Bank Power and Cash Holdings: Evidence from Japan

By

Lee Pinkowitz and Rohan Williamson*

Preliminary: Comments Welcome

This Version: August 23, 1998

Abstract

Using a sample of firm years from the United States, Germany and Japan, we examine the effect of bank power on the cash holdings of firms. We show that firms in Japan have higher cash holdings than those in the US or Germany, which indicates that there are possible agency problems associated with a bank centered system that lacks another source of monitoring. Through an analysis of the Japanese firms we show that the high cash levels are correlated with power of the banks. During periods of high bank power, firms' cash holdings seem to be consistent with banks extracting rents, yet when the banks are weaker, firms appear to hold cash for precautionary reasons. We conclude that the Japanese banks persuade firms to hold higher cash balances than firms in the US and Germany. This is contrary to widely held beliefs about the Japanese governance system.

* Ph.D Candidate, The Ohio State University and Assistant Professor, Georgetown University, respectively. We would like to thank Bernadette Minton and René Stulz for their invaluable comments and suggestions. We also thank Jim Angel, Allan Eberhart, Jeff Harris, Jarrad Harford, Jan Jindra, Andrei Shleifer, Sonya Williams-Stanton, Yishay Yafeh and seminar participants at The Ohio State University, the SEC, and the 1998 International Finance Conference at the Georgia Institute of Technology. Previous versions of this paper appeared under the title "Governance Structures and Financing Behavior: An International Perspective."

1. Introduction

Should firms in a system with agency costs hold higher levels of liquid assets than in a system where agency costs are believed to be minimal? This is the primary difference between the US system where capital markets act as a monitor and the Japanese system in which the main bank acts as the primary monitor and disciplinarian of the firm. The basic criticism of a US type system is that with non-active atomistic shareholders and bondholders there may not be optimal monitoring of managers, giving rise to many forms of agency costs.[1] Conversely, in the Japanese system where a main bank acts as monitor and firms are members of large industrial groups (*keiretsu*) with coordinated cross holdings, these conflicts should be mitigated. A reduction in agency costs is to be expected since the main bank relationship should lead to a reduction in asymmetric information and a reduction in the wasteful behavior by management. These two benefits should lead to lower cash holdings in Japanese firms versus US firms, since there is less need to hold cash for precautionary reasons. Likewise, the close monitoring by the main bank should lead to an elimination of cash hoarding for the benefit of management. An analysis of cash holdings leads to the striking result that Japanese firms hold significantly higher levels of cash than US firms. The remainder of the paper then evaluates the possible explanations for this result. We examine whether a system in which banks wield significant influence as the primary monitor and provider of financing leads to higher cash holdings than a system in which the capital markets performs these roles.

In the corporate finance literature, one of the major issues is the reduction of the many forms of agency costs. In the US, these agency problems arise from a corporate governance system in which

[1] This is based on arguments put forth in Berle and Means (1932).

there exists a separation of ownership and control. There has been an extensive amount of financial economics literature examining these potential problems.[2]

Jensen and Meckling (1976) argue that the separation of ownership and control creates many forms of agency costs, while Myers and Majluf (1984) examine the case of information asymmetry between managers and shareholders. Since these costs can make external financing costly, it seems only logical that firms would prefer to finance projects solely from internal funds and operating cash flow. However, Jensen (1986) points out that excess cash could result in free cash flow. Jensen argues that free cash flow should not only be returned to the shareholders, but precautionary steps need to be taken in order to prevent firms from building up free cash in the first place.

In Japan, some forms of agency conflict may be mitigated since a main bank acting as monitor can provide liquidity to the firm, reduce costs associated with financial distress and play a general disciplinary role, especially in the case of poor managerial performance.[3] At the forefront of this reasoning is Diamond's (1984) argument that banks can serve as monitors who bear the costs of becoming informed and ensure that firms make efficient business decisions. Also, with a diversified portfolio, bank monitoring is the least costly way to overcome the asymmetric information between borrowers and lenders. In addition, Japan may have lower agency costs due to the equity ownership of the main banks. Jensen and Meckling (1976) argue that if stakeholders own debt as well as equity in the firm, then the conflict between the two groups can be reduced. Thus, with the main bank acting as monitor as well as holding both an equity and debt stake in the firm, the agency costs that are

[2] Although there are many papers that discuss these issues, we choose to focus on a few of the main papers.

[3] See Kaplan and Minton (1994), Hoshi, Kashyap and Scharfstein (1990, 1991) and Sheard (1989) for examples.

familiar in the US system should be reduced or even eliminated. With a reduction in agency costs, we would expect the cost differential between external and internal financing to be small. Consequently, relative to the US, we would expect Japanese firms to hold lower levels of cash. The circumstances under which this might not occur may be influenced by the amount of power that is held by the main bank. It may be in the best interest of the main bank to have the firms in which it acts as principal monitor hold relatively high levels of cash.[4]

The initial examination of the cash holdings of Japanese and US firms leads to a striking result based on the predictions of the above arguments. We find that Japanese firms hold significantly higher levels of cash than firms from the United States (affirming the results in Rajan and Zingales (1995)). Japanese firms also exhibit greater persistence in cash holdings than US firms. When we include a sample of German firms, we find that the cash holdings in Germany are similar to those in the US. This is even more interesting since the German system is also characterized as being bank centered. These findings are inconsistent with any arguments of the efficiencies of the Japanese main bank monitoring system. What then could explain the high cash holdings of Japanese firms?

The governance system in Japan is characterized by a closely held ownership structure in which firms in an industrial group (keiretsu) hold shares of other keiretsu firms.[5] Additionally, at the center of this system, there is a large (main) bank which holds equity in the firms. Similar to the Japanese system, German banks also have significant ownership and even greater voting control in most of the large manufacturing firms. Also, German firms frequently have one or more large blockholders via a

[4] See Macey and Miller (1997) for a discussion of banks' incentives in the US, Japan, and Germany and why they might not coincide with those of shareholders.

[5] For a complete discussion of the Japanese main bank system and keiretsu arrangement see Aoki, Patrick and Sheard (1994)

system of pyramided holdings. The ultimate holder of the large blocks is most often a family group or another corporation (Franks and Mayer (1997)). Thus, although in both Germany and Japan, the large external stockholder takes a more active role in the management of the firm than in the US, generally, there are no large nonbank blockholders in the Japanese system with at least equivalent power as the banks.[6] This lack of a counteracting influence could result in a situation in which the Japanese main banks possess monopoly power. If this were the case, we may observe banks persuading firms to hold higher levels of cash in order to extract rents or reduce the banks monitoring costs.

We explore this rent extraction hypothesis through a detailed evaluation of Japanese firms' cash holdings across time. Banks in Japan had effective monopoly power during the period after the second world war through the 1970's, but became weaker following a liberalization of the capital markets and an exogenous adverse shock in the late 1980's and into the 1990's. Consistent with the bank power arguments, Japanese firms held significantly higher levels of cash during the 1970's than during the late 80's and 90's. The cash holdings during the later years are still relatively high, but closer to US levels. More interesting, debt levels were also significantly lower in the later period which lends support to the idea that when powerful, Japanese banks may have preferred firms to hoard cash rather than use it to pay down their debt. These results are supportive of our arguments that during the 70's, Japanese firms held cash in order to generate rents for the main banks, reduce the banks monitoring costs, or both. However when the banking system weakened, since capital markets were not as developed as in the US, firms seem to hold cash for precautionary reasons. These results are even more pronounced when we evaluate the level of bank debt to total debt held by the firms. There was a significant

[6] However, the German evidence in Franks and Mayer (1997) is not consistent with the idea that large shareholders are acting as diligent monitors, which may be due to the multiple layers of corporate holdings. They find that block shareholding is not significantly related to board turnover for firms with poor operating performance.

decrease in the level of bank debt from the earlier to the later period. The implication is that there appears to be agency costs of a bank centered system when there are no other monitoring forces, such as large nonbank blockholders or well developed capital markets.

The rest of the paper is organized as follows. In Section 2, we present a theoretical discussion of the predictions of the various governance systems as it pertains to a firm's cash balance. Also, we present our hypotheses that explain cash holdings behavior in Japan. In Section 3 the data are described along with our methodology, while the determinants of cash holdings across the three countries are presented in Section 4. In section 5 we take a closer look at the Japanese system and the changes in cash holdings across time. Section 6 concludes along with some general implications for various systems of corporate governance.

2. Corporate Governance and Cash Holdings: Theory and Prediction

In this paper we are interested in the role of banks in monitoring the cash holdings of nonbank firms. We first lay out the arguments under which one would expect some agency costs to be lower in a bank centered system versus one in which the firms are monitored by the capital markets. We then discuss the circumstances under which a bank centered system may not be an efficient monitor for all shareholders and could lead to higher than expected cash holdings by firms. Finally, we summarize the empirical predictions.

2.1 Cash holdings and agency costs

Access to the capital markets is a major concern for firms in any country. However, in the US, this should be more significant than in Japan. A US firm which requires external financing can rely on

either debt or equity, but both have an information asymmetry problem which may prevent financing from being obtained. Myers and Majluf (1984) examine the case of information asymmetry between managers and shareholders. The main conclusion of their model is that because of asymmetric information costs, firms prefer to issue safer securities before riskier ones and thus firms desire financial slack.

Similarly, there are informational asymmetry costs associated with lending (see for instance Leland and Pyle (1977) and Diamond (1984)). In some cases, identifying a firm's quality may be so difficult that the lender may simply ration credit (see Stiglitz and Weiss (1981)). Clearly, the higher the level of informational asymmetry between the firm and the lender, the more difficult it will be for the lender to ascertain the firm's credit quality. Because of this asymmetry in lending and the possibility of credit rationing by banks, firms may decide to hold cash for precautionary reasons. Firms may hold high levels of cash so they can survive times of tight credit and still be able to take advantage of positive NPV projects. However, Jensen (1986) cautions about the agency costs associated with firms holding too much cash, referring to this as the costs associated with free cash flow.

Compared to the US, in Japan, where banks are closely connected with the operations of the firms to which they lend, it is assumed that the cost of determining credit quality will be lower. Since bank officials are often members of the firm's board and perhaps its management team, they are able to observe the firm's operations on a relatively frequent basis and may be able to assess the firm's credit quality prior to a financing need. Additionally, firms within a group or keiretsu often share human capital and information. Therefore, the Japanese system of governance differs from the US in several ways which should impact the problems associated with informational asymmetries and free cash flow. This situation is analogous to the recent literature on small firms and bank relationships in

the US. Smaller firms tend to have larger informational asymmetries, but Petersen and Rajan (1994) show that small firms which have a lending relationship with a bank are more likely to have access to credit than those without such relationships.

Lenders must also be concerned about the risk of asset substitution when they provide debt to a firm. Typically in the US, restrictive debt covenants are used to preclude shareholders from undertaking a higher risk program. As Jensen and Meckling (1976) argue, another way to resolve this potential agency conflict is to have stockholders own proportionate shares of debt and equity, essentially strip financing. However, since US banks are very limited in their ability to hold equity, this resolution is unavailable. This is not the case in Japan, though, where the banks not only can, but do hold equity in the firms to which they lend.[7] By holding equity, the Japanese banks are protected against the risk of asset substitution because they are shareholders as well as lenders.

In sum, US lenders not only face the problem of assessing credit quality, but they are also subject to asset substitution.[8] Further, since US banks cannot hold equity, not only do they need to be concerned about risk substitution, but the fact that the firm's project may be foregone does not provide any further incentive for the bank to lend. Thus it seems as though US firms would be better off holding proportionately more cash for precautionary motives.[9] Conversely, in Japan, the active

[7] There are limits on the amount equity a bank can hold in a firm in Japan but this is not binding since there is a complex web of cross holdings across firms and banks. Through these cross holdings, a bank can effectively have control over a higher percentage of shares than is formally allowed by law.

[8] Although we discuss the problems that US banks face, the discussion generalizes to other creditors. Bondholders have to assess the risk of default when deciding whether or not to purchase bonds and they are at risk of asset substitution, thus the fact that US firms do not have to rely solely on banks does not materially affect our argument. Although bondholders can hold equity, wealth constraints are likely to make strip financing difficult.

[9] Opler, Pinkowitz, Stulz, and Williamson (1998) provide evidence which is consistent with US firms holding cash for precautionary reasons.

participation of the main bank and the web of cross ownership should lead to much lower agency costs from asset substitution, asymmetric information and free cash flow. Thus we would expect Japanese non-bank firms to hold very little cash relative to the United States.

2.2. Why would Japanese firms hold high levels of cash?

Given the discussion in the previous sub-section, it is easy to conclude that cash holdings in Japan should be lower than in the US. Additionally, since they are both bank centered, there should be no significant difference in the level of cash held by Japanese and German firms. This would be the case unless we consider the fact that under a system of bank centered monitoring, we must be concerned with banks having monopoly power and the incentives of the bank that may result. Also, if we include the responsibilities of the main bank under such a system it will become clearer why Japanese banks may induce firms to hold higher levels of cash relative to other markets.

Weinstein and Yafeh (1998) show that a system with bank centered monitoring may lead to wealth redistribution from the manufacturing sector to the banking sector, and that firms with no bank ties outperform firms that are connected to a main bank. Also, they argue that risk averse banks may encourage firms to take on fewer positive NPV projects. However if the bank was interested in redistributing wealth or extracting rents, how might this be facilitated through the firm's cash holdings? One way is by firms holding large reserves of cash rather than paying it out as dividends. For instance, suppose the bank holds 5% of a firm's equity, then if the firm paid out its excess cash in the form of a dividend, the bank would receive only 5% of the cash.[10] In this case the bank would have 5% of the

[10] In Japan banks could hold up to 10% of a firms shares until 1987 when it dropped to 5%. Even though banks are limited to 5% of the equity, due to the keiretsu arrangement and the fact that the main bank is over a number of smaller banks, the effective control over equity could be much larger.

cash to use to make loans to other firms, less any reserve requirements. However, if the firm pays no dividends and holds the cash on deposit at the bank, the bank would have 100% of the cash that it could use to lend to other firms at a profitable interest rate. If the bank is required to pay taxes on its dividend distribution, this would give further incentive to the bank to pursue such action.

There is an additional consideration, which is particularly applicable to the Japanese banks. If a bank persuades a firm to hold a large level of cash, it is reasonable to assume that the firm may not need as much debt financing from the bank as they would if the firm paid out its excess cash. Thus, the bank may incur a cost by encouraging cash holdings, namely the loss of potential loans to those firms. Hence, Japanese banks which are shareholders or which have considerable control seem to face a tradeoff between encouraging the firm to hold cash and paying the cash out as dividends. The tradeoff is that with large cash holdings, banks have more funds to lend to the general market than if the bank depended primarily on dividend income; however, the cash rich firm might not need to borrow as much. The ideal situation for the bank is if the cash rich firm decides to hoard the cash and use bank financing for its positive NPV projects. This situation can only occur if the banks have monopoly power and thus can extract rents from the firms.

The ability of banks to extract rents when it has monopoly power is similar to the argument presented in Petersen and Rajan (1995). Petersen and Rajan (1995) show that the rents banks can extract tend to be directly related to how competitive the market for financing is in the city where a firm is located. This argument is particularly applicable to the bank centered system in Japan where, due to the *keiretsu*, the competition among banks is almost nonexistent. Therefore, if the Japanese system provides the main bank with monopoly power, the banks may persuade firms to hold higher

levels of cash than would be expected based on US agency cost considerations. Although we don't discuss it in depth, these large cash holdings can be thought of as compensating balances.

During the industrial growth of the Japanese economy, there were ceilings on the interest rate that banks could charge firms. This ceiling was set relatively low, thus banks used a system of compensating balances in order to earn a higher effective interest rate. The mechanism through which compensating balances could be eliminated is competition across banks. Since there is very little competition across banks in Japan, compensating balances are a viable device for rent extraction by the banking system. Also, compensating balances could be used to better discriminate among borrowers with varying levels of risk.

There exists yet another reason that banks may encourage firms to which they lend to hold large amounts of cash. Although equity ownership decreases the risks of asset substitution, Japanese banks typically hold more of a firm's debt than its equity. By keeping a large reserve of cash on hand, the firm reduces its risk of default and thus increases the value of the debt (see Macey and Miller (1997) for a discussion). In the main bank system of Japan, the bank is expected to support the firm if encounters financial difficulty.[11] Therefore, a reduction in the probability of default reduces the costs of the firm's financial distress to the bank.

Hoshi, Kashyap and Sharfstein (1990) show that firms with strong main bank ties tend to invest more and sell more than firms without these strong ties when they face financial distress. They conclude that a main bank relationship either overcomes the free-rider problem and allows efficient renegotiation or that the main bank simply refuses to allow one of its group to fail due to a reputation

[11] Aoki, Patrick and Sheard (1994) discuss the Japanese main bank system and the responsibilities of the main bank.

issue. Kaplan and Minton (1994) shows that the main bank plays a monitoring and disciplinary role by placing members of the bank on the firm's board or actively manages the firm during time of distress and contraction. These papers argue that the cost of financial distress is relatively low for Japanese firms. Here we argue that, due to the role of the main bank in the Japanese system, the financial distress costs may be passed on to the banks.

At times, main banks have even fulfilled the liabilities of its borrowers to outside entities. This implies that a firm's default may be more costly for a Japanese bank than a US bank since the Japanese bank stands to lose not only the loans it made to the firm, but may also face costs associated with loss of reputation or explicit costs associated with honoring the firm's liabilities. With default being a more costly state, we would expect to see Japanese banks take precautions to avoid it, which may include requiring large cash holdings of the firm. Many of the predictions on cash holdings for the cost reduction in financial distress versus the rent extraction hypothesis will be the same. Therefore, it is difficult to cleanly disentangle the motives of the bank. However, regardless of the motives, this behavior may be detrimental to shareholders.

2.3. Other Predictions

Based on the agency cost arguments, we expect that US firms should have larger cash holdings than Japanese firms. However, this may not be the case if Japanese banks exert monopoly power and extract rents by persuading firms to hold cash balances which may be higher than optimal. Interesting questions that arise out of the previous discussion are whether or not this situation exists in other developed markets with bank centered systems, such as Germany. Additionally, since the strength of the banking system in Japan decreased since the 1970's along with structural changes that resulted in

the reduction of barriers to firms issuing public debt, what role would these occurrences play in firms' cash holdings?

On the surface, it's not apparent that there should be a significant difference in the cash holdings of German and Japanese firms. In fact, Japanese banks own less stock than do their German counterparts and due to voting rules, they have far less voting control than do German banks. This would seem to indicate a similar monopoly power in Germany. However, in Germany, there are forces that counteract the power of banks. First, the German system provides for a two tiered board in which employees as well as stockholders hold seats on the supervisory board. Additionally, although there are cross holdings in Germany, there is not an equivalent keiretsu structure as is found in the Japanese system. More importantly, often there exist large active nonbank shareholders who may act to mitigate the power of the banks, thus leading to relatively lower cash holdings.

During the 1970's and 1980's the Japanese system underwent changes that made it easier for firms to issue public debt. Additionally, regulatory changes reduced the power of the banks by lowering the maximum percentage of shares banks could own in a particular firm. The maximum share provision was enacted in 1977 but banks had 10 years to comply, therefore the provision was not binding until 1987. Finally, by the early 1990's the health of the Japanese banking system came into question. With the weakening of the power of the main banks and the ability to more easily issue public debt, both domestically and internationally, we should see Japanese firms moving towards similar levels of cash as we observe in the US. In addition, we might see a reduction in the level of debt, but in particular the level of bank debt. This should be hastened by the weakening of the banking sector. However, we may also observe an increase in cash hoarding activity since with weakened banks, firms

may be more likely to face credit rationing. The rest of the paper is focused on empirically testing these hypotheses.

3. Data and Methodology

We use the PACAP files of all Japanese firms from 1974-1995 for our analysis. For German data, we use COMPUSTAT's Global Vantage database from 1984-1994, while the US firm data is from COMPUSTAT for 1971-1994. In this paper, for the US and Germany, cash refers to cash and marketable securities. However, in Japan, since there are significant cross holdings of shares of other firms, cash refers only to cash on hand as reported in the PACAP database. This should bias our results toward finding that Japanese firms have lower cash holdings than firms in the US or Germany. Since we are trying to examine the effect of cash, we deflate all variables by assets minus cash which we refer to as net assets following Opler, et. al. (1998).

We use the year end Japanese consumer price index (including imputed rent) to deflate total assets to 1994 Yen. To calculate total assets in 1994 dollars, we use the average monthly exchange rate for the dollar to the yen during 1994. Size is the natural logarithm of total assets, thus real size is the value of the logarithm of total assets based on 1994 US dollars. The German data is adjusted similarly using the CPI from West Germany, obtained from CITIBASE.

Since we are concerned with free cash flow as well as potential underinvestment, we need to examine a firm's investment policy. For the US data, we rely on the flow of funds statements, however, we do not have access to this data for Japanese and German firms. As a proxy for capital expenditures, we use the annual change in net fixed assets to which we add back depreciation charges.

Roughly 4 percent of the Japanese firm years we examine have negative capital expenditures using this proxy. For Germany, roughly 18 percent of the firm years have negative capital expenditures.

We use the market to book ratio as a measure of a firm's growth opportunities since the value of growth options are not included in a firm's book value, but should be reflected in its market value (see for instance Smith and Watts (1992)). Market to book is defined as book value of assets - book value of equity + market value of equity / total assets. We define a firm's cash flow as income from operations + depreciation charges - interest and discount charges - income taxes - cash dividends, while total leverage is defined as long-term debt + short-term debt divided by total assets. Since we need to control for alternative sources of liquidity, we also examine net working capital, which we define as current assets - current liabilities - cash. Thus, net working capital is examined without the impact of cash included in it.

For Japan, bank holdings are calculated using shares owned by financial institutions divided by total shares outstanding. In this paper, we will refer to all financial institutions as banks. COMPUSTAT Global Vantage does not have financial institution holdings for Germany, hence we do not have bank ownership data in German firms. To control for outliers which may impact our results, all raw variables are winsorized at the 1 percent tails.

4. Cash Holdings: A Cross Country Analysis

Table 1 shows summary statistics for Japan, Germany and the United Sates. Panel A shows Japanese firm years from 1974-1995, Panel B includes German firm years from 1984-1994, and Panel C contains US firm years from 1971-1994. The first thing to notice is that Japanese firms hold a greater percentage of their assets in cash. On average, they hold 18.5 percent of net assets in cash,

which is slightly greater than the US, but remember that for the US the cash includes marketable securities while in Japan it only includes liquid cash. Japan is also 50 percent greater than the mean for Germany's cash and marketable securities. The results are more striking when we compare the medians. The median Japanese firm holds roughly two and one half times the amount of cash that the median German or US firm does. The high cash levels in Japan are consistent with the findings in Rajan and Zingales (1995). This is interesting since the Japanese firms have significant cross holdings and are monitored by banks as well as other firms that own its debt and equity. However, this is consistent with the idea that the monopoly power of the Japanese main bank system may allow banks to extract rents from their borrowers through large holdings of cash. We also notice that when we examine the quartiles of cash, Germany and the US seem relatively similar, while Japanese firms hold more cash at each quartile.

We find that the foreign firms in our sample are larger than the US firms. This makes the higher cash holdings of Japanese firms even more surprising since smaller firms are more likely to hold higher levels of cash. Therefore, any bias our sample creates would tend to be towards the US cash holdings being overstated. Market to book ratios appear to be similar across countries, while net working capital to net assets is dramatically different. German firms tend to have high levels of net working capital to assets while Japanese firms have very low levels, with more than half of the firm years characterized by negative net working capital. This may simply reflect the fact that Japanese firms are well known for not holding large stocks of inventory.

Pertaining to leverage, we notice that Japanese firms are not very different from US firms although they are slightly more levered, while German firms seem to carry relatively little debt. Another interesting observation is that although Japanese firms seem best able to pay cash dividends,

they pay the least, with the average German firm paying out 80 times the level of the average Japanese firm. This is consistent with the idea that the large non-bank blockholders in Germany push for higher dividends since, unlike banks, they do not benefit from large cash holdings. US firms tend to fall in the middle.

One possible reason a firm may hold cash is to smooth out the fluctuations of internally generated cash flow. Industry sigma is the mean of the standard deviation of cash flow to assets for 20 (10) years for Japanese and US (German) firms for each year in each industry. Industry is defined as 2 digit SIC code for Germany and the US and 2 digit industry code (INDID) from PACAP for Japan. This variable accounts for the volatility of cash flows and shows that there are dramatic differences among the countries. Although Japan and Germany have similar levels of cash flow volatility, US firms experience a much higher degree of volatility. On average, US firms face a cash flow volatility about 4 times as large as its foreign competitors.[12] Clearly, for precautionary reasons, it seems as though the US firms have the incentive to hold larger amounts of liquid assets. Additionally, the larger volatility in the US should create incentive for banks to require larger cash balances since the risk of default is higher. Strangely, we do not see this; however, debt covenants may be taking the place of large cash balances.

Since the role of the keiretsu in Japan may play a significant role in the cash holdings of firms, we have a sample of firms that are a part of a keiretsu.[13] In our sample 49% of Japanese firms are part of a keiretsu. To this point, our discussion of the differences among countries has not included any

[12] This is consistent with Macey and Miller (1997) who argue that bank centered governance can lead to less risk taking.

[13] We would like to thank Jun-Koo Kang for providing us with the sample of Japanese keiretsu firms.

statistical analysis; however, when we conduct tests for the difference in means and medians, we find that almost all of the variables are statistically different from each other at the 1% level.[14]

In order to properly evaluate the rent extraction hypothesis, we need to have a measure of the bank debt that is held by the firm. The PACAP database provides us with the source of the debt for the Japanese firms. Kang and Stulz (1997) reports that the loans variable in the PACAP database is a good proxy for bank debt, while the notes and debentures are used for the nonbank debt. We use loans to evaluate the ratio of the firm's debt that is bank debt. We see that the mean (median) percentage of bank debt to total debt is almost 90% (100%) for the full sample. Thus, even though the total leverage of the US and Japan are comparable, Japanese firms' debt is almost entirely bank debt. Since we do not have this information for the US or Germany, we cannot make a comparison, though we do not expect the bank debt level to be as high in the US.

Finally, to determine the existence of excess cash holdings in Japan, we use the United States regression in Table 2 to predict the level of cash holdings for a firm assuming that it was a US firm. We then do a univariate analysis of the residual. We find convincing evidence of the relatively high cash levels in Japan relative to the US and Germany. The mean level of excess cash in Japan is almost twice that of Germany and around 50% higher than that of the United States. The results are even more striking if we evaluate the medians. The median level of excess cash in Japan is more than ten times that of Germany and around 20 times that of the US. The excess cash for Germany is similar to that of the US.

[14] Median cash and market to book are insignificantly different between Germany and the US. Results are available upon request.

Clearly, the level of cash holdings in Japan is higher than that of the US or Germany. This is surprising given what we would expect from the Japanese monitoring system. Japanese firms may not face the agency costs that are common in the US that may impact a firms cash holdings. Also, given the main bank relationship, one would not expect a significant precautionary need for cash. Later in the paper, we evaluate the bank monopoly arguments by analyzing the time series characteristics of firms' cash holdings behavior under differing bank power regimes. However, we first evaluate the determinants of cash holdings in the three countries.

4.1 Determinants of cash holdings

Among the three countries, there are considerable differences in the governance systems and thus we might expect firms in each country to have distinctive determinants of cash holdings. Panel regressions of the cash holdings across the full sample and on a country specific level are shown in Table 2. Since Opler et al. (1998) find persistence in cash holdings which likely indicates a violation of the independently and identically distributed errors assumption, we use the Fama-MacBeth (1973) methodology. Each year, we run cross-sectional regressions and then use the time series of the regression coefficients to make our inferences. The independent variables are as described in the previous section. There are some interesting findings in the results which are not consistent with what one may predict based on the assumptions developed in previous studies.

For the full sample of all countries, we find that market to book, cash flow/net assets and R&D/sales all increase with an increase in the cash level of the firms and are consistent with the results from the US. Net working capital/assets, firm size, and the dividend dummy are all negative which is again consistent with the US findings. However, in the full sample, US firms make up most of the data

and thus similarities are to be expected. The regression in column 1 shows that there is a significant country specific component to the cash holdings of these firms. Consistent with the univariate results, the Japan dummy variable is highly significant indicating that Japanese firms hold more cash even after controlling for fundamental factors. What is interesting is that the German dummy also is significantly positive. In order to use all available information we run a pooled time-series cross-section regression for all countries (column 2). To control for any macroeconomic events we include yearly dummies which are unreported. The inferences do not change greatly with this specification.

Since there are significant differences in the determinants of cash holdings across countries, we run individual regressions for the sample of firms from each of the three countries. These results are shown in columns 3-6 of the same table. Some interesting findings result from evaluating the country specific samples. First, in Germany the evidence shows that larger firms hold more cash, while the opposite is true for Japan and the US. Another finding is that for German firms net working capital is insignificant, whereas in the other countries it is significantly negative. However, due to the limited sample size, we have lower power to reject in the German regressions.

Even though cash flow is significant for both the US and Japan they are of opposite signs, with the US increasing and Japan decreasing in cash. A possible explanation for this is that due to the keiretsu relationships, high cash flow firms may be funded by the high cash but low cash flow firms within the keiretsu. This is also supported by the results on capital expenditures, in which the US and German firms both show a significant increase in capital expenditures as cash increases but the Japanese firms have a significantly negative relation. This argument is analogous to the recent evidence by Shin and Stulz (1997) regarding the behavior of the internal capital market. Although this seems inconsistent with the market to book results which indicate that firms with good investment opportunities hold more

cash in order to take advantage of them, it is not necessarily inconsistent if the high growth firms are being funded by the banks within the keiretsu.

To test the impact of keiretsu membership on the cash holdings of the firms, we include a dummy variable for keiretsu membership. Firms that are members of a keiretsu hold less cash than non-member firms, which is consistent with Hoshi, Kashyap and Sharfstein (1991) who show that keiretsu firms are less liquidity constrained than non-group firms.

Contrary to the results from the US, Japanese and German firms that pay dividends tend to have higher levels of cash. This might signify that dividends, in the US, are a mechanism firms use to avoid building up free cash flow, as Jensen (1986) argues, while dividends in Japan and Germany are used to return cash to shareholders in the event of unusually profitable years. This is consistent with the findings of Dewenter and Warther (1998) who show that dividends are less sticky in Japan than they are in the US. Clearly, for all three countries, firms with higher leverage hold less cash which is again consistent with Jensen's argument. In column 4, we run a Fama-MacBeth specification for Japan in order to address the econometric issues mentioned previously. Again, we find that the inferences are materially unchanged.

A crucial issue is whether there is more persistence in the cash hoarding at Japanese firms than firms from other countries. If there is more persistence, this may be evidence that Japanese banks prefer non-bank firms to hoard cash. On the other hand, if we find less persistence in Japan, it would be supportive of the idea that banks play a key role in forcing firms to disgorge excess cash. This is the focus of the next sub-section.

4.2 Persistence of Cash Holdings Through Time

One major consideration is whether or not firms maintain a high level of cash for a long period of time. Do firms enter and exit the quartile of high excess cash or do they stay in the high excess cash category over time? This could shed some light on whether firms save cash for future investment or whether they simply hold high levels of cash.

If firms simply hold high levels of cash, this could be indicative of banks extracting rents, especially during periods when banks were powerful. Conversely, if firms hoard cash when banks were weaker, and firms were less dependent on banks for financing, this may be consistent with precautionary motives for holding cash as in Opler et al. (1998) for the United States. During the course of our sample, the power of Japanese banks changed greatly allowing us to further examine the impact of bank power on cash holdings.

We have established that firms in Japan have cash holdings that are inconsistent with previous work regarding the motives that account for cash holdings in the US. In addition, the Japanese main bank system provides for bank powers that are beyond those in other industrialized countries. The main bank system was in its heyday of power beginning after the second world war until the mid 1970's when regulatory changes in Japan resulted in the opening of the Japanese markets that made it easier for firms to raise financing. This regulatory change took effect around 1980 and led to a gradual change in the make-up of the financial structure. In the late 1980's the Japanese financial system began showing signs of stress. Additionally the effects of limitations on stock ownership by banks as well as capital market development started to have more influence on the relationship between firms and banks. Combined with the strong growth and profitability of Japanese manufacturing firms in the mid to late 1980's, this resulted in a relative weakening of the Japanese main bank system.

One might expect that these changes would have a significant effect on the cash holdings of Japanese firms. When the banking system weakened and its monopoly power decreased, firms may have found themselves forced to change their cash holding behavior. With weak banks that may not have been able to guarantee financing, firms may have decided to reduce their debt while maintaining high levels of cash in order to take advantage of future investment opportunities.[15] Moreover, firms were now able to more freely issue public debt.

Table 3 shows the dynamics of firms after the first year they have a high level of excess cash (defined as year zero). First we look at the sample of firms across the three countries as shown in Panel A. There is some evidence of persistence since almost 39 percent of the firms remain in the high excess cash quartile five years after first entering. We then evaluate this persistence for Japan and find some interesting results. The persistence of firms in the highest quartile of excess cash is much stronger for the Japanese firms than for the US firms. (Table 10, Opler, Pinkowitz, Stulz, and Williamson (1998)).

For the Japanese firms, nearly half of the firms remain in the highest quartile after five years while the same holds true for only 39.2 percent of the US firms. Thus firms in Japan with high levels of excess cash seem to hoard the cash for a long period of time. With a main bank acting as an efficient monitor and members of the board being more active in the management of the firm, one would expect low levels of cash hoarding by the Japanese firms. Conversely, if the banks are able to persuade the firms to maintain a moderate degree of leverage as well as retaining a sizable cash balance, then they may not be acting as an efficient monitor. In such a case, the bank could not only generate rents from the loans to the firm, but also capture the benefits of the high level of cash.

[15] See Gibson (1995) for the effect of bank health on firm performance.

In order to more clearly examine this, we look at the persistence of firms across the two sub-periods. Panel C shows the results of the early period while the latter period is studied in Panel D. The inferences remain the same and the results are consistent across both periods. This seems to indicate that powerful banks did little to influence firms' payout policy regarding excess cash. In addition, the results still show that cash hoarding in Japan is more prevalent than in the US. These results support the argument that an active market for corporate control may be the biggest factor influencing the decision of a firm to pay out its cash.

This argument is further supported when we examine the number of firms which go from the highest quartile of excess cash to the lowest in a single year. In the bank centered system of Japan, only three percent of firms make this transition while in the market based system of the US, the percentage is almost four times as high (Opler et al., Table 9). This result is identical in both sub-periods. Thus, it appears that Japanese main banks, even when powerful have little desire to force firms to eliminate excess cash holdings. The remainder of this paper more closely examines the cash holdings in Japan and how they are affected by the change in bank power.

5 Japanese Firms and Cash

We have argued that cash holdings in Japan may be affected by the power which the main banks held. To evaluate this more clearly we focus on two sub-samples. The early period, 1974 - 1981, which was characterized by significant bank power, and 1988-1995 which saw a considerable weakening of the financial system. In the early period, we assume that the main bank had significant influence over the nonbank firms. This seems reasonable since banks could hold up to 10% of a firm's equity and the capital markets, especially for debt were not developed. Also firms were effectively

prohibited from issuing debt internationally, thus if firms needed debt, the banks were their only option. The law restricting bank ownership to 5% of a firm was passed in 1977 but firms had until 1987 to fully implement these laws, therefore it was not effective until 1987. Also, a relaxation of the debt markets made it easier for firms to issue debt domestically and internationally, which included convertible debt. Additionally, the banking system was beginning to exhibit signs of stress related to bad loans made in previous periods. The middle years are assumed to be a transition period and are eliminated from our tests.

Regressions of the full sample and sub-periods are shown in Table 4. In columns 1, 3 and 5, we include annual dummies to incorporate any macroeconomic effects that may impact the results. The regressions show that there are differences in the determinants of cash across the periods. Specifically, leverage is insignificant during the first sub-period, but is significantly negative in the latter. This is particularly interesting. With powerful banks, firms' cash holdings and leverage may have been dictated by the banks, thus we might not expect to see any relation between them, which is what we observe in the early period. However, if firms were allowed to select their leverage and cash holdings, as with the US, we would expect to find an inverse relationship. This is precisely what we observe in the later period.

We find that R&D / sales and industry sigma are not significant during either the first or second periods. However, the market to book coefficients go from being insignificantly negative in the first period to strongly positive in the latter. We also find that the coefficient on capital expenditures is significantly negative during the early sub-period but insignificant during the later period. These differences seem to indicate that firms with greater investment opportunities held higher levels of cash in the second period than they did from 1974-1981.

Consistent with the findings in Hoshi, Kashyap and Sharfstein (1991), keiretsu membership lowers the necessity to hold cash, but only during the last sub-period. If banks were extracting rents during the first period, then this could make the liquidity benefits of the keiretsu less important, which is consistent with our arguments.

Finally, if banks extracted rents from firms, then we should see cash increasing as firms increased their bank borrowing. This is exactly what we find when we incorporate the effect of bank debt to total debt for the first sub-period. We find a positive and marginally significant relation between cash holdings and bank debt / total debt. However, during the second period, we see a strong negative relation between bank debt / total debt and cash holdings, which is what we would expect if firms were using debt and cash as substitutes.

We have argued that if banks were forcing firms to hold high levels of cash in order to extract rents, we should see firms moving towards more optimal levels of cash as bank power diminished. The last specification attempts to directly test this by looking at both sub-periods at the same time. We define a dummy variable Early which equals one during the period of high bank power and zero otherwise. Consistent with our arguments, we find that the coefficient on Early is positive and highly significant. Thus, controlling for fundamental factors, Japanese firms held considerably higher levels of cash when banks were strong.

The regression results indicate that the sub-periods we define do seem to be substantively different. We've shown that as the power of banks decreased it had an effect on cash holdings. However, it may also be the case that the powerful banks were able to impact the firms in other ways. The next section more closely examines the two sub-periods and the characteristics of firms.

5.1 Bank ownership and cash

We have shown that cash holdings changed through time, and have attributed it to the weakening of the financial system. However, to more thoroughly examine the idea that bank power can affect cash holdings, we study the level of stock ownership by financial institutions. It is reasonable to assume that the higher the level of bank ownership, the more power the bank wields over the firm. However, when bank ownership is very high, then the banks begin to bear the brunt of the agency costs, thus we might expect to see a non-linear relationship between bank ownership and agency costs. Also, as banks hold more equity, then any wealth transfer gain on debt is tempered by a loss on equity, therefore it is possible that the higher the bank ownership, the lower the cash level of the firm.

To test whether firms with very high bank ownership act differently from firms with lower bank ownership, we run univariate tests on the Japanese firms. Table 5 shows these results for the early sub-period when bank power was high (Panel A) and the latter period when bank power decreased (Panel B). Panel C shows the p-values for difference of mean and medians tests between the two sub-periods.

We find that in the early period, firms in the lowest quartile of bank ownership have a higher cash level than firms in the highest quartile. Additionally, the level of cash declines monotonically as the level of bank ownership increases. In the later period, there is not a clear relation between bank ownership and cash. This may seem counter to our argument but as banks increase ownership, they will prefer that the firms pay out cash versus hoarding. This is because the bank then has a larger claim on the dividend of the firm and will benefit directly from these payments. Therefore as the ownership of the firm increases, the banks gain on debt is offset by a loss on their shares, thus cash hoarding by the firm becomes less important for the bank as its equity share increases.

We argue that with higher bank power, we might observe firms holding not only more cash, but higher leverage as well. We find that in the early period, firms hold considerably higher levels of cash, while at the same time being more highly levered. This evidence seems consistent with the idea that banks not only had more power in the early period, but exerted its influence.

However, since we are interested in whether banks persuade firms to hold too much cash, we use the residual of the first pass regression from Table 2 which we refer to as excess cash. Interestingly there is evidence of a switching point in the excess cash level of the firms as we go from the second to the third quartile of bank ownership in the early period. The firms that hold the most excess cash are in the second quartile of bank ownership which could be consistent with the findings of Stulz (1988) and Shleifer and Vishny (1986) on insider ownership of a firm. The U-shaped results do not seem to hold when we examine the latter period when bank power decreased. However, we observe that firms held higher levels of excess cash in the latter period which could be consistent with the idea that the impetus behind firms holding cash changed over time.

These results do not appear to be driven by internal cash flows since cash flow to assets is similar at the highest and lowest levels of bank ownership for both sub-periods. Additionally, there is no difference in cash flow to assets across time, so that doesn't explain the increase in excess cash through time. Also consistent with firms hoarding cash is the fact that market to book first decreases then increases with bank ownership, with the minimum occurring in the third quartile. However, this relationship is observed in both periods, which we can interpret as evidence that high bank ownership may provide effective monitoring, but the benefit is not monotonic.

Cash dividends are decreasing in bank ownership which seems to be contrary to our argument that banks with low ownership might encourage cash holdings rather than cash dividends. However,

there are two caveats to this result. First, Table 5 only presents a univariate analysis and thus there may be interactions that are unaccounted for. Second, it may simply be that for Japanese firms with low bank ownership, the control is not in the hands of the banks, but rather the open market or more likely the other firms in the keiretsu. This would be the case in a vertical keiretsu in which the controlling firm is not a bank, but a large manufacturing firm. In either case, the emphasis would be on the payment of dividends rather than on cash holdings.

We argued that banks might prefer firms to hold cash in order to lessen the riskiness of the firm, especially since in Japan, the costs to the banks of a firm's financial distress are substantial. One way to examine this is to look at the volatility of operating cash flows in each period. Cash flow sigma is the standard deviation of operating cash flows for a 20 year period. Although the measure crosses the two sub-periods, it should give us an idea of the firm's risk. We see that cash flow sigma is decreasing in bank ownership in both periods which is consistent with banks persuading firms to take less risky projects (see Macey and Miller (1997) for a theoretical discussion). However, we also see that in the later period, cash flow sigma is higher which is indicative of the firm taking greater risk after bank power decreased. We see similar evidence with capital expenditures. Although mainly decreasing in bank ownership, they are higher in the later years.

One of the main aspects of the bank power argument is that firms were not only encouraged to hold high levels of cash, but also high levels of debt. More importantly we should see this result in the bank debt held by firms. As seen in the table, the level of both long- and short-term bank debt was significantly greater in the first period over the second. With the deregulation of the bond markets and firms' ability to more easily access the bond markets, firms might replace long-term bank debt with bonds. Consistent with this, we find that the level of long-term bank debt is significantly lower in the

second sub-period. This is consistent across all levels of bank ownership and lends strong support for the bank power arguments presented.

Finally, if banks are able to extract rents through debt, we would expect that firms would hold a higher percentage of its bank debt during the first sub-period than during the second sub-period. We see that the mean bank debt was 99% for firms with low bank ownership and 88% for firms with high bank ownership in the first period. Consistent with our hypothesis, we see that mean bank debt to total debt was significantly lower in the second period for firms in all levels of bank ownership. The results show that bank debt to total debt was 86% for the lowest quartile of bank ownership and 60% for high bank ownership. Firms with high bank ownership were probably better able to lower bank debt because we see that these were larger firms and thus better able to access the public capital markets for debt. Additionally, we see that even though the total leverage did not change significantly for firms in the lower quartile of bank ownership, the mean percentage of bank debt drop significantly from 99% to 86%. Again the evidence is consistent with banks persuading firms to hold relatively high levels of cash and debt during the period in which banks were more powerful. As the capital markets became more developed and other events resulted in lower bank power, firms reduced their dependency on bank debt and lowered cash holdings.

5.2 Cash hoarding in Japan

We have already seen that nearly half of Japanese firms in the highest quartile of excess cash are still there after five years. However, it may be that firms leave the highest quartile in years 2-4 and return in year 5. Table 6 attempts to examine this more closely by looking at two classes of firms: those that hoard cash and those that disgorge cash. Firms are said to hoard cash if they are in the

highest quartile of excess cash in each of the six years. Firms are classified as disgorging cash if they move from the highest quartile of excess cash in year zero to the lowest quartile in year one. In our sample of Japanese firms, we have 231 which we classify as hoarding and 31 (23 after five years) which disgorge cash.

Perhaps the most immediate observation is that of the 891 firms which are in the sample for all 6 years and are in the highest quartile of excess cash in year zero, 231 of them never leave the highest quartile. Thus, more than 25 percent of the firms remain in the highest quartile for six years! For the US, only 17 percent of firms remain in the highest quartile after 6 years. This result casts some doubt on the efficiency of a bank centered system with banks as monitors, at least with respect to discouraging firms from hoarding cash.

Table 6 also shows some very interesting characteristics of firms which disgorge cash versus those that hoard. First, bank ownership is not different between the two groups of firms. Thus it is not due to banks that firms choose to disgorge their excess cash. In fact, the firms tend to spend the cash in two areas: paying down debt and increasing capital expenditures. A striking result is that the hoarding firms have a higher level of leverage than the disgorging firms in year zero and throughout the five year period. The disgorging firm pay down debt from 23.8 percent to 17.6 percent while the hoarding sample leverage changes form 29.7 percent to 28.8 percent from year 0 to 1. Another interesting result is that the hoarding firms continue to build up cash, from 36.3 percent to 37.7 percent, while the disgorging firms' cash level goes from 31.1 percent down to 9.6 percent. The statistical results are strengthened by the fact that with only 31 disgorging firms, we may be facing a slight power problem. It is also interesting that in years 2-5,while the disgorging firms have significantly less cash, they still have much lower leverage than the hoarding firms.

We see similarly interesting results with capital expenditures. Firms which disgorge cash go from 6.8 percent to 7.7 percent, while firms that hoard cash go from 3.9 to 4.6 percent. Even though the hoarding sample increases its capital expenditures, the expenditures are still significantly below that of the disgorging firms. In later years, though, the two classes have similar levels of capital expenditures, which seems to indicate that certain firms hoard cash in order to invest in projects while others hoard cash for no clear reason at all.

Another major difference between the two classes of firms is that the firms which disgorge cash have significantly higher market to book ratios than do the firms which hoard cash. Even with the small sample size, the results are significant at better than the five percent level for half of the years. Part of the explanation for the market to book ratio may be that firms which disgorge cash tend to be smaller than those which hoard cash. However, this in itself is a bit strange since we would expect the smaller firms to be the ones which most need to hoard cash. Also, it should be noted that the results do not appear to be driven by profitability since cash flow is similar for the two classes of firms for each of the six years, as are the level of dividends that the firms pay out. Finally, firms which hoard are just as likely to be members of a keiretsu then those which disgorge their cash.

Overall, the results in Table 6 seem a bit surprising. Not only do a large percentage of Japanese firms hoard cash, but those that do have higher leverage and pay out similar amounts of dividends to those firms which do not hoard cash. It is not the bank ownership which drives the disgorging of excess cash; rather, the results in Table 6 appear consistent with the idea that banks are able to encourage large firms to not only maintain a moderate degree of leverage, but to also retain a sizable amount of cash.

Of course, we have mentioned that bank power likely decreased substantially from the early period to the later one. Therefore, we should examine the differences across sub-periods. However, statistical tests between firms that hoard cash and those that don't are difficult since we have very few disgorging firms when we separate the period into sub-samples. Therefore, we examine if there was a change in the behavior of firms which hoarded cash when banks had power versus those that hoarded in the later period. Those results are shown in Table 7.

We argued earlier that the incentive for firms to hoard cash changed through time. When banks had a lot of power, firms seemed to be holding cash in order to provide rents to the banks. In the later period when banks were weakened, firms needed to hold cash for precautionary reasons since the capital markets were not as well developed as in the US. The results in Table 7 lend further support to this hypothesis.

We see that hoarding firms actually began to hold larger amounts of cash in the later period than in the early years. This seems to contradict our regression results, but recall that the firms in these tests are only those that hoard cash, i.e. they are in the highest quartile of excess cash for all 6 years. We showed in Table 4 that, on average, all firms held less cash in the later period. The fact that the firms which hoard cash increase their holdings while there is a general decline is interesting in itself and may support the argument that firms which hoarded cash in the second period did so for different reasons than those that hoarded when banks were powerful.

We find that firms held about 12 percentage points more cash/net assets when bank power decreased. However, if we examine leverage, we see that they hold roughly 60% of the debt in the later years. The high cash and debt holdings in the early period is consistent with the banks encouraging firms to take loans while maintaining large cash reserves in order to provide rents to the

banks. The drastic switch in the later period seems to indicate that the decline in bank power did have an effect on the reasons firms hold cash.

Another interesting result is that bank ownership increased dramatically from the earlier period to the later period. Although this could be partially attributed to a trend of higher bank ownership over time, it is also supportive of the idea that as banks implicit power decreased, they were forced to hold larger share stakes to maintain their explicit power. This would also align their interests with outside shareholders since as banks hold a larger stake in the firm, they have less incentive to expropriate wealth from atomistic shareholders.

When banks have power over their firms, they may desire a lower risk investment program since as debtholders, they benefit from a lower probability of distress. Consistent with firms changing their incentives as bank power weakened, we see that the firms which hoard cash in the later period have higher market to book ratios which is indicative of better investment opportunities. Additionally, it seems that the firms are actually investing more since capital expenditures increase substantially over time. The fact that cash flow roughly doubles also supports the notion that firms are able to invest in risky, albeit profitable, projects that they may have been discouraged from taking when bank power was strong.

When we take a closer look at the debt of the hoarding firms we see evidence that strongly supports the bank power hypothesis. There is a significant decrease in the long-and short-term bank debt of the hoarding firms. This is consistent with firms reducing bank leverage as the banks power diminished. Moreover, the ratio of bank debt to total debt went from 98% in the early period to 66% in the later period. Overall, the evidence in Table 7 seems to support the hypothesis that as bank power weakened, firms began to hold cash for different reasons, namely precautionary motives and firms that

used debt depended more on public debt rather than bank debt. The significance levels are augmented by the fact that with the small sample sizes we may be facing a slight power problem.

6. Conclusion

This paper evaluates the existence of surprisingly high levels of cash held by Japanese firms. This is contrary to what we would expect from a bank centered monitoring system. In such a system, we would expect lower agency costs from asymmetric information and asset substitution. Hence, with the reduction of the cost differential between internally and externally generated funds, we would expect lower cash holdings than that observed in the United States. The results show that the level of cash holdings is higher in Japan than it is in the US or Germany. Since the Japanese system is characterized by large banks having monopoly power, especially during the early periods of our sample, this finding is consistent with banks extracting rents from firms or banks lowering their costs of monitoring by encouraging firms to maintain large cash balances.

We show that the amount of power banks wield over their borrowers is an important factor in determining cash holdings. When we separate the Japanese firms into sub-periods based on the degree of bank power, we find several interesting results. There is strong evidence in support of cash holdings being the mechanism by which banks extract rents from firms, especially during the 1974-1981 sub-period when banks were strongest. In the later years of the sample, Japanese firms continued to hold relatively high levels of cash but significantly lower levels of debt. This is consistent with the hypothesis that with the weakening of the banking system, firms paid down their debt and held high cash balances for what appears to be precautionary reasons. Overall, our results lend support to the

idea that there may be difficulties with a bank centered governance system if no other monitoring forces exist, such as large non-bank blockholders or an active market for corporate control.

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Table 1

Summary Statistics

Denominator of assets is really net assets (assets-cash). Cash in the US and Germany is defined as cash on hand plus marketable securities. In Japan, cash is defined solely as cash on hand. Real Size is the logarithm of real total assets. Market to Book is defined as book value of assets - book value of equity + market value of equity / total assets. Cash Flow is defined as EBITDA - interest expense - taxes - common dividends. Net working capital is defined as current assets - current liabilities - cash. Total leverage is defined as long-term plus short-term debt / total assets. For Japan and Germany, capital expenditures is defined as the change in net fixed assets plus depreciation, for the US, capital expenditures are from the flow of funds statement. Capital expenditures are negative for about 4% (17%) of Japanese (German) firm years. Industry sigma is the standard deviation of cash flow for a firm's industry based on the previous 20 (10) years for the US and Japan (Germany). Industry is defined as 2 digit SIC code for Germany and the US and 2 digit industry code INDID from PACAP for Japan. When R&D is listed as missing it is set to zero. Bank ownership of equity is defined as total shares owned by financial institutions divided by total shares outstanding. Keiretsu is a dummy variable which equals one if the firm belongs to any type of keiretsu and zero otherwise. Excess cash is defined as actual cash to assets minus that predicted from a regression with log cash to assets as the dependent variable. Excess cash if US firm is a measure which uses the coefficients from the US regression. For Japan, the difference of means (medians) shows the t-statistic (Z-statistic) and p-values in parentheses.

Panel A: Japan 1974-1995

Variable	Mean	First Quartile	Median	Third Quartile	Sample Size
Cash / Assets	18.50%	9.89%	15.74%	23.48%	31,068
Real Size (1994 Yen)	10.97	10.03	10.83	11.80	30,178
Real Size (1994 $)	6.35	5.41	6.21	7.18	30,178
Market-to-Book	1.54	1.14	1.34	1.71	27,690
Cash Flow/Assets	3.68%	0.90%	3.67%	6.42%	28,796
Net Working Capital/Assets	-0.82%	-13.96%	-1.92%	11.85%	31,068
Cash Dividends/Assets	0.021%	0.000%	0.007%	0.026%	31,068
Total Leverage	29.28%	14.84%	27.90%	42.28%	31,069
Capital Expenditures/Assets	4.95%	1.69%	3.89%	7.00%	27,503
Industry Sigma	2.75%	2.39%	3.11%	3.17%	29,150
R&D / Sales	0.088%	0.000%	0.000%	0.000%	31,070
Bank Ownership of Equity	30.71%	18.16%	30.16%	42.43%	27,263
Keiretsu	48.85%				30,262
Short term bank debt / assets	18.73%	10.16%	17.18%	25.50%	13,331
Long term bank debt / assets	10.31%	2.13%	6.86%	15.31%	26,112
Bank debt / total debt	88.38%	85.28%	100.00%	100.00%	13,161
Excess cash if US firm	12.84%	4.81%	10.55%	17.78%	24,054
Excess cash	3.15%	-4.46%	0.61%	7.36%	23,956

Panel B: Germany 1984-1994

Variable	Mean	First Quartile	Median	Third Quartile	Sample Size
Cash / Assets	12.17%	2.21%	6.63%	16.50%	2,177
Real Size (1994 DM)	6.60	5.29	6.50	7.79	2,177
Real Size (1994 $)	6.12	4.81	6.03	7.32	2,177
Market-to-Book	1.42	0.98	1.20	1.59	2,009
Cash Flow/Assets	2.14%	-0.72%	2.22%	5.09%	2,137
Net Working Capital/Assets	19.66%	6.35%	21.94%	34.24%	2,177
Cash Dividends/Assets	1.59%	0.00%	1.15%	2.15%	2,176
Total Leverage	20.48%	6.59%	17.04%	31.85%	2,177
Capital Expenditures/Assets	7.45%	1.43%	5.74%	11.55%	1,350
Industry Sigma	3.10%	2.03%	3.11%	3.96%	2,613
R&D / Sales	0.45%	0.00%	0.00%	0.00%	2,141
Excess Cash if US firm	6.73%	-1.29%	1.75%	9.76%	1,224
Excess Cash	5.24%	-2.15%	0.96%	7.36%	1,224

Panel C: United States 1971-1994 (See also Opler et al. (1998) Table 2)

Variable	Mean	First Quartile	Median	Third Quartile	Sample Size
Cash / Assets	18.03%	2.16%	6.05%	17.22%	127,284
Real Size (1994 $)	4.19	2.68	4.13	5.60	126,131
Market-to-Book	1.59	0.93	1.18	1.74	97,801
Cash Flow/Assets	0.74%	0.76%	6.37%	10.91%	125,532
Net Working Capital/Assets	13.36%	-0.95%	15.51%	32.30%	122,511
Cash Dividends/Assets	1.04%	0.00%	0.00%	1.54%	125,151
Total Leverage	27.96%	10.05%	24.94%	40.49%	127,165
Capital Expenditures/Assets	8.87%	2.93%	6.10%	11.49%	127,063
Industry Sigma	12.26%	5.59%	8.80%	16.90%	126,067
R&D / Sales	2.96%	0.00%	0.00%	1.50%	127,462
Excess cash	8.55%	-2.69%	0.59%	9.02%	87,117

Table 2
Cash Regression Results

The dependent variable in all regressions is the natural logarithm of cash/net assets. Cash in the US and Germany is defined as cash on hand plus marketable securities. In Japan, cash is defined solely as cash on hand. Net assets is defined as total assets less cash. Market to Book is defined as book value of assets - book value of equity + market value of equity / total assets. Real Size is the natural logarithm of total assets deflated to 1994 US dollars. Cash flow is defined as EBITDA - interest expense - taxes - common dividends. NWC is current assets - cash - current liabilities. Capex is capital expenditures. For the United States, capital expenditures come from the flow of funds statement while for Germany and Japan it is the yearly change in gross property, plant and equipment. Leverage is defined as short term plus long term debt divided by total assets. Industry sigma is the standard deviation of cash flow for a firm's industry based on the previous 20 (10) years for the US (Japan and Germany). Industry is defined as 2 digit SIC code for Germany and the US and 2 digit industry code INDID from PACAP for Japan. R&D is research and development expense. When R&D is missing, we set it equal to zero. Sales is net sales. Dividend Dummy is equal to 1 if the firm paid a dividend in that year and zero otherwise. Keiretsu is a dummy variable which equals one if the firm belongs to any type of keiretsu and zero otherwise. Japan (Germany) Dummy equals 1 if the firm is Japanese (German) and zero otherwise. The United States data runs from 1971-1994. The Japanese data is from 1974-1995 and the German data is from 1984-1994. All pooled regressions are run including dummy variables for each year (not reported) to eliminate any global macroeconomic factors. The omitted dummy variable is for 1994. White's (1980) correction for heteroscedasticity is used to calculate the t-statistics. FM indicates that the regression coefficients are determined from the time series of cross-sectional regression coefficients.

Variable	All Countries FM	All Countries	Germany	Japan FM	Japan	United States
Market to Book	0.1505 (16.86)	0.1446 (30.42)	0.2416 (4.28)	0.1107 (4.50)	0.0604 (6.25)	0.1423 (27.63)
Real Size (1994 US $)	-0.0382 (-5.43)	-0.0367 (-14.38)	0.1802 (7.83)	-0.0517 (-3.71)	-0.0568 (-15.82)	-0.0403 (-13.39)
Cash Flow / Net Assets	0.7048 (4.03)	0.1723 (4.81)	-2.3425 (-2.82)	-0.3699 (-2.21)	-0.6821 (-5.08)	0.1599 (4.39)
NWC / Net Assets	-0.9748 (-11.89)	-0.7992 (-36.11)	0.0944 (0.36)	-0.6471 (-6.21)	-0.6177 (-21.22)	-0.8097 (-31.23)
Capex / Net Assets	-0.2235 (-0.96)	0.3132 (5.26)	0.9616 (2.79)	-1.4196 (-5.56)	-1.2799 (-10.80)	0.4798 (7.31)
Leverage	-2.4035 (-28.19)	-2.5986 (-104.72)	-2.5531 (-8.61)	-0.7218 (-4.97)	-0.6859 (-22.06)	-3.0251 (-101.72)
Industry Sigma	0.5145 (1.66)	1.2589 (17.57)	10.0194 (3.03)	-0.0519 (-0.05)	0.6926 (1.03)	1.1653 (14.94)
R&D / Sales	1.6559 (6.58)	1.7797 (20.96)	1.9043 (1.31)	5.2262 (2.96)	7.9245 (5.68)	1.6589 (19.80)
Dividend Dummy	-0.0878 (-2.77)	-0.1117 (-11.85)	0.5552 (5.00)	0.1055 (3.70)	0.1117 (9.19)	-0.1279 (-11.38)
Keiretsu				-0.1311 (-8.51)	-0.1286 (-14.49)	
Japan Dummy	0.8105 (8.33)	1.1027 (95.54)				
Germany Dummy	0.0570 (2.10)	0.1666 (3.71)				
N	25	112,395	1,224	20	23,956	87,117
Adjusted R^2	24.43%	24.33%	21.84%	14.51%	13.86%	21.86%
Annual Dummies	No	Yes	Yes	No	Yes	Yes

Table 3

Persistence of Highest Quartile of Excess Cash

Firms are examined after entering the highest quartile of excess cash for the first time (Year 0). Excess cash to assets is defined as the residual from a first pass regression. The table shows the number of firms and the percentage of firms in each quartile for each year given that the firm was in the highest quartile in year 1. The numbers in parentheses show the number of firms and the percentage of firms in each quartile for each year for those firms which are in the sample for the full 6 years.

Panel A: All Countries

	Lowest Quartile	Quartile 2	Quartile 3	Highest Quartile
Year 0				7443 - 100.0% (4237 - 100.0%)
Year 1	699 - 10.5% (365 - 8.6%)	669 - 10.1% (389 - 9.2%)	1571 - 23.6% (1047 - 24.7%)	3713 - 55.8% (2436 - 57.5%)
Year 2	785 - 13.3% (505 - 11.9%)	772 - 13.1% (540 - 12.7%)	1533 - 26.0% (1117 - 26.4%)	2808 - 47.6% (2075 - 49.0%)
Year 3	807 - 15.3% (603 - 14.2%)	847 - 16.0% (660 - 15.6%)	1391 - 26.3% (1154 - 27.2%)	2238 - 42.4% (1820 - 43.0%)
Year 4	719 - 15.1% (624 - 14.7%)	826 - 17.4% (731 - 17.3%)	1338 - 28.2% (1203 - 28.4%)	1868 - 39.3% (1679 - 39.6%)
Year 5	663 - 15.6% (663 - 15.6%)	723 - 17.1% (723 - 17.1%)	1213 - 28.6% (1213 - 28.6%)	1638 - 38.7% (1638 - 38.7%)

Panel B: Japan - Full sample

	Lowest Quartile	Quartile 2	Quartile 3	Highest Quartile
Year 0				1051 - 100.0% (891 - 100.0%)
Year 1	31 - 3.0% (23 - 2.6%)	91 - 8.8% (78 - 8.8%)	278 - 27.0% (241 - 27.0%)	630 - 61.2% (549 - 61.6%)
Year 2	58 - 5.7% (45 - 5.1%)	111 - 11.0% (101 - 11.3%)	302 - 29.9% (265 - 29.7%)	538 - 53.3% (480 - 53.9%)
Year 3	71 - 7.3% (59 - 6.6%)	133 - 13.6% (117 - 13.1%)	267 - 27.3% (246 - 27.6%)	508 - 51.9% (469 - 52.6%)
Year 4	86 - 9.1% (75 - 8.4%)	132 - 14.0% (127 - 14.3%)	288 - 30.5% (271 - 30.4%)	438 - 46.4% (418 - 46.9%)
Year 5	85 - 9.5% (85 - 9.5%)	141 - 15.8% (141 - 15.8%)	231 - 25.9% (231 - 25.9%)	434 - 48.7% (434 - 48.7%)

Panel C: Japan - 1974-1981

	Lowest Quartile	Quartile 2	Quartile 3	Highest Quartile
Year 0				551 - 100.0% (546 - 100.0%)
Year 1	15 - 2.7% (15 - 2.7%)	37 - 6.7% (37 - 6.8%)	149 - 27.0% (147 - 26.9%)	350 - 63.5% (347 - 63.6%)
Year 2	36 - 6.5% (35 - 6.4%)	58 - 10.5% (57 - 10.4%)	150 - 27.2% (149 - 27.3%)	307 - 55.7% (305 - 55.9%)
Year 3	49 - 8.9% (47 - 8.6%)	70 - 12.7% (70 - 12.8%)	129 - 23.4% (127 - 23.3%)	303 - 55.0% (302 - 55.3%)
Year 4	52 - 9.5% (51 - 9.3%)	90 - 16.4% (88 - 16.1%)	145 - 26.4% (145 - 26.6%)	263 - 47.8% (262 - 48.0%)
Year 5	78 - 14.3% (78 - 14.3%)	103 - 18.9% (103 - 18.9%)	125 - 22.9% (125 - 22.9%)	240 - 44.0% (240 - 44.0%)

Panel D: Japan - 1988-1995

	Lowest Quartile	Quartile 2	Quartile 3	Highest Quartile
Year 0				693 - 100.0% (351 - 100.0%)
Year 1	18 - 2.7% (6 - 1.7%)	50 - 7.6% (25 - 7.1%)	168 - 25.4% (77 - 21.9%)	425 - 64.3% (243 - 69.2%)
Year 2	32 - 5.3% (10 - 2.8%)	70 - 11.6% (39 - 11.1%)	146 - 24.3% (79 - 22.5%)	354 - 58.8% (223 - 63.5%)
Year 3	35 - 6.4% (15 - 4.3%)	69 - 12.7% (35 - 10.0%)	150 - 27.5% (104 - 29.6%)	291 - 53.4% (197 - 56.1%)
Year 4	43 - 9.3% (27 - 7.7%)	66 - 14.3% (49 - 14.0%)	118 - 25.5% (88 - 25.1%)	235 - 50.9% (187 - 53.3%)
Year 5	33 - 9.4% (33 - 9.4%)	51 - 14.5% (51 - 14.5%)	96 - 27.4% (96 - 27.4%)	171 - 48.7% (171 - 48.7%)

Table 4
Japan Cash Regression Results

The dependent variable in all regressions is the natural logarithm of cash/net assets. Cash in Japan is defined solely as cash on hand. Net assets is defined as total assets less cash. Market to Book is defined as book value of assets - book value of equity + market value of equity / total assets. Real Size is the natural logarithm of total assets deflated to 1994 US dollars. Cash flow is defined as EBITDA - interest expense - taxes - common dividends. NWC is current assets - cash - current liabilities. Capex is capital expenditures. For the United States, capital expenditures come from the flow of funds statement while for Germany and Japan it is the yearly change in gross property, plant and equipment. Leverage is defined as short term plus long term debt divided by total assets. Industry sigma is the standard deviation of cash flow for a firm's industry based on the previous 10 years. Industry is defined as 2 digit industry code INDID from PACAP. R&D is research and development expense. When R&D is missing, we set it equal to zero. Sales is net sales. Keiretsu is a dummy variable which equals one if the firm belongs to any type of keiretsu and zero otherwise. Dividend Dummy is equal to 1 if the firm paid a dividend in that year and zero otherwise. Early is a dummy variable equal to one if the period is from 1974-1981 and zero otherwise. Two regressions are run including dummy variables for each year (columns 2 and 4) to eliminate any macroeconomic factors. The omitted dummy variable is for 1994. White's (1980) correction for heteroscedasticity is used to calculate the t-statistics.

Variable	1974-1995	1974-1981	1974-1981	1988-1995	1988-1995	Both Periods
Early						0.5066 (23.02)
Market to Book	0.0207 (1.27)	-0.0208 (-0.74)	-0.0247 (-0.86)	0.2400 (8.55)	0.0793 (8.59)	0.1414 (7.16)
Real Size (1994 US $)	-0.1342 (-27.39)	-0.1274 (-22.99)	-0.1266 (-22.79)	-0.1454 (-8.92)	-0.1522 (-9.61)	-0.1378 (-23.48)
Cash Flow / Net Assets	-0.7148 (-4.12)	-0.1999 (-1.02)	-0.2205 (-1.11)	-1.0314 (-2.05)	-0.8974 (-1.79)	-0.7692 (-3.84)
NWC / Net Assets	-0.9081 (-21.77)	-0.9940 (-19.62)	-0.9937 (-19.43)	-0.7830 (-6.60)	-0.7070 (-6.01)	-1.0098 (-19.97)
Capex / Net Assets	-1.6332 (-11.06)	-1.8531 (-10.73)	-1.7902 (-10.37)	0.1931 (0.51)	-0.5004 (-1.30)	-1.2218 (-6.97)
Leverage	-0.2142 (-5.09)	-0.0331 (-0.67)	-0.0559 (-1.13)	-0.7719 (-6.10)	-0.7967 (-6.43)	-0.2350 (-4.65)
Industry Sigma	0.2041 (0.22)	0.4600 (0.48)	1.1833 (1.21)	-4.9464 (-1.54)	-4.0430 (-1.30)	-1.7196 (-1.64)
R&D / Sales	2.0161 (1.18)	1.2377 (0.66)	0.5058 (0.27)	7.1883 (1.52)	5.3870 (1.14)	3.3117 (1.65)
Dividend Dummy	0.1339 (9.07)	0.2072 (12.82)	0.2071 (12.81)	0.1036 (2.46)	0.0069 (0.16)	0.1791 (9.95)
Keiretsu	-0.0403 (-3.61)	-0.0097 (-0.77)	-0.0103 (-0.83)	-0.1070 (-3.23)	-0.1190 (-3.70)	-0.0308 (-2.26)
Bank debt / total debt	-0.5180 (-12.52)	0.1160 (1.89)	0.1053 (1.72)	-0.8378 (-12.20)	-0.8565 (-12.75)	-0.6052 (-11.77)
N	9,597	4,989	4,989	2,189	2,189	7,177
Adjusted R^2	24.43%	24.13%	24.59%	15.20%	19.33%	23.77%
Annual Dummies	Yes	No	Yes	No	Yes	No

Table 5

Univariate Results Broken by Quartile of Financial Institution Holdings

Means and medians (in brackets) for each variable for which data on bank holdings are available are shown broken by quartile of bank ownership. The quartiles are determined each year. Panel A shows results from 1974-1981, Panel B shows results from 1988-1995, and Panel C shows p-values from differences in means [medians] tests for the early and later subperiod. Cash is defined as cash on hand. Net assets is defined as total assets less cash. Excess cash is the residual from a first pass regression to predict cash to net assets. Market to Book is defined as book value of assets - book value of equity + market value of equity / total assets. Real Size is the natural logarithm of total assets deflated to 1994 Yen. Cash flow is defined as EBITDA - interest expense - taxes - common dividends. NWC is current assets - cash - current liabilities. Capex is the yearly change in gross property, plant and equipment. Leverage is defined as short term plus long term debt divided by total assets. Cash flow sigma is the standard deviation of cash flow for a firm based on the previous 10 years. When R&D is missing, we set it equal to zero. Sales is net sales. The p-values are from a t-test of difference of means between lowest and highest quartile of bank ownership (in parentheses), and a Wilcoxon test for difference in medians between lowest and highest quartile (in brackets).

Panel A: Early Subperiod, 1974-1981

Annual Quartile Of Financial Institution Ownership					
Variable	1.73% - 15.52%	13.42 - 27.16%	25.00 - 39.42%	37.21 - 66.97%	p-values
Cash / Net Assets	0.2066 [0.1888]	0.2052 [0.1853]	0.1901 [0.1742]	0.1599 [0.1469]	(0.0001) [0.0001]
Excess cash / Net Assets	0.0236 [0.0087]	0.0291 [0.0146]	0.0239 [0.0143]	0.0043 [-0.0043]	(0.0001) [0.0001]
Market to Book	1.348 [1.205]	1.298 [1.187]	1.269 [1.184]	1.281 [1.206]	(0.0001) [0.7918]
Leverage	0.2839 [0.2701]	0.2944 [0.2849]	0.3368 [0.3357]	0.3327 [0.3366]	(0.0001) [0.0001]
Cash Dividends/ Net Assets (Times 100)	0.0497 [0.0275]	0.0415 [0.0231]	0.0235 [0.0121]	0.0135 [0.0069]	(0.0001) [0.0001]
Real Size (in 1994 Yen)	9.87 [9.82]	10.43 [10.27]	11.07 [10.92]	11.81 [11.73]	(0.0001) [0.0001]
Cash Flow / Net Assets	0.0391 [0.0390]	0.0397 [0.0392]	0.0326 [0.0318]	0.0360 [0.0371]	(0.0677) [0.0531]
NWC / Net Assets	-0.0791 [-0.1050]	-0.0512 [-0.0764]	-0.0590 [-0.0738]	-0.0204 [-0.0351]	(0.0001) [0.0001]
Capex / Net Assets	0.0514 [0.0379]	0.0455 [0.0343]	0.0438 [0.0344]	0.0436 [0.0377]	(0.0001) [0.1166]
Cash Flow Sigma	0.0372 [0.0233]	0.0269 [0.0181]	0.0241 [0.0172]	0.0189 [0.0152]	(0.0001) [0.0001]
R&D / Sales	0.0009 [0.0000]	0.0009 [0.0000]	0.0013 [0.0000]	0.0007 [0.0000]	(0.1183) [0.0051]
Short term bank debt / assets	0.1914 [0.1715]	0.1983 [0.1855]	0.2059 [0.1978]	0.1869 [0.1745]	(0.2916) [0.9045]
Long term bank debt / assets	0.1232 [0.1018]	0.1179 [0.0933]	0.1353 [0.1044]	0.1331 [0.0963]	(0.0116) [0.2252]
Bank debt / total debt	0.9867 [1.0000]	0.9690 [1.0000]	0.9235 [1.0000]	0.8790 [0.9209]	(0.0001) [0.0001]

Panel B: Later Subperiod, 1988-1995

Annual Quartile Of Financial Institution Ownership -1988-1995					
Variable	1.73% - 24.35%	20.97% - 36.48%	30.87% - 48.59%	41.77 - 66.97%	p-values
Cash / Net Assets	0.1716 [0.1281]	0.1845 [0.1415]	0.1679 [0.1303]	0.1754 [0.1357]	(0.3940) [0.0314]
Excess cash / Net Assets	0.0308 [-0.0091]	0.0504 [0.0078]	0.0385 [0.0057]	0.0553 [0.0158]	(0.0001) [0.0001]
Market to Book	1.827 [1.605]	1.697 [1.543]	1.700 [1.554]	1.707 [1.567]	(0.0001) [0.0358]
Leverage	0.2789 [0.2639]	0.2638 [0.2462]	0.2904 [0.2737]	0.2940 [0.2730]	(0.0066) [0.0001]
Cash Dividends/ Net Assets (x 100)	0.0244 [0.0133]	0.0199 [0.0117]	0.0134 [0.0082]	0.0077 [0.0038]	(0.0001) [0.0001]
Real Size (in 1994 Yen)	10.30 [10.27]	10.92 [10.85]	11.51 [11.34]	12.27 [12.26]	(0.0001) [0.0001]
Cash Flow / Net Assets	0.0385 [0.0395]	0.0389 [0.0387]	0.0343 [0.0336]	0.0392 [0.0400]	(0.6175) [0.6581]
NWC / Net Assets	-0.0015 [-0.0067]	0.0530 [0.0576]	0.0509 [0.0385]	0.0684 [0.0641]	(0.0001) [0.0001]
Capex / Net Assets	0.0546 [0.0421]	0.0522 [0.0394]	0.0482 [0.0390]	0.0516 [0.0447]	(0.0326) [0.1741]
Cash Flow Sigma	0.0389 [0.0299]	0.0283 [0.0223]	0.0255 [0.0212]	0.0218 [0.0190]	(0.0001) [0.0001]
R&D / Sales	0.0007 [0.0000]	0.0009 [0.0000]	0.0010 [0.0000]	0.0008 [0.0000]	(0.1857) [0.0395]
Short term bank debt / assets	0.1931 [0.1652]	0.1689 [0.1306]	0.1475 [0.1258]	0.1342 [0.1085]	(0.0001) [0.0001]
Long term bank debt / assets	0.0933 [0.0593]	0.0804 [0.0497]	0.0728 [0.0476]	0.0699 [0.0396]	(0.0001) [0.0001]
Bank debt / total debt	0.8642 [1.0000]	0.7812 [0.8926]	0.6866 [0.7589]	0.6025 [0.5787]	(0.0001) [0.0001]

Panel C: p-values of differences between early and late subperiod

p-values for difference in means [medians] between early and late subperiod				
Cash / Net Assets	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0005]
Excess cash / Net Assets	0.0745 [0.0006]	0.0001 [0.3671]	0.0001 [0.1795]	0.0001 [0.0001]
Market to Book	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]
Leverage	0.4188 [0.1713]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]
Cash Dividends/ Net Assets (x 100)	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]
Real Size (in 1994 Yen)	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]
Cash Flow / Net Assets	0.7434 [0.8406]	0.5950 [0.7799]	0.1920 [0.2135]	0.0104 [0.0155]
NWC / Net Assets	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]
Capex / Net Assets	0.0565 [0.0462]	0.0001 [0.0001]	0.0012 [0.0001]	0.0001 [0.0001]
Cash Flow Sigma	0.1697 [0.0001]	0.0994 [0.0001]	0.0660 [0.0001]	0.0001 [0.0001]
R&D / Sales	0.0628 [0.0007]	0.7473 [0.0001]	0.0255 [0.0001]	0.3165 [0.0001]
Short term bank debt / assets	0.7976 [0.3717]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]
Long term bank debt / assets	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]
Bank debt / total debt	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]	0.0001 [0.0001]

Table 6

Characteristics of Japanese Firms Hoarding Cash Versus Firms Disgorging Cash

Firms are examined after entering the highest quartile of excess cash for the first time (Year 0). Excess cash to assets is defined as the residual from a first pass regression. Firms are said to hoard cash (Panel A) if they are in the highest quartile of excess cash in all 6 years. Firms are said to disgorge cash (Panel B) if they are in the highest quartile of excess cash in year 0 and then the lowest quartile of excess cash in year 1. Cash is cash on hand divided by net assets where net assets are total assets minus cash. Market to Book is defined as book value of assets - book value of equity + market value of equity / total assets. Real Size is the natural logarithm of total assets deflated to 1994 US dollars. Cash flow is defined as EBITDA - interest expense - taxes - common dividends. NWC is current assets - cash - current liabilities. Capital expenditures is the yearly change in gross property, plant and equipment deflated by net assets. Leverage is defined as short term plus long term debt divided by total assets. Dividends are cash dividends divided by net assets. Bank ownership is the number of shares financial institutions own divided by the total shares outstanding. When R&D is missing, it is set to zero. Keiretsu is a dummy variable which equals one if the firm belongs to any type of keiretsu, and zero otherwise. The numbers in parentheses in Panel A are p-values for a difference in means test between Panels A and B.

Panel A: Firms which hoard cash - 231 firms

Variable	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cash	0.3633 (0.0290)	0.3773 (0.0001)	0.3858 (0.0001)	0.3724 (0.0001)	0.3741 (0.0001)	0.3542 (0.0001)
Leverage	0.2971 (0.1207)	0.2883 (0.0027)	0.2842 (0.0502)	0.2803 (0.0370)	0.2795 (0.1249)	0.2818 (0.1458)
Dividends (times 100)	0.0345 (0.4878)	0.0382 (0.2991)	0.0370 (0.1178)	0.0351 (0.1783)	0.0340 (0.0696)	0.0318 (0.3622)
Cash Flow	0.0354 (0.9209)	0.0362 (0.3587)	0.0416 (0.4827)	0.0419 (0.4503)	0.0350 (0.8992)	0.0294 (0.7604)
Real Size	6.000 (0.0478)	6.032 (0.0478)	6.080 (0.0380)	6.149 (0.0231)	6.170 (0.0615)	6.196 (0.0988)
Market to Book	1.518 (0.0333)	1.532 (0.1143)	1.575 (0.1846)	1.521 (0.0323)	1.503 (0.1006)	1.436 (0.0420)
Bank Ownership	0.2500 (0.4262)	0.2637 (0.9558)	0.2721 (0.8592)	0.2807 (0.8084)	0.2877 (0.7882)	0.2938 (0.7904)
Capital Expenditures	0.0391 (0.0216)	0.0465 (0.0342)	0.0448 (0.6537)	0.0517 (0.3896)	0.0473 (0.8250)	0.0508 (0.7754)
R&D/Sales	0.0010 (0.5916)	0.0009 (0.6587)	0.0007 (0.3685)	0.0006 (0.4758)	0.0006 (0.4265)	0.0007 (0.6233)
Keiretsu	0.4675 (0.1287)	0.4675 (0.1287)	0.4675 (0.1660)	0.4675 (0.2403)	0.4675 (0.3071)	0.4675 (0.2735)
Short term bank loans / assets (127 firms / 100 year 5)	0.2500 (0.1858)	0.2515 (0.0005)	0.2572 (0.0001)	0.2465 (0.0599)	0.2386 (0.0149)	0.2476 (0.0233)
Long term bank loans / assets (182 firms / 168 year 5)	0.1219 (0.0007)	0.1189 (0.0094)	0.1065 (0.0767)	0.1011 (0.0207)	0.1036 (0.0549)	0.1033 (0.0060)
Bank debt / total debt (125 firms / 99 year 5)	0.9714 (0.1005)	0.9612 (0.0730)	0.9637 (0.0263)	0.9551 (0.0728)	0.9563 (0.0503)	0.9510 (0.2236)

Panel B: Firms which disgorge cash - 31 firms in year 1, 23 firms by year 5

Variable	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cash	0.3114	0.0963	0.1096	0.1138	0.1442	0.1449
Leverage	0.2382	0.1757	0.2106	0.2009	0.2195	0.2211
Dividends (times 100)	0.0415	0.0305	0.0254	0.0253	0.0216	0.0256
Cash Flow	0.0368	0.0266	0.0346	0.0339	0.0332	0.0331
Real Size	5.528	5.560	5.564	5.550	5.665	5.731
Market to Book	1.903	1.741	1.798	1.831	1.803	1.829
Bank Ownership	0.2731	0.2622	0.2773	0.2732	0.2792	0.3024
Capital Expenditures	0.0685	0.0771	0.0489	0.0433	0.0495	0.0478
R&D/Sales	0.0014	0.0012	0.0013	0.0009	0.0010	0.0011
Keiretsu	0.3226	0.3226	0.3333	0.3462	0.3600	0.3478
Short term bank loans / assets (12 firms / 8 year 5)	0.2054	0.1296	0.1188	0.1681	0.1408	0.1492
Long term bank loans / assets (23 firms / 19 year 5)	0.0628	0.0601	0.0671	0.0520	0.0609	0.0420
Bank debt / total debt (12 / 8)	0.8696	0.7693	0.6657	0.7988	0.7872	0.7826

Table 7

Characteristics of Japanese Firms Hoarding Cash, Sub-periods

Firms are examined after entering the highest quartile of excess cash for the first time (Year 0). Excess cash to assets is defined as the residual from a first pass regression. Firms are said to hoard cash if they are in the highest quartile of excess cash in all 6 years. Cash is cash on hand divided by net assets where net assets are total assets minus cash. Market to Book is defined as book value of assets - book value of equity + market value of equity / total assets. Real Size is the natural logarithm of total assets deflated to 1994 US dollars. Cash flow is defined as EBITDA - interest expense - taxes - common dividends. NWC is current assets - cash - current liabilities. Capital expenditures is the yearly change in gross property, plant and equipment deflated by net assets. Leverage is defined as short term plus long term debt divided by total assets. Dividends are cash dividends divided by net assets. Bank ownership is the number of shares financial institutions own divided by the total shares outstanding. When R&D is missing, it is set to zero. Keiretsu is a dummy variable which equals one if the firm belongs to any type of keiretsu, and zero otherwise. The numbers in parentheses in Panel A are p-values for a difference in means test between firms that hoard cash in the early period versus those that hoard cash in the later period.

Panel A: 1974-1981 Firms which hoard cash - 166 firms

Variable	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cash	0.3559 (0.0001)	0.3606 (0.0001)	0.3601 (0.0001)	0.3460 (0.0001)	0.3399 (0.0001)	0.3297 (0.0005)
Leverage	0.3545 (0.0001)	0.3443 (0.0001)	0.3303 (0.0001)	0.3196 (0.0001)	0.3182 (0.0001)	0.3177 (0.0001)
Dividends (times 100)	0.0418 (0.0076)	0.0416 (0.0022)	0.0409 (0.0002)	0.0396 (0.0003)	0.0380 (0.0001)	0.0364 (0.0001)
Cash Flow	0.0243 (0.0000)	0.0266 (0.0008)	0.0364 (0.0385)	0.0387 (0.0158)	0.0289 (0.0008)	0.0220 (0.0001)
Real Size	5.732 (0.0000)	5.728 (0.0000)	5.751 (0.0000)	5.807 (0.0000)	5.807 (0.0001)	5.823 (0.0001)
Market to Book	1.262 (0.0001)	1.299 (0.0001)	1.412 (0.0001)	1.344 (0.0055)	1.351 (0.0307)	1.325 (0.0050)
Bank Ownership	0.2307 (0.0000)	0.2410 (0.0000)	0.2471 (0.0000)	0.2523 (0.0000)	0.2522 (0.0000)	0.2574 (0.0000)
Capital Expenditures	0.0347 (0.0001)	0.0387 (0.0000)	0.0378 (0.0000)	0.0442 (0.0001)	0.0433 (0.9731)	0.0473 (0.1054)
R&D/Sales	0.0012 (0.0052)	0.0011 (0.1189)	0.0008 (0.1608)	0.0006 (0.4207)	0.0007 (0.7798)	0.0008 (0.5834)
Short term bank debt / assets (117 firms / 95 yr 5)	0.2561 (0.0569)	0.2591 (0.0214)	0.2612 (0.0333)	0.2532 (0.0118)	0.2480 (0.0431)	0.2518 (0.0386)
Long term bank debt / assets (148 firms/138 yr 5)	0.1420 (0.0001)	0.1378 (0.0001)	0.1249 (0.0001)	0.1163 (0.0001)	0.1181 (0.0001)	0.1163 (0.0001)
Bank debt / total debt (116 firms / 94 year 5)	0.9766 (0.0009)	0.9736 (0.0028)	0.9791 (0.0014)	0.9804 (0.0004)	0.9793 (0.0004)	0.9750 (0.0010)

Panel C: 1988-1995 Firms which hoard cash - 107 firms

Variable	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cash	0.4724	0.4865	0.4468	0.4311	0.4062	0.3875
Leverage	0.2096	0.2021	0.1980	0.2078	0.2057	0.1989
Dividends (times 100)	0.0268	0.0251	0.0224	0.0222	0.0188	0.0071
Cash Flow	0.0588	0.0494	0.0495	0.0533	0.0498	0.0503
Real Size	6.804	6.935	6.968	6.985	6.989	7.000
Market to Book	2.010	2.166	1.847	1.520	1.485	1.502
Bank Ownership	0.3437	0.3712	0.3804	0.3828	0.3910	0.3974
Capital Expenditures	0.0611	0.0622	0.0645	0.0678	0.0435	0.0394
R&D/Sales	0.0003	0.0006	0.0004	0.0004	0.0006	0.0006
Short term bank debt / assets (19 firms / 18 yr 5)	0.1784	0.1694	0.1736	0.1539	0.1688	0.1667
Long term bank debt / assets (59 firms / 53 yr 5)	0.0375	0.0328	0.0381	0.0381	0.0424	0.0452
Bank debt / total debt (19 firms / 18 by year 5)	0.6640	0.6785	0.6579	0.6290	0.6696	0.6686