence.

The data for this table is obtained from the PACAP database. Financial firms and utilities are excluded from the sample. Firms are required to be in the database from 1986 to 1993. Loans include both bank loans and non-bank loans. The proxy for investment is fixed assets in 1993 minus fixed assets in 1990 divided by fixed assets in 1990. Sales growth is sales in 1989 minus sales in 1988 divided by sales in 1988. Liquid assets are cash and marketable securities holdings in 1989. Loan to debt ratio is the loan to debt ratio in 1989. Net income over fixed assets is for the period from 1990 to 1993. There are 1061 observations.

Variable	Coefficient (t-statistic)		
Constant	0.29 (7.56)	0.35 (6.73)	0.05 (0.51)
Book to market	0.06 (0.51)	-0.02 (-0.12)	0.22 (1.49)
Net income/Fixed assets	0.04 (4.84)	0.03 (4.53)	0.03 (4.49)
Sales growth	0.61 (5.87)	0.61 (5.86)	0.60 (5.77)
Liquid asset/Fixed assets	0.001 (0.39)	0.001 (0.57)	0.0003 (0.13)
Loan to debt		-0.13 (-1.69)	-0.28 (-3.20)
Debt to total assets			0.45 (3.78)
Adjusted R-square	0.05	0.05	0.06

References

Gibson, Michael S., 1995, Can bank health affect investment? Evidence from Japan, Journal of Business 68, p. 281-308.

French, K., and J. Poterba, 1991, Were Japanese stock prices too high?, Journal of Financial Economics 29, 337-363.

Hall, B.J., and D.E. Weinstein, 1996, The myth of the patient Japanese: Corporate myopia and financial distress in Japan and the US, unpublished working paper, Harvard University, Cambridge MA.

Hickock, S. and C. Osler, 1995, The credit slowdown abroad, in Studies on Causes and Consequences of the 1989-1992 Credit Slowdown, Federal Reserve Bank of New York, New York.

Hoshi, T., A. Kashyap, and D. Scharfstein, 1991, Corporate structure, liquidity, and investment: Evidence from Japanese industrial groups, The Quarterly Journal of Economics, 33-60.

Kang, J.-K., 1993, The international market for corporate control: Mergers and acquisitions of U.S. firms by Japanese firms, Journal of Financial Economics 34, 345-372.

Kang, J.-K., and A. Shivdasani, 1997, Corporate restructuring during performance declines in Japan, Journal of Financial Economics, forthcoming.

Kaplan, S. N., and B. A. Minton, 1994, Appointments of outsiders to Japanese boards: Determinants and implications for managers, Journal of Financial Economics 36, 225-258.

Marsh, T. A., and J.-M. Paul, 1997, BIS capital regulations and Japanese banks' bad loan problems, unpublished working paper, University of California at Berkeley, Berkeley, CA.

Rajan, R., 1992, Insiders and outsiders: The choice between relationship and arm's length debt, Journal of Finance 47, 1367-1400.

Slovin, M.B., M.F. Sushka, and J.A. Polonchek, 1993, The value of bank durability: Borrowers and bank stakeholders, Journal of Finance 48, 247-266.

Thurow, L., 1993, Head-to-head: The coming economic battle among Japan, Europe and America, Warner Books.

Weinstein, D. E., and Y. Yafeh, 1997, On the costs of a bank centered financial system: Evidence from the changing main bank relations in Japan, Journal of Finance, forthcoming.