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### **Abstract**

This paper uses panel data from Japanese listed firms during 1980-2010 to analyze the factors that influence firms' cash holdings and determine whether cash holdings are related to corporate performance and values. It is demonstrated that firms have increased cash holdings because of the trend of higher cash flow uncertainty since the 1990s, and, especially in the 2000s, due to the continuous availability of low-cost funding. It is also shown that with large investment opportunities, the positive relationship between cash holdings and firms' returns on assets and values has weakened in recent years, although external investors have highly valued firms since 2008. It is implied that under a sudden deterioration in the economy, conservative cash holdings could temporarily increase firms' market values, but, in the long run, a highly conservative liquidity management policy would weaken firms' profitability on assets.

*Keywords:* Cash Holdings; Corporate Finance; Corporate Performance; Corporate Values;  
Japanese Firms

*JEL classification:* G30, G32

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## **1. Introduction**

When the financial crisis occurred in late 2008, most financial institutions in the world faced severe funding difficulties and non-financial firms were immediately forced to strengthen their funding strategies against financial constraints. As the domestic capital markets rapidly shrank owing to the loss of the financial intermediary functions of financial institutions, many Japanese firms were unable to secure funding from the capital markets. Since the late 1990s, Japanese firms have reduced borrowings from banks and instead increased funding from the capital markets. However, this transition from indirect to direct finance was interrupted by the 2008 global financial crisis.

It is widely known that Japanese banks suffered less from the global financial system turmoil than did overseas financial institutions, and therefore Japanese firms that could not source enough funding from the capital markets increased borrowings from banks. In such industries as export-led manufacturing, the sharp downturn in overseas demand hit manufacturers' working capital and soon made short-term cash management difficult, leading them to tap short-term borrowings from banks. In industries with domestic demand, firms also had pre-funding needs to prepare for coming financial constraints and an economic slowdown in the domestic market, and therefore they restored or increased long-term borrowings from banks.

Figures 1 and 2 describe time-series changes in the external funding methods of Japanese firms since the 1980s. As domestic demand shrank rapidly after the bubble era at the end of the 1980s and in the beginning of the 1990s, firms were forced to streamline their balance sheets. Long-term borrowings from banks decreased, and

year-on-year growth of short-term borrowings weakened. The pressure of balance sheet adjustments on firms became stronger in the 2000s, following the banking sector crisis in the late 1990s. The debt continued declining in the mid-2000s, while firms' external funding shifted from bank loans to the capital market.

(Figure 1 ABOUT HERE)

(Figure 2 ABOUT HERE)

However, following the global financial crisis after the collapse of Lehman Brothers in 2008, direct funding from the capital market became extremely difficult. Firms that were unable to issue bonds and commercial paper returned to tapping bank loans, and outstanding bank borrowings increased in 2008.

Notably, while short-term borrowings decreased in 2009, long-term borrowings continued to increase. It is widely recognized that firms increased their borrowings from banks not only because they compensated for a lack of financing alternatives in the capital markets but also because they sought to secure funds in advance to prepare for future financial constraints.

How, then, has the composition of firm assets changed since the 1980s? Figures 3 and 4 show changes in the liquid assets of Japanese firms. On the liability side, the liquid asset size shrank immediately after the bubble era and continued contracting until the early 2000s. It started increasing in 2003 because of the expanding demand growth but declined sharply in 2008, mainly through a sharp decline in receivables, which resulted in a sudden credit crunch between non-financial firms.

(Figure 3 ABOUT HERE)

(Figure 4 ABOUT HERE)

In addition, as seen in Figure 3, cash and its equivalent assets increased during 2009-2010 for all firms. Concerning large- and medium-sized firms with capital of more than 100 million yen, a similar but stronger trend is observed in Figure 4. For the Japanese firms, then, what were the main factors in the accumulation of cash holdings, and did those factors change from the past? To approach this question, we first analyze Japanese firms' cash holdings.

As mentioned later in Chapter 2, motivations behind firms' cash holdings have been discussed from various perspectives. Previous literature explains the influences on cash holdings to include financial constraints and costly external funding, influence of creditors, corporate governance of managers, and shareholders' interests. According to the previous theoretical and empirical studies, we assume several reasons for cash holdings, considering the recent situation Japanese firms have faced: (a) Firms hold larger cash when they earn larger cash flow; (b) Higher leveraged firms have less cash holdings; (c) Firms with larger interest payments have larger cash holdings; (d) Firms with lower credit have larger cash holdings; (e) When funding conditions become severe, firms have more cash holdings; and (f) When cash flow volatility increases, firms increase cash holdings.

To demonstrate how these factors have influenced the cash holdings of Japanese firms, we use firm-level panel data of Japanese listed firms in the period of

1980-2010. Although some previous studies have been made on cash holdings, our study contributes to extending them by covering the latest financial crisis as well as highlighting characteristics in the medium-term changes in cash holdings of Japanese firms.

Many firms have recovered from the crisis, but did their funding strategy and accumulation of cash holdings succeed in improving firm value or business performance since the crisis? This is the second aim of this study: to demonstrate the influence of cash holdings on corporate value and performance. Using the same data set as mentioned above, we test the following hypotheses: First, firms will be highly valued or perform better if they have good opportunities to invest cash or spend money on restructuring to strengthen the business. Second, if the investment opportunity is large enough, larger cash holdings will have a positive effect on corporate value and performance.

Because the previous literature focuses on the reasons for cash holdings rather than their results, this study contributes to analyzing the effectiveness of firms' financial behavior under financial shock and the consideration of planning policies to support corporate finance.

The rest of the paper is organized as follows: Chapters 2 and 3 explain the previous theoretical and empirical literature on motivations for and effects of liquid asset holdings. Chapters 4 and 5 present our frameworks for the analyses, empirical model specifications, and the hypotheses to test. Chapter 6 represents descriptive statistics of our data set. Chapters 7 and 8 describe the estimation results of our empirical models. Chapter 9 explains the summary of results and considers policy implications based on the results.

## **2. Previous literature on motivations for liquid asset holdings**

As Hori, Ando, and Saito (2010) and other related literature summarize, there are several major theoretical perspectives on why firms hold liquid assets: financial constraints and costly external funding, influence of creditors such as banks, and corporate governance. Financial constraints on funding are the most obvious reason for firms to hold liquid assets such as cash and deposits. It would be natural for firms to keep liquidity reserves such as in the form of cash in advance in order to avoid the constraints for funding in the future.

Myers and Majluf (1984) discuss how cash and deposits provide firms with financial slack, which allows them to manage operations without costly external funding. These arguments are based on the pecking order hypothesis, according to which firms have a preference for internal reserves over costly external funding. If there is a large asymmetry of information between borrowers and lenders, firms with large agency costs from the asymmetry of information tend to reserve more liquid assets instead of using external funding. In addition, if a firm has a larger growth opportunity or faces a larger funding risk, it will increase its cash reserve.

Second, creditors have significant effects on debtors' cash holdings. Ozkan and Ozkan (2004) argue that as debtors make repayment to creditors a primary concern, they do not reserve unnecessary liquid assets. Creditors are reluctant to provide additional loans to debtors when the debtors already have plenty of untapped cash. In addition, if the opportunity costs of holding liquid assets are large owing to high funding costs,

firms prefer to utilize the cash inflow for reimbursement rather than accumulating cash reserves. These factors imply that debt accumulation reduces untapped cash reserves.

On the other hand, debtors having a high level of debt and facing severe cash management problems will increase cash reserves to avoid bankruptcy. The main banks, in particular, affect borrowers' cash holdings. Hoshi, Kashyap, and Shrafstein (1991) emphasize the effect of main banks on cash reserve levels and suggest that if they have a firm commitment to provide a minimum liquidity to client firms, the clients do not need to hold an extra amount of cash. This reduces an unnecessary amount of liquid assets if firms already have a large debt.

The third argument on holding cash concerns conflicting interests between managers and external stakeholders from the viewpoint of corporate governance. Jensen (1986), on the basis of agency theory, suggests that managers have incentives to increase assets under their control rather than to pay out cash as dividends to external shareholders.

The reasons for firms' liquid asset holdings are various and related to different interests of internal and external stakeholders. Thus, empirical studies investigate specific motivations for cash holdings to explore the relationship between firms and stakeholders.

In terms of cash holdings under financial constraints, Opler et al. (1999) show that firms with easy access to the capital markets hold lower ratios of cash to total assets. By using U.S. firm data for 1971-1994, they show that when cash flow is low for investment or external funds are costly, firms hold liquid assets to ensure that they will be able to keep investing. Faulkender (2002) on U.S. small firms, Ozkan and Ozkan (2004) on UK firms, and Ferreira and Vilela (2004) on EMU firms have similar results.



The study of Hori, Ando, and Saito (2010) on Japanese manufacturers in the late 1980s and early 1990s demonstrates the positive relationship of cash flow with cash holdings, but it turns insignificant after the late 1990s.

Several studies on the relationship between debtors and creditors deal with the Japanese bank system. Rajan and Zingales (1995) show that in the early 1990s, firms in Japan had a higher level of cash holdings than those in other advanced countries, primarily because of large profits earned after the bubble era. Pinkowitz and Williamson (2001) demonstrate that Japanese firms increased their cash holdings when banks were dominant and exerted more power over client firms. They consider that banks are able to earn rent from firms by imposing additional cash and deposits. Hori, Ando, and Saito (2010) also show that debt ratios had a positive relationship with cash holdings in the early 1980s but the relationship turned negative from the late 1980s to the early 1990s.

In terms of the role of corporate governance on cash holdings, Opler et al. (1999) and Mikkelson and Partch (2003) show no strong evidence of managerial interests in U.S. firms. Ferreira and Vilela (2004) show an insignificant negative relation between dividend and cash holdings while the ratio of cash flow to assets is positively related to cash holdings.

### **3. Previous literature on effects of liquid asset holdings on corporate performance**

This study investigates not only the reasons for cash holdings but also firms' performance and value from the viewpoint of cash holdings. Jensen (1986) notes that

firms with large cash holdings are not valued highly by external stakeholders, who can spend cash on investing in less profitable projects. This increases agency costs. Similarly, Harford (1999) also explains that firms with large cash holdings tend to invest in mergers and acquisitions, which decreases corporate values.

On the other hand, if a firm faces a profitable investment opportunity but the asymmetry of information prevents additional capital funding from shareholders, underinvestment problems arise, as Myers and Majluf (1984) point out. Assuming that the firm has large cash holdings and investment opportunities are also large enough, cash holdings could solve the underinvestment problems. External shareholders do not highly value large cash holdings before investment, but the firm could invest in proper projects using cash and earn profits.

In terms of empirical studies on cash holdings and corporate performance, Blanchard, Lopez-de-Silanes, and Shleifer (1994) analyze a small sample of firms that have cash windfalls from lawsuits. They find that managers retain cash rather than distribute it to shareholders even though they have no attractive investment opportunities. The results also show that such firms invest in projects that later fail.

Pinkowitz and Williamson (2005), using U.S. firm-level data for the period of 1950-1999, show that firms with growth opportunities have their cash valued higher. They also demonstrate that cash holdings of firms with stable investment programs and those facing the possibility of financial distress are less valued. Fukuda (2011), using Japanese firm data for the period of 2000-2004, similarly shows that cash holdings of firms with big opportunities for investment are highly valued, although financial constraints such as debt ratios and capital market access have no significant effects on the relationship between cash holdings and corporate values.

#### **4. Empirical analysis framework: Motivations for cash holdings**

This study analyzes the motivations for and effects of cash holdings using Japanese firm data that covers the latest financial crisis of 2008. We first use using panel data of listed firms during 1980-2010 to explore why Japanese firms hold liquidity assets such as cash. As described in Chapter 2, there are several different theoretical motivations for cash holdings. We assume the following relationships on the basis of previous theoretical literature and test the assumption using our data set.

(a) Firms would hold larger cash when they earn larger cash flow.

Following the pecking order hypothesis, firms use cash as a buffer between earnings and capital/operating expenditure. If their cash flow is larger than their expenditure needs, they use cash for repayment of debt and dividends. If, however, the cash flow is less than needed, they cash out of accumulated deposits before issuing debt. Considering financial constraints and costly external funding, firms increase cash holdings when they have larger cash flow under constant needs for expenditures. Under the severe financial crisis in 2008, in particular, financial concerns expanded too fast for firms to reduce expenditures, and thus firms became more conservative toward cash reserves.

(b) Higher leveraged firms would have more cash holdings.

If firms consider their debt over capital to be already at too high a level, they

increase cash holdings to avoid bankruptcy or to prepare for future expenditures instead of incurring costly external funding.

(c) Firms with larger interest payments would have larger cash holdings.

As with (b), firms plan to reduce debt by accumulating cash holdings.

(d) Firms with lower credit would have larger cash holdings.

If firms are concerned about having their credit lowered and being able to secure funding in the future, they accumulate cash holdings in advance.

(e) When funding conditions become severe, firms have more cash holdings.

If banks become stricter on financing especially during a financial crisis, firms will hold more cash to prepare for the supply-side financial constraints.

(f) When cash flow volatility increases, firms increase cash holdings.

As Ferreira and Vilela (2004) describe, firms with higher cash flow volatility face a higher probability of experiencing cash shortage owing to unexpected cash flow deterioration.

To test the above hypotheses, we conduct panel data analysis using data of Japanese listed firms for the period of 1980-2010, obtained from the DBJ financial databank. We specify the empirical model as follows:

$$\Delta cash_t = \alpha + a*\Delta cf_t + b*\Delta DCR_{t-1} + c*\Delta SPRD_t + d*\Delta DI_t + e*\Delta UC_t + f*YD$$

*cash* is the ratio of cash and equivalent assets such as deposits over total assets. *cf* is the ratio of cash flow, which is calculated as current net profit/loss after tax + depreciation – dividends – managerial compensation, over total assets. The relationship (a) assumes that the coefficient  $a$  is positive. *DCR* means the interest-bearing debt-to-capital ratio, and (b) assumes  $b$  is positive. *SPRD* is defined as the difference between deposit rates and interest rates paid that are calculated as paid interest/average outstanding of interest-bearing debt. Thus, the relationships of (c) and (d) assume that  $c$  is positive. *DI* is the industry-level index obtained from the Tankan Survey by the Bank of Japan, which indicates the lending attitude of financial institutions. As negative numbers mean severe lending situations, the coefficient  $d$  is assumed to be negative according to (e). *UC* is the indicator of uncertainty that is measured by three-year cash flow volatility, and (f) assumes that  $e$  is positive. *YD* is the dummy year variable. We adopt fixed effect models based on the Hausman test.

## **5. Empirical analysis framework: Effects of cash holdings on corporate performance**

Next, we conduct empirical analysis on the effects of cash holdings on corporate performance and values. Our interests are mainly to investigate whether firms with large cash holdings tend to spend cash on effective expenditures to improve business performance and corporate values. If firms accumulate unnecessary cash holdings through conservative attitudes that might conflict with shareholder interests,

they could have a tendency to keep cash or use it on ineffective expenditures.

In addition, according to the previous literature mentioned in Chapter 3, the significance of such a relationship between cash holdings and corporate performance and value depends on the investment opportunity set. Thus, we assume the following relationships to test it:

(g) If the investment opportunity is large enough, large cash holdings have a positive effect on corporate performance, which is measured as returns on assets. In other words, firms would accumulate cash holdings to invest in profitable projects, conduct investment projects, and achieve better returns on assets. We test whether a firm that accumulated cash holdings would succeed in increasing returns, by dividing the sample firms into three sub-samples by three year-average levels of investment ratios toward total assets.

(h) If equity investors have the view that firms with large cash holdings would have better business performance, market values of such firms are higher. We test whether a firm that accumulates cash holdings would have a higher market value by dividing the sample firms into three sub-samples by three year-average level of investment ratios toward total assets.

We set the following empirical model for the panel data estimation to test these relationships:

$$\Delta P_t = \alpha + a * \Delta cash_{t-1} + b * YD + c * ID$$

$P$  denotes corporate performance and market value indicators are return on asset (ROA) and price-to-book ratio (PBR), which is the ratio of total market cap over the book value of total assets.  $YD$  and  $ID$  denote year and industry dummies, respectively. We adopt fixed effect models based on the Hausman test.

We divide sample firms into three sub-samples (high/medium/low) on the basis of distributions of fixed investment ratios over total assets. The low sample consists of firms with ratios lower than the 33rd percentile, the high sample comprises firms with ratios higher than the 66th percentile, and the medium sample includes the rest. In the sub-samples, firms with lower fixed investment ratios — which accumulated cash holdings — could not invest in efficient projects and have lower ROA and PBR. Assuming that sub-sample firms with higher investment ratios have a greater investment opportunity set, cash holdings would be positively correlated with the performance indices.

## **6. Dependent and independent variables**

Figures 5a-5g describe time-series variables used in our estimation models and explained in Chapters 4 and 5. The numbers are medians of the samples, which consist of 1,416 to 2,276 firms on an annual basis in our unbalanced panel data set.

(Figures 5a, 5b, 5c, 5d, 5e, 5f, 5g ABOUT HERE)

(Table 1 ABOUT HERE)

Figure 5a shows the ratio of cash and relevant asset (deposit) holdings to total assets. The ratio plummeted during the bubble economy at the beginning of the 1990s and continued declining after the bubble collapse. It slightly increased during the first half of the 2000s but declined again in 2007. However, since 2008, the ratio has largely increased to reach the same level as that at the beginning of the 1990s.

The ratio of cash flows to total assets had a similar trend as that witnessed for the cash holdings ratio until the beginning of the 1990s. However, it experienced sharp declines in 1998 and 2001, while the cash holdings ratio was maintained at almost the same level. Moreover, from the beginning of the 2000s to 2007, Japanese firms boosted profits and significantly increased cash flows, but the cash holdings ratio did not largely change. Both ratios rose after 2008, but comparing the trend of the median variables, they seem not to have been simply correlated.

The total debt-to-total assets ratio in Figure 5c has an almost linear downward trend, which means that during those periods, Japanese firms continued to be pressured by balance-sheet adjustments and de-leveraging. Figure 5d shows the difference in interest rates paid and certificate deposit (CD) rates, which is a proxy for credit spreads. The spread dropped below zero, particularly at the end of the 1980s, because CD rates were spot rates reaching very high levels while interest paid rates are calculated on a stock basis as total interests paid divided by interest-bearing debt outstanding. After the bubble collapse, the interest rates have had a long-term declining trend until the beginning of the 2000s: Ten-year yields of Japanese government bonds dropped from 8% in 1990 to 1% in 2002. In the 2000s, the yields were quite stable in a very narrow



range of 1%-2%. In Figure 5d, it is found that the spread gradually tightened through the 2000s, except 2009-2010.

Figure 5e describes a volatility index of cash flows, which is calculated as a three-year historical standard of ratios of cash flows to total assets. The index, a proxy for the uncertainty that firms face, is almost flat from the 1980s to the late 1990s. There are two spikes after the bank crisis at the end of the 1990s: The first is from the end of the 1990s to 2001, when the cash flow levels dropped to their lowest, as described in figure 5b. The second is the period after the Lehman collapse, when cash flows again declined sharply in 2008 but recovered immediately in 2009. In the second period, the level of cash flows was not lower than that in the first period, but cash flows deteriorated more rapidly. Thus, the uncertainty increases more in the second period.

Figures 5f and 5g show typical indices indicating corporate performance and relative market values, ROA and PBR. In the bubble era, ROA reached a very high level, but it plummeted during the early 1990s. From the middle of the 1990s to the early 2000s, ROA remained at low levels but turned up and rose in the 2000s owing to the economic expansion. In 2006, it climbed to 5%, but in contrast to the cash flow ratios, it did not reach the level of the bubble era. In the long run, ROA levels have lowered since the 1980s.

PBR was at its highest level in 1989, when the bubble economy reached a peak. It continued declining through the 1990s and the first half of the 2000s. Although it picked up in the middle of the 2000s, it dropped to its lowest level after the Lehman collapse.

In sum, as observed in the charts, cash flows followed the trend of the business cycle and, particularly in the 2000s, significantly recovered. Nevertheless, profitability

and market values on assets did not reach historical high levels. However, Japanese firms continued balance-sheet adjustment. In such circumstances, it is expected that cash holdings would be motivated not simply by the ups and downs in cash flows and debt but by conservative management under increasing uncertainty. This hypothesis/conjecture is investigated in the next chapter.

## **7. Estimation results: Motivations for cash holdings**

According to the estimation model described in Chapter 4, Table 2 shows results of the panel data estimation. First, the results of the full sample for the 1980-2010 period show that coefficients of cash flows and debt-to-capital ratio are positive as expected but not significant. This implies that firms do not always place a priority on cash flows and changes in debt outstanding for accumulating cash holdings. The coefficient of cash-flow uncertainty is significantly positive, which means that cash flow volatility rather than the amount of annual cash flow motivates firms to hold cash. The coefficient of credit spreads or interest paid is significant but negative, as opposed to the expected sign. As described later, the negative relation suggests that the long trend of reducing debt by firms and lowering interest rates could lessen firms' concerns over the costs of cash holdings and firms would rather increase cash holdings as credit spreads tighten or interest rates drop. The coefficient of industry-level lending attitudes of banks by industry has no significant result in the full sample.

(Table 2 ABOUT HERE)

Table 2 also shows the sub-sample results obtained by dividing the full sample period into three periods: 1980-1990 (before the bubble burst), 1991-2000 (after the bubble burst and including the domestic bank crisis in 1998), and 2001-2010 (including the Lehman collapse). The coefficients of the cash-flow uncertainty are significantly positive in the periods of 1991-2000 and 2001-2010, suggesting that the uncertainty has been a main motivation for cash holdings since the 1990s. The negative coefficient of the credit spread is significant in 2001-2010, which is consistent with the view that the trend in lowering interest rates since the 2000s made it easier for firms to accumulate cash by external funding.

In addition, Table 3 shows results of the estimations with the sub-sample periods divided by business cycles: 1991-1996, 1997-2000, 2001-2007, and 2008-2010. These are estimated by the model explained in Chapter 4, but year-dummy variables are removed because of the length of the periods. The factors of credit spread and cash-flow uncertainty have similar results in 2001-2007 and 2008-2010. The coefficient of uncertainty in 2008-2010 is larger than that in 2001-2007, and firms are more likely to hold cash facing the cash-flow uncertainty. It is also seen that the coefficient of industry-level lending attitudes of banks is significantly negative in 1997-2000 and 2008-2010. This suggests that in a sudden downturn of the economy, the financial constraints of banks could contribute to firms' cash holdings at the industry level.

(Table 3 ABOUT HERE)

## **8. Estimation results: Effects of cash holdings on corporate performance and value**

According to the estimation model described in Chapter 5, Tables 4 and 5 present results of the panel data estimation. In Table 4, we see the estimation results on the relationship between cash holdings and corporate performance measured by ROA. In the full sample of 1980-2010, coefficients of cash holdings are significantly positive, as expected. However, the size of the coefficient in the sample firms with higher investment ratios is smaller than that in firms with lower investment ratios, which is in contrast to our assumption described in Chapter 5.

(Table 4 ABOUT HERE)

(Table 5 ABOUT HERE)

In the divided samples of 1980-1990 and 1991-2000, coefficients of cash holdings of the groups with higher and medium investment ratios are found to be larger than those of the group with lower investment ratios. This finding is consistent with our assumption that if firms with large investment opportunities accumulate cash holdings, they will use cash for profitable investment to increase returns on assets. However, the result of 2001-2010 shows that the coefficient of firms with large investment opportunities is smaller than that of firms with fewer opportunities. Furthermore, sizes of those coefficients dropped from 5.959 in 1980-1990 to 2.518 in 2001-2010. This suggests the possibility that if cash management is too conservative regardless of large

investment opportunities, the “side-line” cash becomes large and firms cannot fully utilize investment opportunities to maximize returns on assets. It also suggests that the positive relationship between cash holdings for future investment and returns on assets weakened recently.

Table 5 presents results of estimating the relationships between cash holdings and corporate value. Corporate values are measured as PBR, which reflects market-based valuations (market cap) compared to book values of total assets. It is found that firms with large investment opportunities had a significant relationship between cash holdings and market values in the 1980-1990 and 1991-2000 periods, while the other groups of firms do not have significant relationships. That is consistent with our assumption explained in Chapter 5.

On the other hand, in results of the 2001-2010 sample, the relationship between cash holdings and market values of firms with large investment opportunities is not significant. The capital market had not highly valued an increase of cash holdings in the 2000s. Table 6 presents results of other sample periods of 1991-1996, 1997-2000, 2001-2007, and 2008-2010. While the coefficient of cash holdings of firms with large investment opportunities is not significant in 2001-2007, it is significantly positive in 2008-2010. It implies that when the sudden severe deterioration in the economy occurred in 2008, external shareholders could value conservative cash management higher, regardless of large investment opportunities, but in fact, such firms failed to utilize assets to improve profitability in that period, as mentioned earlier. It is assumed that if such cash management and difficulty in improving the profitability on assets continues, market values would decline.

(Table 6 ABOUT HERE)

## **9. Concluding remarks**

This study analyzed motivations for firms' cash holdings and related influences on corporate performance and values, using panel data of Japanese listed firms for the period of 1980-2010. Concerning motivations, it is proven that Japanese firms accumulated cash holdings from the 1990s as the cash-flow uncertainty increased. Especially in the 2000s, the continuous availability of low-cost funding made it easier for firms to accumulate cash holdings.

In terms of the effects of cash holdings on corporate performance, it is elucidated that since the 1990s, with large investment opportunities, the positive relationship between firms' returns on assets and cash holdings has weakened. However, external investors valued cash holdings positively after 2008. It is implied that under a sudden deterioration in the economy, conservative cash management increased firms' market values, but in the long run, with less financial constraints and large investment opportunities, it would weaken firms' profitability on assets.

Thus, under the sudden deterioration of the economy, firms that try to increase borrowings from banks owing to their inability to access funding from the capital market and reserve cash could be provided with fiscal and monetary policy support. However, considering the implication that a highly conservative cash management policy would not lead to an increase in profitability on assets, the persistence of such policy measures could waste investment opportunities by creating conflicting interests

with external shareholders. It is important to set proper exit strategies for such policy measures after considering banks' lending attitudes and capital market conditions. It is also important to set a time horizon to encourage firms to return to direct financing and restore the capital market function, which leads to firms' self-sustainable growth.

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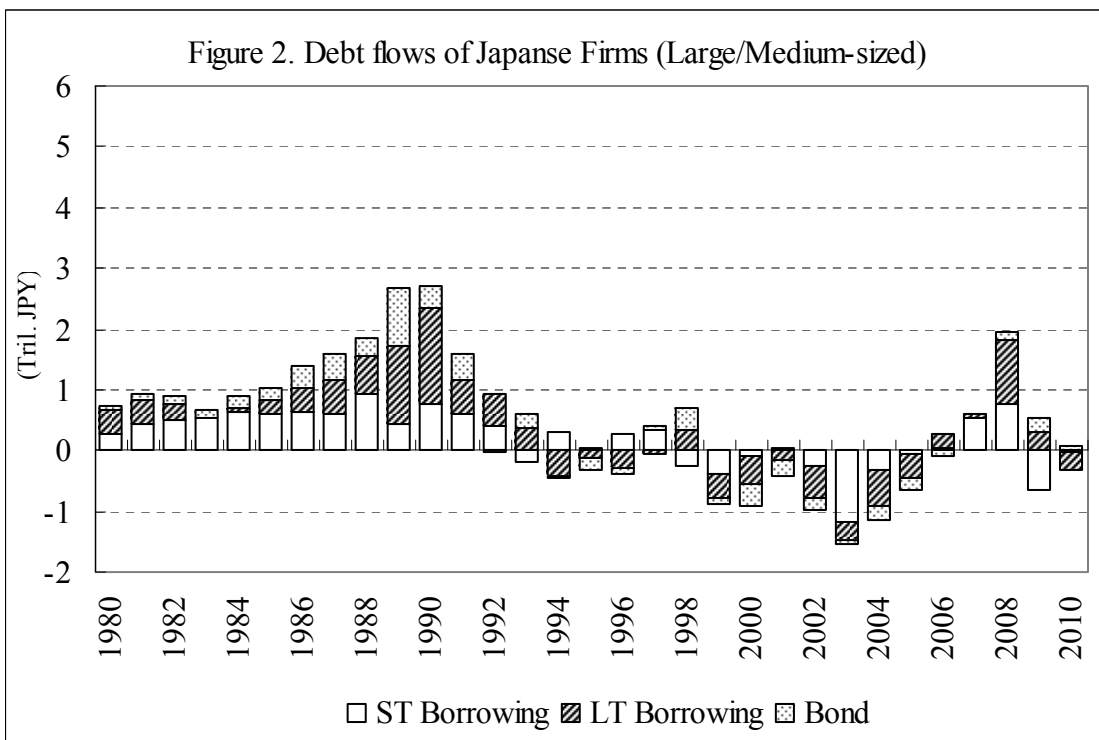
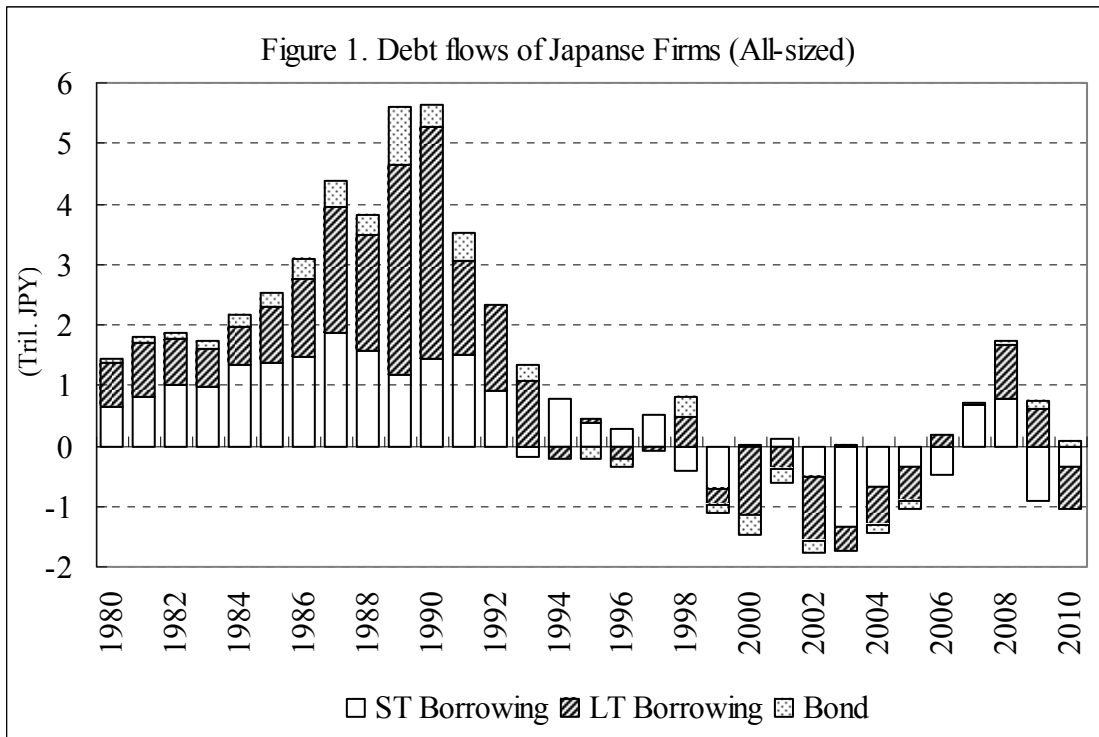
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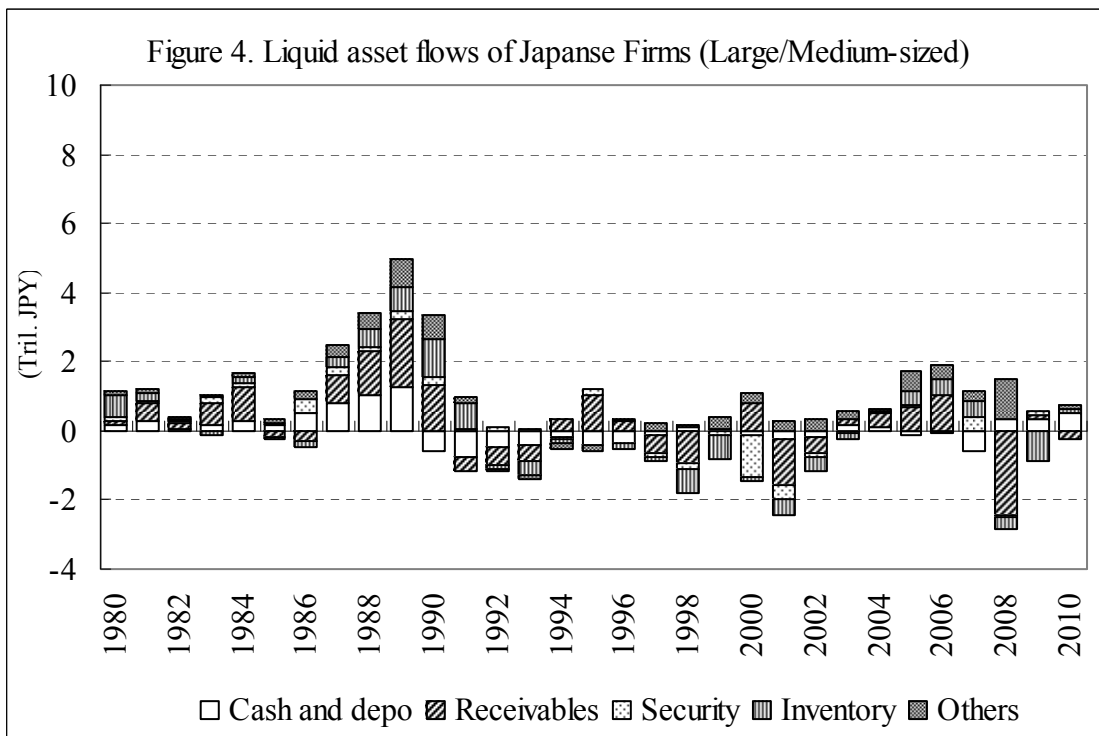
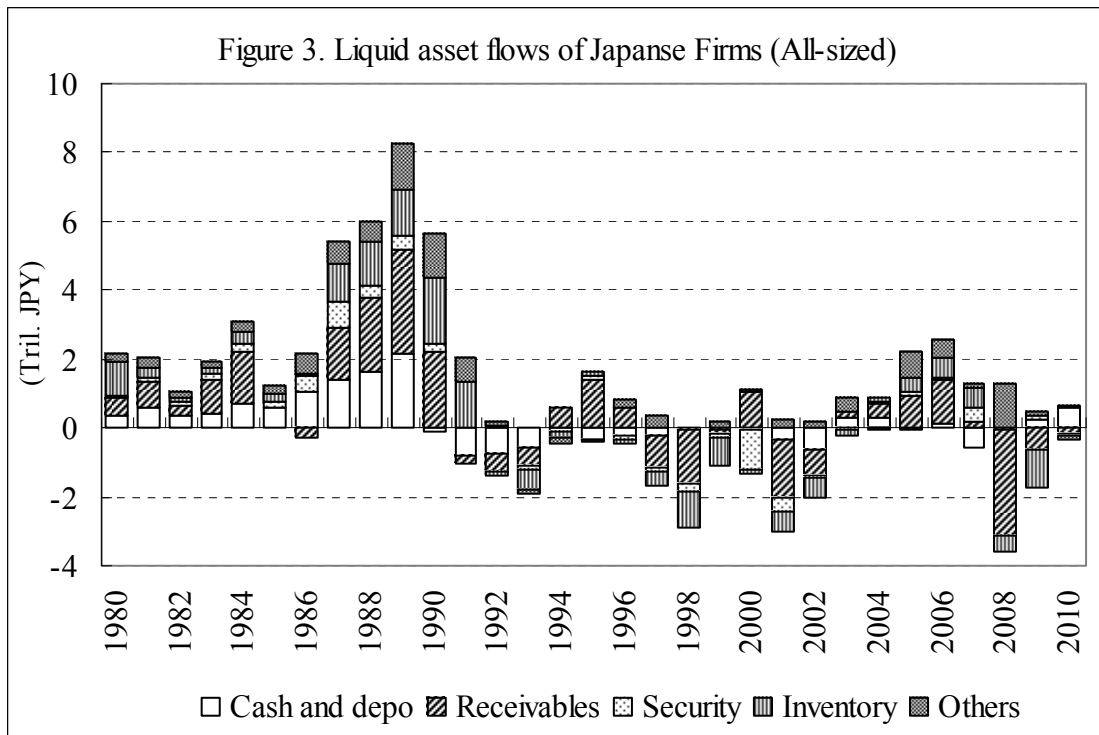
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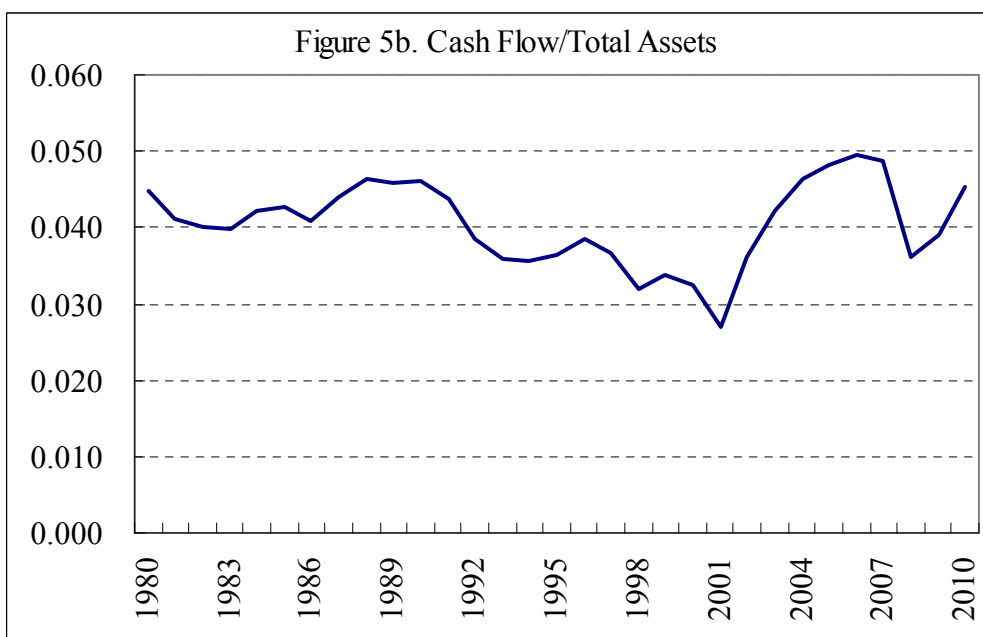
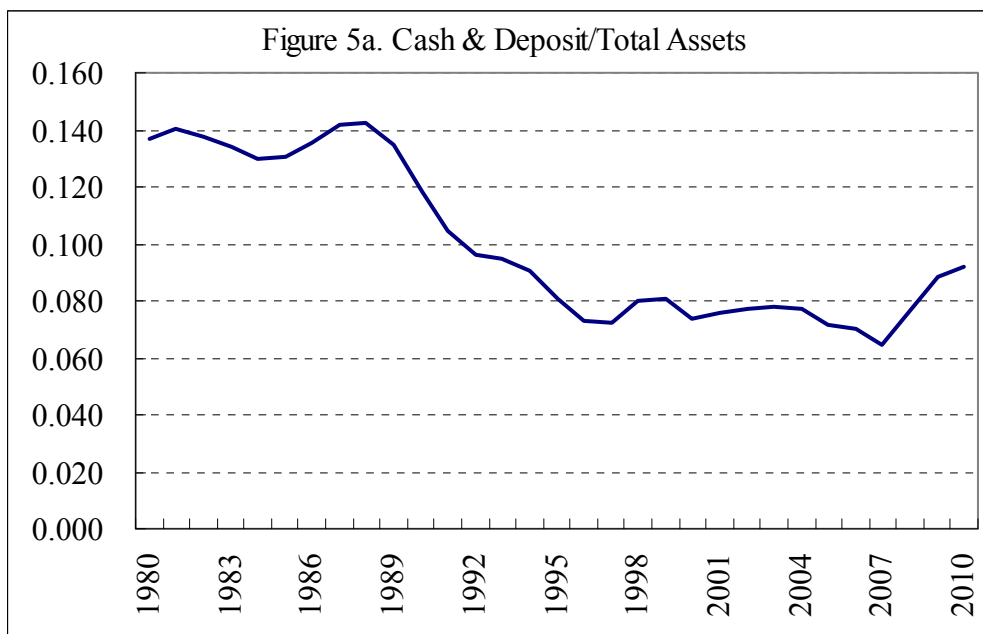
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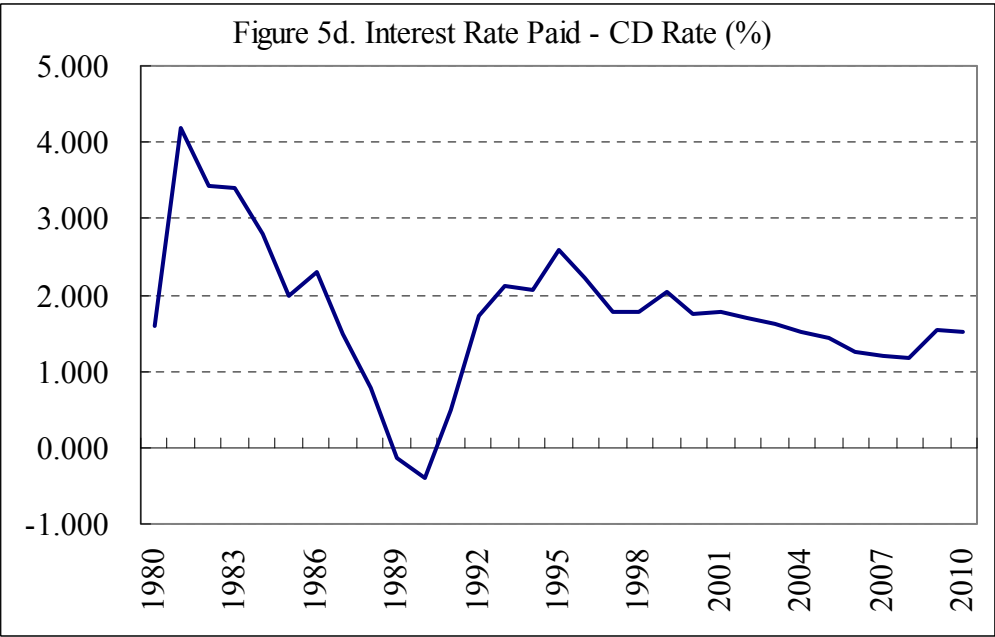
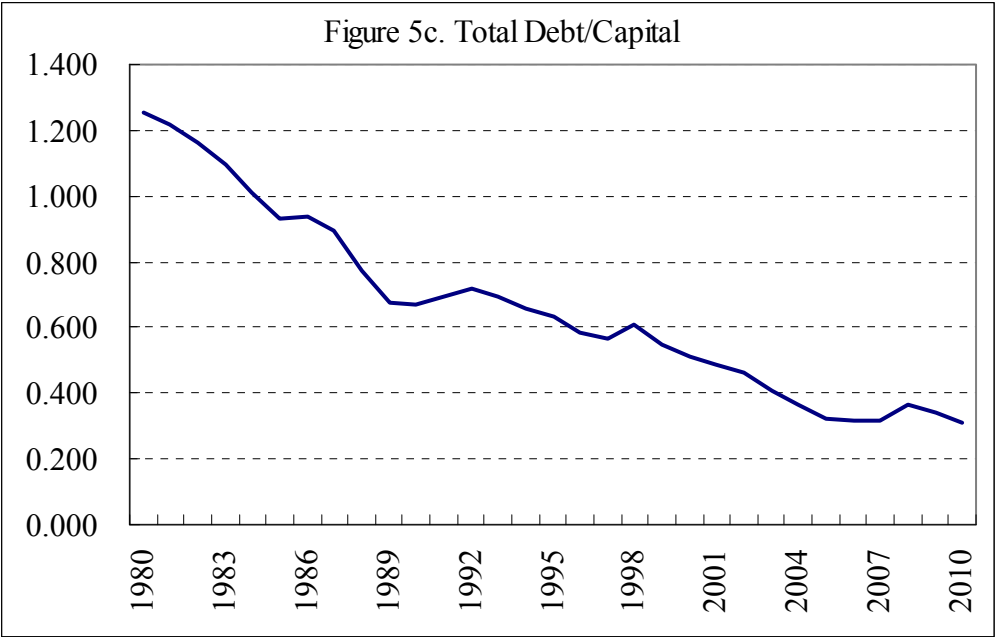
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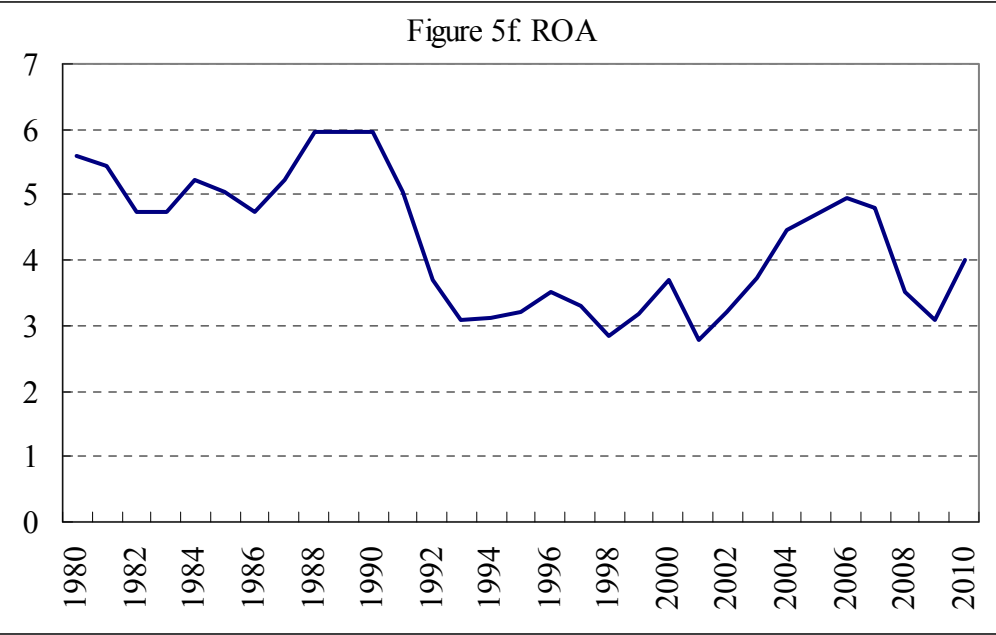
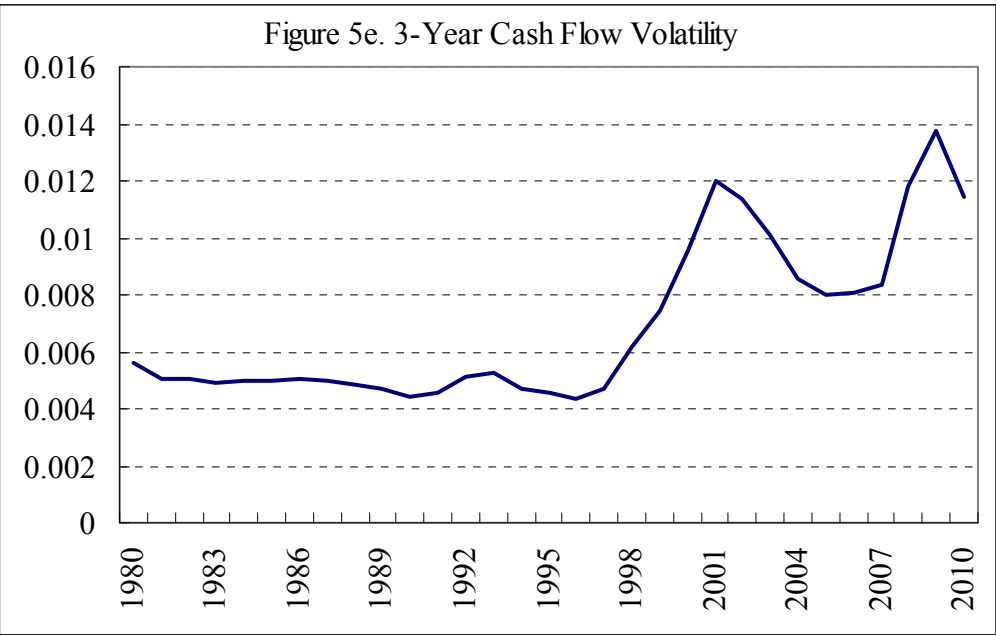
Rajan, Raghuram G., and Luigi Zingales (1995), "What Do We Know about Capital Structure? Some Evidence from International Data," *Journal of Finance* 50(5), 1421-1460.











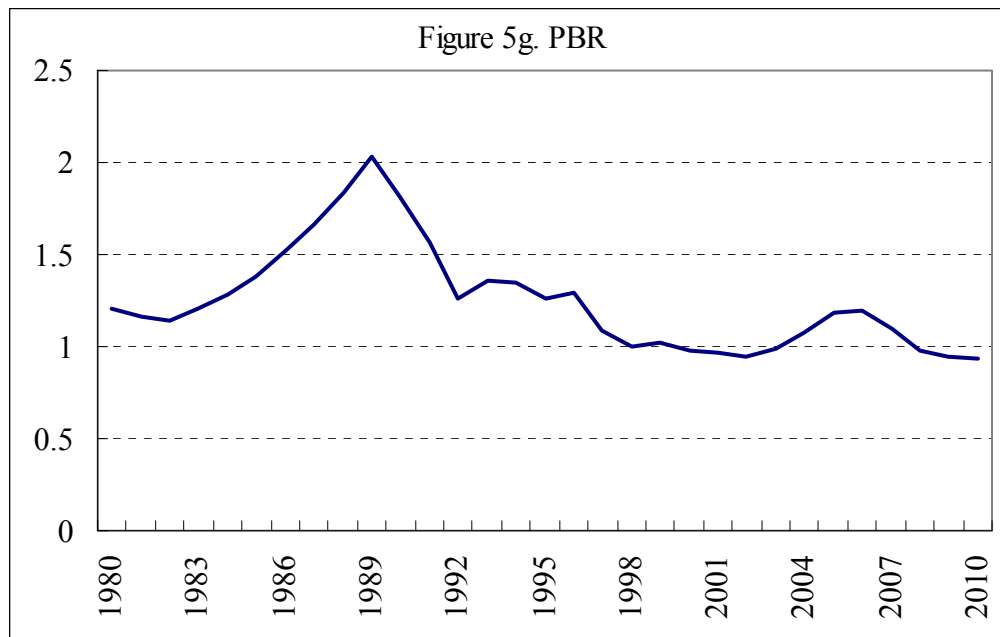


Table 1. Descriptive statistics

|             | Number of obs | Mean  | Std. Dev. | Min     | Max    |
|-------------|---------------|-------|-----------|---------|--------|
| <i>cash</i> | 58,443        | 0.106 | 0.077     | 0.000   | 0.744  |
| <i>cf</i>   | 50,588        | 0.039 | 0.037     | -0.404  | 0.202  |
| <i>DC</i>   | 50,588        | 1.392 | 1.972     | -2.197  | 27.268 |
| <i>SP</i>   | 50,588        | 2.058 | 2.405     | -5.208  | 30.360 |
| <i>UC</i>   | 50,588        | 0.012 | 0.017     | 0.000   | 0.286  |
| <i>ROA</i>  | 58,443        | 4.297 | 3.917     | -17.366 | 27.090 |
| <i>PBR</i>  | 58,443        | 1.328 | 0.553     | 0.425   | 8.664  |

*Note:* *cash* :Cash and deposit/total asset

*cf* :Cash flow (current profit after tax + depreciation - dividend - managerial compensation)/total assets

*DC* :Debt outstanding/capital

*SP* :Interest rate paid - certificate of deposit rate

*UC* :Uncertainty index, three-year standard deviation of  $\Delta cf$

*ROA* :Current profit/total assets, YtY

*PBR* :Market cap/total assets

Table 2. Estimation results on cash holdings

| Dependent var.       | 1980-2010             | 1980-1990         | 1991-2000            | 2001-2010            |
|----------------------|-----------------------|-------------------|----------------------|----------------------|
| $\Delta cf$          | 0.000<br>(0.001)      | 0.001<br>(0.005)  | 0.001<br>(0.003)     | 0.000<br>(0.002)     |
| $\Delta DC_{t-1}$    | 0.002<br>(0.004)      | 0.003<br>(0.005)  | 0.133<br>(0.195)     | -0.027<br>(0.033)    |
| $\Delta SP$          | -0.021 *<br>(0.012)   | -0.018<br>(0.033) | 0.024<br>(0.034)     | -0.039 **<br>(0.015) |
| $\Delta DI$          | 0.000<br>(0.002)      | 0.003<br>(0.003)  | -0.001<br>(0.003)    | -0.005<br>(0.004)    |
| $UC$                 | 0.009 ***<br>(0.003)  | 0.009<br>(0.014)  | 0.017 ***<br>(0.007) | 0.014 **<br>(0.006)  |
| <i>Cons.</i>         | -0.012 ***<br>(0.001) | -0.002<br>(0.001) | 0.000<br>(0.001)     | 0.003 ***<br>(0.001) |
| $R^2$                | 0.21                  | 0.18              | 0.18                 | 0.16                 |
| <i>Number of obs</i> | 50,588                | 14,164            | 18,708               | 17,716               |

Note: Standard deviations in the parentheses.

\*\*\* denotes significance at 1% level, \*\* at 5% level, and \* at 10% level.

Year dummies are omitted.

$\Delta cash$  : Cash and deposit/total assets, YtY

$\Delta cf$  : Cash flow (current profit after tax + depreciation - dividend - managerial comp.)  
/total assets, YtY

$\Delta DC$  : Debt outstanding/capital, YtY

$\Delta SP$  : Credit spread (interest rate paid - certificate of deposit rate), YtY

$\Delta DI$  : Diffusion index of industry-level lending attitude of financial institutions, YtY

$UC$  : Uncertainty index, three-year standard deviation of  $\Delta cf$



Table 3. Estimation results on cash holdings

| Dependent var.       | 1991-1996             | 1997-2000             | 2001-2007             | 2008-2010             |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| $\Delta cf$          | 0.014 **<br>(0.007)   | -0.005<br>(0.004)     | -0.002<br>(0.002)     | 0.005<br>(0.005)      |
| $\Delta DC_{t-1}$    | 0.078<br>(0.300)      | 0.354<br>(0.271)      | -0.028<br>(0.034)     | 0.956<br>(1.450)      |
| $\Delta SP$          | -0.001<br>(0.044)     | 0.036<br>(0.065)      | -0.048 **<br>(0.021)  | -0.054 **<br>(0.013)  |
| $\Delta DI$          | 0.017 ***<br>(0.003)  | -0.008 ***<br>(0.001) | -0.004<br>(0.003)     | -0.020 ***<br>(0.003) |
| $UC$                 | 0.014<br>(0.019)      | 0.001<br>(0.009)      | 0.033 ***<br>(0.008)  | 0.049 **<br>(0.021)   |
| <i>Cons.</i>         | -0.009 ***<br>(0.000) | -0.002 ***<br>(0.000) | -0.003 ***<br>(0.000) | 0.005 ***<br>(0.001)  |
| $R^2$                | 0.06                  | 0.08                  | 0.03                  | 0.16                  |
| <i>Number of obs</i> | 10,835                | 7,892                 | 8,820                 | 9,039                 |

Note: Standard deviations in the parentheses.

\*\*\* denotes significance at 1% level, \*\* at 5% level, and \* at 10% level.

$\Delta cash$  : Cash and deposit/total assets, YtY

$\Delta cf$  : Cash flow (current profit after tax + depreciation - dividend - managerial comp.)  
/total assets, YtY

$\Delta DC$  : Debt outstanding/capital, YtY

$\Delta SP$  : Credit spread (interest rate paid - certificate of deposit rate), YtY

$\Delta DI$  : Diffusion index of industry-level lending attitude of financial institutions, YtY

$UC$  : Uncertainty index, three-year standard deviation of  $\Delta cf$

Table 4. Estimation results on ROA

| Group of lower investment opportunity  |                      |                      |                       |                       |
|--|----------------------|----------------------|-----------------------|-----------------------|
| Dependent var.                         | 1980-2010            | 1980-1990            | 1991-2000             | 2001-2010             |
| $\Delta cash_{t-1}$                    | 5.899 ***<br>(0.712) | 2.380 **<br>(1.131)  | 3.000 ***<br>(0.938)  | 3.979 ***<br>(0.517)  |
| <i>Cons.</i>                           | 0.338<br>(0.210)     | 0.200<br>(0.147)     | 0.224 *<br>(0.118)    | -0.987 ***<br>(0.262) |
| $R^2$                                  | 0.15                 | 0.18                 | 0.14                  | 0.14                  |
| <i>Number of obs</i>                   | 18,437               | 5,419                | 6,343                 | 6,675                 |
| Group of medium investment opportunity |                      |                      |                       |                       |
| Dependent var.                         | 1980-2010            | 1980-1990            | 1991-2000             | 2001-2010             |
| $\Delta cash_{t-1}$                    | 4.531 ***<br>(0.581) | 7.612 ***<br>(1.141) | 3.910 ***<br>(0.794)  | 3.359 ***<br>(1.236)  |
| <i>Cons.</i>                           | -0.111<br>(0.156)    | -0.167<br>(0.147)    | 0.173 *<br>(0.102)    | -1.388 ***<br>(0.161) |
| $R^2$                                  | 0.16                 | 0.15                 | 0.18                  | 0.15                  |
| <i>Number of obs</i>                   | 18,991               | 5,405                | 6,458                 | 7,128                 |
| Group of higher investment opportunity |                      |                      |                       |                       |
| Dependent var.                         | 1980-2010            | 1980-1990            | 1991-2000             | 2001-2010             |
| $\Delta cash_{t-1}$                    | 4.594 ***<br>(0.506) | 5.959 ***<br>(0.923) | 3.404 ***<br>(0.700)  | 2.518 **<br>(1.219)   |
| <i>Cons.</i>                           | 0.164<br>(0.138)     | 0.383 ***<br>(0.123) | -1.024 ***<br>(0.099) | -1.044 ***<br>(0.140) |
| $R^2$                                  | 0.17                 | 0.14                 | 0.18                  | 0.17                  |
| <i>Number of obs</i>                   | 21,015               | 5,981                | 7,268                 | 7,766                 |

Note: Standard deviations in the parentheses.

\*\*\* denotes significance at 1% level, \*\* at 5% level, and \* at 10% level.

Year and industry dummies are omitted.

$\Delta ROA$  : Current profit/total assets, YtY

$\Delta cash$  : Cash and deposit/total assets, YtY

Table 5. Estimation results on PBR

| Group of lower investment opportunity  |                   |                      |                       |                   |
|--|-------------------|----------------------|-----------------------|-------------------|
| Dependent var.                         | 1980-2010         | 1980-1990            | 1991-2000             | 2001-2010         |
| $\Delta cash_{t-1}$                    | 0.704<br>(0.985)  | 0.053<br>(0.129)     | 0.284 *<br>(0.146)    | 1.793<br>(2.751)  |
| <i>Cons.</i>                           | -0.099<br>(0.290) | 0.075 ***<br>(0.017) | -0.075 ***<br>(0.018) | -0.439<br>(0.446) |
| $R^2$                                  | 0.08              | 0.09                 | 0.06                  | 0.11              |
| <i>Number of obs</i>                   | 18,437            | 5,419                | 6,343                 | 6,675             |
| Group of medium investment opportunity |                   |                      |                       |                   |
| Dependent var.                         | 1980-2010         | 1980-1990            | 1991-2000             | 2001-2010         |
| $\Delta cash_{t-1}$                    | -1.525<br>(2.234) | -1.334<br>(5.177)    | -1.831 **<br>(0.905)  | 2.068<br>(4.639)  |
| <i>Cons.</i>                           | 0.049<br>(0.601)  | -0.123<br>(0.667)    | -0.174<br>(0.435)     | 0.425<br>(0.605)  |
| $R^2$                                  | 0.10              | 0.02                 | 0.11                  | 0.12              |
| <i>Number of obs</i>                   | 18,991            | 5,405                | 6,458                 | 7,128             |
| Group of higher investment opportunity |                   |                      |                       |                   |
| Dependent var.                         | 1980-2010         | 1980-1990            | 1991-2000             | 2001-2010         |
| $\Delta cash_{t-1}$                    | 0.983<br>(1.910)  | 0.362 **<br>(0.149)  | 4.305 *<br>(2.589)    | 0.167<br>(5.533)  |
| <i>Cons.</i>                           | -0.095<br>(0.519) | 0.132 ***<br>(0.020) | -0.125<br>(0.365)     | -0.234<br>(0.635) |
| $R^2$                                  | 0.08              | 0.07                 | 0.11                  | 0.10              |
| <i>Number of obs</i>                   | 21,015            | 5,981                | 7,268                 | 7,766             |

Note: Standard deviation in the parentheses.

\*\*\* denotes significance at 1% level, \*\* at 5% level, and \* at 10% level.

Year and industry dummies are omitted.

$\Delta PBR$  : Market cap/total assets, YtY

$\Delta cash$  : Cash and deposit/total assets, YtY

Table 6. Estimation results on PBR

| Group of lower investment opportunity  |                       |                       |                   |                      |
|--|-----------------------|-----------------------|-------------------|----------------------|
| Dependent var.                         | 1991-1996             | 1997-2000             | 2001-2007         | 2008-2010            |
| $\Delta cash_{t-1}$                    | 0.306 **<br>(0.152)   | -0.086<br>(0.367)     | 2.758<br>(4.239)  | -0.594<br>(1.907)    |
| <i>Cons.</i>                           | -0.296 ***<br>(0.016) | -0.085 ***<br>(0.023) | -0.511<br>(0.546) | -0.148<br>(0.132)    |
| $R^2$                                  | 0.19                  | 0.03                  | 0.11              | 0.11                 |
| <i>Number of obs</i>                   | 3,636                 | 2,707                 | 3,229             | 3,446                |
| Group of medium investment opportunity |                       |                       |                   |                      |
| Dependent var.                         | 1991-1996             | 1997-2000             | 2001-2007         | 2008-2010            |
| $\Delta cash_{t-1}$                    | 0.545 ***<br>(0.120)  | -4.296 ***<br>(1.282) | 3.961<br>(7.067)  | 0.275 **<br>(0.122)  |
| <i>Cons.</i>                           | -0.308 ***<br>(0.014) | -0.736<br>(0.808)     | -0.434<br>(0.725) | 0.115 ***<br>(0.007) |
| $R^2$                                  | 0.27                  | 0.03                  | 0.12              | 0.11                 |
| <i>Number of obs</i>                   | 3,666                 | 2,792                 | 3,356             | 3,772                |
| Group of higher investment opportunity |                       |                       |                   |                      |
| Dependent var.                         | 1991-1996             | 1997-2000             | 2001-2007         | 2008-2010            |
| $\Delta cash_{t-1}$                    | 0.394 ***<br>(0.105)  | 4.550<br>(7.600)      | -4.286<br>(8.663) | 8.739 ***<br>(2.280) |
| <i>Cons.</i>                           | 0.145 ***<br>(0.011)  | 0.506<br>(0.453)      | -0.418<br>(0.779) | -0.063<br>(0.118)    |
| $R^2$                                  | 0.12                  | 0.11                  | 0.10              | 0.15                 |
| <i>Number of obs</i>                   | 4,128                 | 3,140                 | 3,853             | 3,913                |

Note: Standard deviations in the parentheses.

\*\*\* denotes significance at 1% level, \*\* at 5% level, and \* at 10% level.

Year and industry dummies are omitted.

$\Delta PBR$  : Market cap/total assets, YtY

$\Delta cash$  : Cash and deposit/total assets, YtY