Investment and Corporate Governance: Evidence from Japan in the 1990s

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1. Introduction

A non-trivial aspect of a corporate capital structure is whether leverage affects the firm's investment or not.   One approach for explaining the relation between leverage and the firm's investment is to stress the disciplinary effect of leverage.   Managers with poor investment opportunities seek to enhance their private benefits, and shareholder suffers from overinvestment problem.   In this case, leverage can restrict those managers from investing (Jensen 1986, Stulz 1990, Hart and Moore 1995).

On the other hand, there are well known costs imposed by high leverage.   High leverage raises the possibility of bankruptcy, which can be costly for managers when they get private benefit from being in that position or the market for managers is less flexible.   Therefore, in the extreme cases, managers might take more conservative strategy on investment in the future, and again restrain from investment even though the firm has growth opportunities when leverage is higher.   Debt overhang can also be large enough to prevent investment even though the firm has investment opportunities (Myers 1977, Stulz 1990, Hart and Moore 1995, Lamont 1995).

In both the overinvestment and the underinvestment problem, the reason why leverage matters is because agency problem exists among stakeholders. On the other hand, one of the main roles of corporate governance is to solve such agency problems. If shareholders can monitor managers directly, leverage might not affect so much on firm investments.

This paper investigates empirically the relation between leverage and investments using Japanese firm data during the 1990s.   In this period, as is shown in Fig.1 and 2, the investment of Japanese firms was sluggish while debt asset ratio did not change so much.   Furthermore, the coefficient of variation about debt-asset ratio increased so much in this period.   Then, we investigate whether the negative effect of leverage on investment is observed either firms with high growth prospect or firms with low growth prospect.   Following Lang, Ofek and Stulz (1996), here, we measure firm's growth opportunity by Tobin's q.

Further, we analyze whether the corporate governance structure influence the relationship between leverage and investment or not.   Especially, we focus on the role

of main banks, institutional investors, and foreign investors. In Japan, the relatively stable corporate governance structure has changed dramatically from the beginning of 1990s. Table 1 summarizes the corporate governance structure about companies listed in the Tokyo Stock Exchange First Section. The ownership structure was changed in recent years. For instance the share held by foreign investors increased in the early 1990s, and then its standard deviation went up sharply in some companies in the late 1990s. On the other hand, bank-firm relationship characterized by main bank system has been diversified. It is well know that firm's financial dependence on main banks was falling quickly in the late 1980s as the result of a big shift from bank borrowing to corporate bond. However, this dependence in some firms increased again in the 1990s. Thus, in the 1990s, the Japanese corporate governance structure gradually shows large diversity. We examine whether these changes have some effects on the relation between leverage and investment. Has such a change in corporate governance structure affects on the overinvestment problem? Or does it further strengthen the constraint on investment caused by high leverage?

Our findings are as follows. First, we find that investments of manufacturing sector are related negatively with leverage, and this negative relation is getting stronger after financial crisis in 1997. Whereas investments of non-manufacturing sector, especially construction and real estate sectors, are positively related to leverage shortly after the collapse of the bubble economy from 1993 to 1996, which indicate the soft budget problem in these sectors.

Second, we find the negative relationship between investment and leverage for both of firms with low Tobin's q and high Tobin's q among the firms of manufacturing sector. This result suggests that negative effect of leverage on investment affects not only firms with poor investment opportunities but also the one with high investment opportunities. In other words, leverage may play multiple roles in Japanese firms.

Third, we test the effect of corporate governance characteristics on corporate investment. On firms with high growth opportunities, foreign investors with strong monitoring incentive would decrease the negative effect of leverage on investment of firms. The main banks also mitigate the underinvestment problem caused by high

leverage for firms with high growth opportunities even in the 1990's.

On the other hand, among firms with poor growth opportunities, foreign investors also decrease the negative effect of leverage on corporate investment. This result indicates that foreign investors might substitute for the disciplinary role of leverage by preventing the overinvestment of matured firms. However, being different from the role of the main bank on firms with high growth opportunities, the main bank tends to strengthen the negative effect of leverage on investments of firms with poor investment opportunities.

Finally, to understand the contrasting role of main bank between firms with high and low growth opportunities, we examine whether the performance of the main bank matters or not. Using PBR of banks as a performance measurement, we classified banks into two types; high PBR main bank and low PBR main bank. As the result suggests, among firms with high growth opportunities, we do not find any significant difference on the relation between leverage and investment in either having high PBR or low PBR main bank. However, among firms with low growth opportunities, we find that the investment of firms having low PBR main bank is much restricted by leverage comparing to firms having high PBR main bank.

The remainder of this paper is as follows. In section 2, the theoretical relation between investment and leverage is explored, and the hypothesis in this paper is presented. Section 3 gives brief explanation for formulization of investment function, data, and sample. The estimation result is reported in section 4, 5. The bank performance is introduced in Section 5-3. Section 6 put the empirical result on broad historical perspective, and suggest some policy implication.

2. Theoretical Background and Hypotheses
2.1 The bright side and dark side of leverage

How does leverage influences investment? If market is perfect, a firm's capital structure is irrelevant. Nevertheless, leverage affects a firm's investment policies when there exists agency problems. There are at least two theoretical explanations on the relation between investment and leverage. One theory highlights the bright

side of leverage on investment, while the other emphasizes the dark side of leverage.

The bright side of high leverage is to restrict unprofitable investment project initiated by less monitored manager (Jensen 1986, Stulz 1990, Hart and Moor 1995). When managers' behavior cannot be observed or verified completely, the managers with free cash flow tend to enhance their own benefit or try to build their empire. Then, high leverage restricts such overinvestment. When corporate leverage increases, the obligation to reimburse the debt restricts the free cash flow that may give rise to inefficient investment. Thus, where overinvestment problem is serious, the bright side of high leverage would be of importance.

On the other hand, the dark side of high leverage could be to cause underinvestment due to the following reasons. High leverage raises the possibility of bankruptcy, which can be costly for managers when they get private benefit from being in that position or the market for managers is less flexible.[1] Therefore, when leverage is higher, managers might take more conservative strategy on investment, and restrain from investment even though the firm has growth opportunities.

Moreover, the rise of leverage implies that creditor face the risk of asset substitution by managers. Managers or shareholders to whom equity capital ratio fell have the incentive to make risky investment at the expense of creditors (Jensen and Meckling 1976). In this case, creditors do not also provide new money. As a result, a firm with high leverage is likely to invest less than optimal level.

Debt overhang is also the candidate for the reason of negative relation between leverage and investment (Myers 1977, Stulz 1990, Hart and Moore 1995, Lamont 1995). Suppose that the claim of the lender who finances loans for new investment is inferior to that of existing creditors. [2]   When all the existing debts are repaid from the profit of new investment, the new loan may not be reclaimed. Therefore, creditors do not again lend for new investment. In that case, it is impossible for firms to finance new investment, even though they have good investment opportunities. In short, underinvestment problems occur at least from three reasons; bankruptcy cost, asset

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[1] Kraus and Litzenberger (1973), for example, also discuss the bankruptcy cost.
[2] The subordination of the existing debt causes manager's moral hazard (Otaki,2000).

substitutions, and debt overhang. Hereafter, we call such negative relation between leverage and investment as high leverage constraint on investment.

To identify whether leverage is costly or beneficial, we examine the relation between leverage and firm's investment opportunities. Following Lang, Ofek and Stulz (1996), we divide the sample firms into two sub-samples: firms with high growth prospect and firms with low growth prospect measured by Tobin's q. In the case of mature firms with low Tobin's q, the benefit of high leverage is relatively large. In contrast, in the case of firms with good investment opportunities or high Tobin's q, high leverage is likely to be the reason for the underinvestment problem.

2-2 The Roles of Corporate Governance

Strict monitoring by shareholders and creditors can solve agency problems among stakeholders. For example, the direct monitoring by shareholders could prevent the empire-building behavior instead of using debt. Then, we investigate here whether corporate governance structure affect on the relationship between leverage and investment.

While a number of stakeholders are considered as a candidate to solve agency problem, we especially focus on the role of main bank, institutional investor, and foreign investor. In the 1960s and the 1970s, main bank have played the important role in corporate governance. They disciplined managers by close monitoring of firms (Aoki and Patrick, 1994). It is plausible that main bank has restricted asset substitution of managers or prevented free cash flow problem, if it still worked well in the 1990s. Here, it should be noticed that main bank must be in a good condition to maintain the long-term relationship with client firms. If a bank is in the poor performance, it might behave not as relationship banking but as arm's length banking. On the other hand, the strong main bank relationship could intensify overinvestment problem. According to Dewatripont and Maskin (1995), a bank lending out a large amount of fund to one client is likely to bail out client firms in financial distress regardless of their growth prospect, since the liquidation cost they have to pay when the client go bankrupt is much higher than that of banks which have arm's length

relation with borrowers.

Institutional investors and foreign investors could also affect the relationship between leverage and investment. Amid the struggling stock price in the 1990s, the overseas institutional investors heavily purchased the Japanese stock for the purpose of international portfolio diversification. The percentage of shareholdings by the foreign investors in Tokyo Stock Exchange First Section rose from 4.4% in 1990 to 9.1% in 1996. As is shown in Table 2, there are 30 firms with more than 30% share held by institutional investors and foreign investors.

<center>---Table 2 about here---</center>

In general, institutional investors with larger stakes can pile pressure on the manager who takes inefficient action through, for instance, voting rights. MacConnell and Servaes (1995) shows that the rise of percentage of share held by institutional investors have led to the better performance of firms with low growth prospect. Therefore, the monitoring by institutional investors or foreign investors may act as an alternative solution of leverage to the free cash flow problem. [3] The increase in the number of shareholders with strict monitoring incentive might solve the underinvestment problem with high leverage in growth firms as well. For the firm held mainly by institutional investors, creditors could take on debt forgiveness more easily without fearing am moral hazard behavior of managers.

3 Estimation Model and Variables

Out of the listed companies on the TSE First Section from 1993 to 2000 fiscal year, 1302 companies are used as the sample. We exclude financial firms and utilities from our sample. The average total asset for our sample firms in 2000 is 24.1 billion dollars and the average number of employee is about 2800. Since the median of total asset for firms listed on TSE first section is 9 billion dollars and the median employee is 200, our sample includes not only large firms but also relatively middle-size firms.

In this paper, after controlling the business chance by Tobin's q and liquidity

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[3] However, in this case, the risk of the asset substitution stll remains.

constraint by cash flow, the analysis tries to test whether investment is influenced by leverage or not, and whether the factor of corporate governance has a significant influence on this relation. The estimation formula is as follows.

$$I_t = f(Q_{t-1}, \mathrm{DA}_t, \mathrm{CF}_t, H(L), \ \mathrm{H(L)} * DA, YD) \qquad (1)$$
$$I_t = f(Q_{t-1}, DA_t, CF_t, G, \ G * DA, YD) \qquad (2)$$

Here, *I* is investment level, which is calculated as depreciation plus the difference of fixed assets from period t-1 to period t divided by fixed assets.   *CF* is cash flow calculated as the depreciation plus after-tax profit minus dividend and bonus paid to directors divided by total asset.   *DA* is firms' leverage ratio defined as debt over total asset. [4]   H(L) in equations (1) is the dummy variable which is equal to one if a firm has high growth opportunities(low growth opportunities).   Tobin's q is calculated by following the method developed by previous literatures such as Hoshi and Kashyap (1990), Hayashi and Inoue (1991).   Then, we use q as a proxy of firms' future growth opportunities.   Whole sample firms are divided into three sub-samples based on three years average of a firms Tobin's q prior to the estimation period.   Firms are defined as firms with high growth opportunities if their Tobin's q is higher than the third quartile of whole sample, while firms are defined as the one with low growth opportunities if q is lower than the first quartile.   *YD* is the year dummy for controlling macro economic effect.

In equations (2), *G* represents the variable that accounts for corporate governance, and *G*DA* is the interaction term between *G* and *DA,* which is introduced for testing the effect of corporate governance characteristics on investment through leverage.

As explained earlier, we focus on main banks, institutional investors, and foreign investors as corporate governance variables. We obtained these variables from "Corporate governance data base" which has been developed by Nissei Research

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[4] For every data of *I,q,* and *DA*, we exclude the one that deviates from average value at more than three standard deviation as an abnormal value from our sample.

Institute and the Institute of Financial Studies in Waseda University.[5]   We use the total percentage of stock holdings of investment trust, pension fund and foreign investors as the share held by institutional investors.   Since foreign investors stock holdings was rapidly increasing in the 1990s, we also use the share held by foreign investors as the proxy of shareholder with strong monitoring incentive.

Another corporate governance variable is the main bank dummies that is the proxy for a firm's strong tie with its main bank.   We identify main bank of each firm as the bank that have the largest loan outstanding in the firm.   Since main bank relationship is characterized as long-term and stable one, we first check whether the main bank of each company is the same bank as five years ago or not.   Second, we examine whether a firm's main bank dependence (borrowing from main bank/total assets) is more than 5.1 %, which is the average number of main bank dependence for all the sample firms, or not.   If a firm satisfies these criteria, then we give it the dummy variable equals to one, and otherwise zero.

The descriptive statistics are shown in Table 3.   The average of I/K for all the sample firms is 10.9%, and I/K for the manufacturing firms is 10%.   When we divide this sample into two based on growth opportunities, I/K of LQ firms is 9% whereas it is 11% in the HQ firms.

4. Estimation result I: Sensitivity of investment to leverage

First, we report the estimation result of whole firms from 1993-2000, using the estimation formula (1). [6]

---Table 4   about here ---

According to model 1 of panel A, the investment of manufacturing industry from 1993 to 2000 is significantly sensitive not only to Tobin's q and CF but also to leverage. Two standard deviations increase in DA is associated with a reduction in investment

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[5] The institutional investors, percentage of main bank's stock ownership and percentage of management-held stock ownership is originally obtained from 'Data of Major Stockholders' of Toyo Keizai Shinposya, Nikkei NEEDS and others.

[6] We choose the estimation method based on Hausman χ^2 test.

ratio of 4.1%, and this represents 41% of the investment ratio of the manufacturing industry (10.0%) in this period.   On the other hand, two standard deviations increase in CF is associated with a reduction in investment ratio of 2.7%.   Although it cannot be asserted strongly since the samples differ, the sensitivity of investment to leverage in the 1990s is much higher than that of the 1980s. In the 1980s, the sensitivity of investment to DA is approximately same as that of *CF* (Miyajima, Arikawa, and Saito, 2001).

The high sensitivity of investment to *DA* in the manufacturing industry in the 1990s is even more obvious when compared with that of the non-manufacturing industry.   As is shown in model 3 of panel A in Table 4, corporate investment in the non-manufacturing industry is not negatively correlated to the leverage ratio.   Rather, the coefficient of *DA* is positive, although it is not significant.

Furthermore, to analyze whether the financial crisis in the 1997 affect the relation between leverage and investment, we divide the samples period into two sub-periods; pre-financial crisis (1993 –1996), and post financial crisis(1997-2000).   The result is shown in panel B and C of Table 4.[7]   As for the manufacturing industry, the coefficient of DA and its significant level in the estimation of the post financial crisis period is roughly 80% larger than that of pre-financial crisis period.   On the other hand, the positive relation between leverage and investment is observed only in the pre-financial crisis period in the non-manufacturing industry.   It is even more obvious when the sample is limited to firms in construction and real estate sectors.   The coefficient of leverage in this period in these two sectors is positive with 1% significance level.   This result is consistent with the understanding that the corporate investment in non-manufacturing sector, especially construction and a real estate business were under soft budget constraint for several years in the post bubble period.   Firms with

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[7] In order to test the change of investment sensitivity to leverage during the 1990s, we adds the interaction term between YEAR dummy and DA to the regression. The result shows that the coefficient of DA in the manufacturing firms was negative during the sample period, and its magnitude abruptly increases after 1997.   On the other hand, the coefficient of DA in the non-manufacturing firms in 1993 and 1994 was significantly positive, and it became negative from 1995.

high leverage tried the riskier investment project for recovering their performance, and the bank supported them through the additional loan.

As described earlier, the investment of Japanese manufacturing firms was negatively correlated to their leverage through the 1990s and the negative relation became much stronger after the financial crisis. Then the next point is whether the negative relation between investment and leverage indicates that the overinvestment is restricted or the underinvestment is induced by high leverage. To clarify this point, the dummy variable that gives one to firms with low growth opportunity (LQ firms), and the dummy variable that yields one to firms with high growth opportunity (HQ firms) are introduced into the regression.

---Table 5　about here---

The estimation result is shown in Table 5. In the non-manufacturing industry, although both the interaction term between HQ dummy and DA and the interaction term between LQ dummy and DA are significantly positive, the coefficient of interaction term between LQ dummy and DA is much higher than that of HQ. Moreover, when we take up the construction and real estate sector as the sample, only the interaction term between LQ and DA is significantly positive. These results imply that the soft budget problem occurred particularly in firms with relatively low growth opportunity in non-manufacturing industry.

Focusing on manufacturing firms, the coefficient of DA is significantly negative, but the coefficients of interaction term between HQ dummy and DA and the interaction term between LQ dummy and DA are not significant in the estimation of 1993-2000. When the estimated period is divided into the pre- and the post financial crisis in 1997, both the interaction term between HQ dummy and DA and the interaction term between LQ and DA are significantly negative only at the post the financial crisis period. Since the coefficient of DA in model 1 represents the sensitivity of investment on leverage in firms with moderate growth opportunity, investment in high growth firms as well as low growth firms is negatively related to leverage. This result is basically held even if we use the average q during the estimation period or we divide the sample into two sub-sample based on whether

Tobin's q is larger than one or not, although we do not show.   Therefore, we can conclude that the negative relation between investment and high leverage in the manufacturing firms in the 1990s occurred because of the following two reasons; one is the high leverage constraints on investment, and another is, as Lang, Ofek and Stultz 1996   point out, the restriction of overinvestment by high leverage.

These results suggest that the problems regarding the relation between investment and leverage, which Japanese firms have faced, are remarkably complicated.   As the consequence of the soft budget constraint, there exist firms that are facing with cumulative excess debt in the non-manufacturing firms, especially real estate and construction firms.   On the other hand, the investment of manufacturing firms has become more sensitive to the leverage since 1993.   What makes situation more difficult is that firms with high growth opportunities face underinvestment problem by leverage, whereas overinvestment are restricted by high leverage in firms with low growth opportunities.

5 Estimation Result   : Impact of Corporate Governance Structure on Investment
5-1 Firms with high growth opportunities

Corporate investment of firms with high Tobin'q(HQ firms) will possibly be repressed by high leverage.   Picking up only the firms with high Tobin'q, we estimate the equation (2), which incorporates corporate governance variables.   The estimation results are reported in Table 6.

<div align="center">---Table 6   about here---</div>

In the regression result of model 2, while Tobin's q and CF is significantly positive, the leverage did not have any influence on investment.   Moreover, the interaction term between corporate governance factor and leverage does not show any significant result either.   However, when the sample period is limited to post financial crisis period from 1997 to 2000, the corporate investment is negatively sensitive to leverage with 1% significant level and the coefficient is also large as shown in model 4.   This implies that the high growth firms faced the investment constraint imposed by high leverage after the financial crisis period.   Furthermore, when corporate governance

variables are introduced, the adjusted R² in the post crisis estimation (model 4) greatly increases comparing with the regression result in model 2.

The interaction term between DA and foreign investors stock holdings dummy is significantly positive at 10% level.   This result is consistent with the hypothesis that the shareholding by foreign investors could control moral hazard behavior of management.

The interaction term of DA and the main bank dummy, which shows a strong main bank relationship, is also significantly positive.   Main bank could avoid underinvestment problem by, for example, controlling managers' too conservative investment through strict monitoring in HQ firms.   It should be noticed, however, the number of firms that depend mainly on main bank as a financial source are relatively small (only 28.5%) among HQ firms comparing to the LQ firms (34.1%).   The main bank still maintains strong commitment only to a small number of firms with growth opportunities after the financial crisis, in which the banking sectors seriously selected their clients.

5-2   Firms with low growth opportunities

Mature firms with low Tobin's q (LQ firms) are likely to face with overinvestment problem.   Here we use LQ firms as the sample and estimate the same regression as previous section (Table 7).

<center>---Table 7   about here---</center>

According to the estimation result for 1993 to 2000, while q is not significant, DA is significantly negative at 1% level.   When the estimation period is limited to post financial crisis period, the coefficient of DA is still significant and much larger than that of whole sample period.   According to model 2, two standard deviations increase in leverage is associated with a reduction in investment ratio of about 4.5%, and this accounts for 50% of the average investment level of LQ firms in manufacturing industry.   In other words, high leverage restricts the corporate investment in the low growth firms through the 1990s.   This is the same relation as what Lang, Ofek and Stulz(1995) pointed out by using American firms data.

Then, how do main bank and foreign investors affect the relation between leverage and investment among LQ firms? We examine the role of foreign investors first. The proportion of shareholdings by foreign investors is lower in LQ firms than that of HQ firms. At the end of the 1996 fiscal year, the average of percentage share held by foreign investors in LQ firms was 6.4% with 7.2% of standard deviation, while the average is 10.9% with 13.0% of standard deviation in the HQ firms. According to model 2, the interaction term between DA and the foreign investors dummy in LQ firms is significantly positive at the 5% level. The effect of foreign investors does not change much even if the estimation period is limited only to post financial crisis. In other words, even at the same leverage level, firms with larger part of shareholdings held by foreign investor tend to invest more comparing to firms with low percentage share held by foreign investors. This result is consistent with the hypothesis that foreign investors with strong monitoring incentive might restrict overinvestment initiated by top management. Thus, foreign investors play disciplinary role substituting for leverage.

Next we examine the effect of main bank ties on the relation between leverage and investment. As model A clearly shows, the interaction term between MBD and DA, as opposed to HQ firms, is significantly negative at 10% level. When the estimation period is limited to post financial crisis (model 4), the coefficient of interaction term rises from -0.115 to -0.174. The result can be interpreted that the impact of leverage on the investment is larger in the case that a mature firm has a close relationship with a main bank. [8] Unlike in the high growth period when main bank encouraged corporate investment through the mitigating asymmetric information problem, the main bank in the LQ firms led to further restraint of their investment.

In short, the role of main bank relationship in firms with high growth opportunities is in contrast with that of the firms with poor opportunities. In the growing firms, it mitigates investment constraint in the same way as foreign investors

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[8]In the mature firms, the average debt level of firms that have strong main bank relation (the average debt ratio from 1993 to 1996 is 0.289, and from 1997 to 2000 is 0.295) greatly exceeds that of firms that have weak main bank relation (the average from 1993 to 1996 is 0.158 and from 1997 to 2000 is 0.143).

do, but in the mature firms the strong main bank relationship intensifies the negative relation of leverage to investment, and this phenomenon became much clear after the financial crisis in 1997.

5-3　The influence of bank performance

According to the preceding analysis, the role of main bank relationship in the in the growing firms is quite different from that of the mature firms after the financial crisis in 1997.　In the mature firms, close main bank ties intensifies the negative relation between high leverage and investment, whereas in the growing firms main bank mitigate the underinvestment problems caused by leverage.

The performance in banking sector has plunged since 1995 and the performance gap between good bank and bad bank has widened.　Japan premium occurred and the shares of Japanese banking sector as a whole were down due to the 1995's collapse of some financial institutions and the aggravation of housing-loan company problems (Peek and Rosengren 2001, Ito and Harada 2001).　Moreover, the expansion of Japan premium, the downgrading of bond rating, and the fall of stock price were observed after the financial crisis in 1997.　In Table 8 where the performance of major banks measured by PBR is summarized, we can figure out that not only did PBR fall, but also the inter-bank performance gap measured by the coefficient of variation has widened since the mid 1990s.

---Table 8　about here---

Here, we test whether or not the bank performance affects the role of main bank previously discussed.　Then, we make two dummy variables, high PBR (GMB) and Low PBR (BMB) dummies.　High PBR (GMB) dummy equals to one when PBR of main bank is more than the median of that year, and Low PBR (BMB) dummy equals to one when PBR of main bank is less than the median.　Here, we focus on the after financial crisis period, and analyze the sub-sample of HQ firms and LQ firms respectively.

--Table 9　about here---

According to Panel A in Table 9, the interaction term between GMB, BMB and DA

are positive, although BMB has a little higher coefficient and significant level. [9] Among firms with high growth opportunities, the difference of performance among banks does not have any significant influence on the relation between leverage and investment. Even if the performance of main bank were relatively low, the close relationship with client firms still mitigates investment constraint imposed by high leverage.

On the other hand, the estimation results of the firms with low growth opportunities in Panel B shows that the negative relation between leverage and investment is intensified only in the case that the performance of main bank is relatively low (BMB). The bank performance does matter just for mature firms. There are two interpretations for this result. First, since investment level of mature firms tend to be excessive, the fact that low performance bank restricts their client firms' investment more strictly does not matter at all, and it might contribute their investment to be closer to the optimal level. Alternatively, we can interpret that main bank in bad performance tends to strict their clients' investment too much, and the investment will fall below the optimal level.

7. Concluding Remarks

We have examined the relation of investment and leverage in the 1990s. In this conclusion, let us put the empirical result in a broader historical perspective and give some policy implication.

Firstly, in the 1990s, the relation between investment and leverage in manufacturing firms is quite different from that of non-manufacturing firms. The investment of the manufacturing firms throughout the 1990s was negatively related to leverage level. In the post financial crisis in 1997, the negative sensitivity of investment to leverage ratio increased further. On the other hand, the investment of the non-manufacturing firms from 1993 to 2000, although insignificantly, was

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[9] There are some analyses from this aspect in recent years. Gibson (1995, 1997) tests the direct influence of bank health over the investment level. Likewise, Brewer et al (2001) test the influence of the bank failure on clients firms' market valuation.

positively related to leverage.   Especially, the relationship between the investment of the construction and real estate sector and leverage was significantly positive.   This is in line with the view that, in the non-manufacturing industry, firms with relatively poor growth prospect were under soft budget constraint.   As long as we know, we can observe this positive relation of investment to the initial leverage historically in Japan only after the financial depression in 1927 when firms supported by organ bank went bankrupt and the munitions firms during the WW   (Miyajima 2003: Chapter 5, 7). [10]

Secondly, there is negative relation between the investment of the manufacturing firms in the 1990s and leverage.   Historically, the sensitivity of investment to leverage was high from the beginning of the 1950s to the mid 1960s, the first half of high growth period.   It is partly because the bankruptcy risk was high under the post war turmoil and partly because the agency problem became serious under the radical redistribution of ownership in the post war reform.   However, the negative relation of leverage to investment became less clear in the latter half of the high growth period when the shareholder stabilization and main bank relationship became widespread (Miyajima 2003: Chapter 9).

In the 1990s, corporate investment became much sensitive to their leverage again. According to our analysis, this negative relation of investment to leverage is caused by both the constraint of high leverage on investment in firms with high growth opportunities and the restriction by leverage on investment of firms with low growth opportunities.   This two face of high leverage makes the 'excess debt' problem much complicated, and consequently makes it difficult for policy makers to tackle them.

Thirdly, our concerns are whether the changing characteristics of corporate governance does matter or not in the negative relation between leverage and investment.   Increasing share held by foreign investors has mitigated the constraint of high leverage on investment in firms with the high growth opportunities.   In the

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[10] Famous representative is Kawasaki Shipbuilding Corporation whose organ bank was Dai-jugo Bank.   Another example is the related firms of Suzuki Trading Company whose organ bank was Taiwan Bank.

mature firms, foreign investors could restrain managers' over investment in substitution for leverage. This is especially clear after the financial crisis in 1997. On the other hand, the role of main bank for growing firms is quite different from the one for mature firms. In the high growing firms, like foreign investors, main bank mitigate the constraint of high leverage on investment. This is same as the role of main bank in its heydays (Aoki and Patrcik 1994). However, notice that there are relatively small numbers of firms that do not depend upon corporate bonds (unable to depend upon) among the high growth firms.

In contrast, the strong main bank relationship intensifies the negative relation between high leverage and investment in firms with low growth opportunities. There would be two possible interpretations for this result. First one is that main bank would make firms investment closer to the optimal level, restricting the overinvestment. Alternatively, it is also possible that main bank monitoring firms with low growth opportunities may excessively restrict corporate investment. If main bank suffering from non-performing loan requires client firms to reduce borrowing as much as possible, then the underinvestment in firms with low growth opportunities might happen. Unfortunately, it is beyond this paper's scope to figure out which is right.

Lastly, the influence of bank performance on the relation between high leverage and investment is examined to gain a clearer insight about main bank in the post financial crisis in 1997. Using PBR as the bank performance measurement, we test whether there is a significant difference between main bank with high PBR and main bank with low PBR. Then, we find that, in the mature firms, the negative relation of investment to leverage in firms with low PBR main bank is stronger than that of firms with high PBR main bank. So far the argument concerning main bank has assumed that the performance of banks is homogeneous. However, our result indicates that whether main bank can play its role or not depends on its performance.

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Table 1   Change of the Corporate Governance Structure in the 1990s

Institutional Investor is the percentage of the share held by foreign investors, investment trust accounts and pension investment fund trust accounts of trust banks, and separate accounts of life insurance companies. *Foreign investor* is the percentage of the share held by foreign investors. *Financial Institution* is the percentage of the share held by financial institutions, and *Corporation* is by other corporations. *Individual* is the percentage of the share held by individual investors minus directors' ownership. *Debt-Asset Ratio* is the book value of total debt divided by the market value of assets. *Main Bank Ratio* is borrowing from main bank divided by total assets.This figure includes all firms (except fonancial institutions) listed in Tokyo Ttock Exchange First Section[about 1100 firms].

( )

	Institutional Investor		*Foreign Investor*		*Financial Institution*		*Corporation*		*Individual*		*Debt-Asset Ratio*		*Main Bank Ratio*	
	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
1990	9.28	6.87	4.38	6.79	20.86	9.61	28.00	15.72	20.62	8.43	51.57	17.77	4.61	4.92
1991	10.03	7.42	5.21	7.19	20.90	9.66	27.78	15.85	20.80	8.62	50.74	18.00	4.78	5.37
1992	10.06	7.32	5.23	7.34	20.78	9.62	27.46	15.77	22.10	9.27	50.30	18.66	5.02	5.72
1993	11.07	7.62	6.18	7.83	20.63	9.51	26.71	15.59	22.14	9.51	49.84	19.16	5.29	5.66
1994	11.36	7.49	6.74	7.82	20.31	9.48	26.24	15.57	22.14	9.86	49.74	19.33	5.28	5.78
1995	11.79	8.52	7.80	8.51	19.43	9.31	26.02	15.67	22.49	10.10	50.00	19.49	5.29	5.77
1996	12.32	8.80	8.05	8.82	19.02	9.48	26.02	15.89	23.03	10.95	49.70	19.58	5.52	6.08
1997	11.76	9.42	7.62	9.15	18.20	9.35	26.29	16.13	25.11	11.97	48.97	20.19	5.79	6.30
1998	11.22	9.73	7.09	9.28	17.38	9.11	26.23	16.51	26.63	12.75	48.87	20.93	6.40	6.89
1999	11.96	11.04	8.17	10.19	16.26	9.16	26.26	16.91	28.48	13.68	49.47	27.50	6.58	7.95
2000	12.89	11.76	8.13	10.13	14.96	9.20	25.87	17.36	29.18	14.28	49.60	23.55	N.A.	N.A.

Table 2　Firms with High Institutional Investors' Shareholding

Institutional Investor is the percentage of the share held by foreign investors, investment trust accounts and pension investment fund trust accounts of trust banks, and separate accounts of life insurance companies. *Foreign Investor* is the percentage of the share held by foreign investors. Rank depends on the percentage of the share hels by institutional investors in 2000.

( )

Rank	Firm	Institutional Investor			Foreign Investor		
		1990	2000	% Changes	1990	2000	% Changes
1	Mitsumi Electronics	16.0	56.0	40.0	3.7	29.9	26.2
2	ROHM	11.1	55.7	44.7	6.0	39.5	33.4
3	Yamanouchi Pharmaceutica	30.2	54.1	23.9	18.8	42.8	24.0
4	TDK	31.2	52.2	21.0	12.1	36.1	23.9
5	Canon	26.5	50.7	24.2	15.5	39.6	24.0
6	Tokyo Electron	20.3	50.3	30.0	14.9	36.2	21.3
7	FUJIFILM	21.5	49.8	28.3	9.7	37.4	27.7
8	Chugai Pharmaceutical	22.6	49.4	26.7	16.7	42.1	25.4
9	SONY	29.5	49.2	19.7	18.8	39.7	20.9
10	Pionner	31.7	48.7	17.0	12.7	31.6	18.9
11	HOYA	14.7	48.6	34.0	5.0	32.4	27.4
12	Kao Corporation	18.8	48.4	29.6	9.0	31.9	22.9
13	Minebea	6.4	47.0	40.6	6.4	35.3	28.9
14	TAIYO YUDEN	10.0	46.5	36.5	3.8	29.0	25.1
15	Mitsui Kinzoku	10.3	46.4	36.1	1.7	16.3	14.6
16	NIHON COMSYS	17.7	46.1	28.4	10.9	14.7	3.8
17	Shimachu	27.3	45.0	17.7	14.6	33.4	18.8
18	SANKYO	26.8	45.0	18.2	15.2	35.3	20.1
19	Hirose Electric	27.9	44.1	16.2	15.8	34.2	18.4
20	Murata Manufacturing	22.7	43.6	20.9	14.9	30.8	15.9
21	NICHICON	17.2	42.9	25.6	5.4	34.5	29.0
22	KURARAY	25.1	42.8	17.7	11.0	19.7	8.7
23	KYOCERA	30.4	42.8	12.4	19.5	29.1	9.7
24	SECOM	29.1	42.7	13.6	12.2	25.8	13.6
25	KOMATSU	16.8	42.6	25.8	10.3	35.1	24.9
26	Shionogi	10.8	42.5	31.7	2.6	38.4	35.9
27	Anritsu	15.7	42.1	26.5	2.2	19.0	16.8
28	ADVANTEST	24.9	41.8	16.9	14.2	29.4	15.1
29	Toyo Technical	16.2	41.6	25.4	7.5	10.6	3.2
30	NIPPON SHEET GLASS	16.8	41.4	24.6	3.1	24.2	21.0

Table 3 Descriptive Statistics

I is investment ratio, the change in tangible fixed assets plus depreciation, divided by tangible fixed assets(year t-1). *Q* is Tobin's Q of the firm, calculated as the ratio of the market value of the firm(the market value of stock plus the book value of total debt) divided by the market value of the assets. *CF* is after tax profit plus depreciation minus dividend and bonus, divided by the market value of the assets(year t-1). *DA* is bonds and borrowings, divided by the market value of the assets. *FRGN* is the percentage of the share held by foreign investors. *MBD* is dummy variable which equals one if the main bank has not changed for five years and the ratio of main bank loan to the assets is higher than 5.1%, which is sample means.

Panel A   All Firms

	Full		HQ		LQ	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
I	0.109	0.194	0.119	0.236	0.093	0.142
Q	1.048	0.640	1.258	0.771	0.837	0.305
CF	0.021	0.041	0.021	0.049	0.022	0.034
DA	0.225	0.171	0.207	0.192	0.230	0.149
FRGN	7.118	8.698	8.431	10.629	7.067	8.301
MBD	0.321	0.467	0.265	0.442	0.318	0.466
Obs.	8891		2720		2672	

Panel B   Manufacturing Firms

	Full		HQ		LQ	
I	0.100	0.124	0.110	0.164	0.090	0.090
Q	1.028	0.594	1.283	0.795	0.831	0.337
CF	0.024	0.042	0.022	0.053	0.026	0.031
DA	0.199	0.151	0.192	0.177	0.199	0.125
FRGN	7.593	9.552	9.211	11.880	7.501	8.911
MBD	0.283	0.450	0.244	0.430	0.282	0.450
Obs.	5818		1752		2064	

Panel C   Non-Manufacturing Firms

	Full		HQ		LQ	
I	0.127	0.282	0.136	0.327	0.106	0.247
Q	1.088	0.718	1.212	0.724	0.858	0.156
CF	0.016	0.039	0.019	0.040	0.008	0.039
DA	0.274	0.194	0.234	0.213	0.335	0.176
FRGN	6.216	6.700	7.020	7.681	5.596	5.522
MBD	0.400	0.490	0.304	0.460	0.442	0.497
Obs.	3073		968		608	

Table 4 Base Regression

The dependent variable is I, the change in tangible fixed assets plus depreciation, divided by tangible fixed assets(year t-1). Q is Tobin's Q of the firm, calculated as the ratio of the market value of the firm(the market value of stock plus the book value of total debt) divided by the market value of the assets. CF is after tax profit plus depreciation minus dividend and bonus, divided by the market value of the assets(year t-1). DA is bonds and borrowings, divided by the market value of the assets. Model 1 and 2 of Panel A, Model 1 of Panel B, and Model 1 and 2 of Panel C include the firm fixed effects. t-statistics are reported in parenthesis. ***, ** and * denote significance at the 0.01, 0.05 and 0.1 levels respectively.

PANEL A   1993-2000

Sample	Model 1 Manufacturing Firms	Model 2 Manufacturing Firms	Model 3 Non-Manufacturing Firms
$Qt-1$	0.016 ***	0.015 ***	0.026 ***
	(2.923)	(3.287)	(3.846)
CFt		0.327 ***	0.801 ***
		(7.089)	(5.392)
$DAt-1$	-0.073 *	-0.134 ***	0.035
	(1.741)	(4.070)	(1.131)
Year Dummy	Yes	Yes	Yes
Adj. R2	0.114	0.198	0.029
Obs.	8891	5818	3073
Hausmann	40.179 [.0000]	51.610 [.0000]	13.385 [.2030]

PANEL B   1993-1996

Sample	Model 1 Manufacturing Firms	Model 2 Non-Manufacturing Firms	Model 3 Construction and Real Estate
$Qt-1$	0.039 ***	0.060 ***	0.045
	(3.084)	(2.755)	(1.006)
CFt	0.203	0.114	1.900 ***
	(1.388)	(0.369)	(3.837)
$DAt-1$	-0.140 *	0.082 *	0.180 ***
	(1.957)	(1.668)	(3.096)
Year Dummy	Yes	Yes	Yes
Adj. R2	0.178	0.010	0.102
Obs.	2837	1447	498
Hausmann	37.286 [.0000]	4.171 [.6535]	7.573 [.2711]

PANEL C   1997-2000

Sample	Model 1 Manufacturing Firms	Model 2 Non-Manufacturing Firms	Model 3 Construction and Real Estate
$Qt-1$	0.015 ***	0.016 ***	0.026
	(3.662)	(2.841)	(0.891)
CFt	0.158 ***	-0.049	0.179
	(4.324)	(0.494)	(1.305)
$DAt-1$	-0.256 ***	-0.135 *	-0.053 **
	(6.483)	(1.921)	(2.025)
Year Dummy	Yes	Yes	Yes
Adj. R2	0.374	0.404	0.011
Obs.	2958	1583	523
Hausmann	62.549 [.0000]	37.929 [.0000]	4.005 [.6760]

Table 5   Difference between HQ Firms and LQ Firms   1993-2000

The dependent variable is I, the change in tangible fixed assets plus depreciation, divided by tangible fixed assets(year t-1). Q is Tobin's Q of the firm, calculated as the ratio of the market value of the firm(the market value of stock plus the book value of total debt) divided by the market value of the assets. CF is after tax profit plus depreciation minus dividrnd and bonus, divided by the market value of the assets(year t-1). DA is bonds and borrowings, divided by the market value of total assets. HQ is dummy variable which equals one if Tobin's Q(beginning of the period, three years average) of the firm is higher than one third of whole samples. LQ is dummy variable which equals one if Tobin's Q(beginning of the period, three years average) of the firm is lower than one third of whole samples. All Models include the firm fixed effects. t-statistics are reported in parenthesis. ***, ** and * denote significance at the 0.01, 0.05 and 0.1 levels respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5
Period	1993-2000	1993-1996	1997-2000	1993-2000	1993-2000
	Manufacturing	Manufacturing	Manufacturing	Non-Manufacturing	Construction and
Sample	Firms	Firms	Firms	Firms	Real Estate
$Qt-1$	0.021 ***	0.039 ***	0.014 ***	0.025	-0.048
	(2.643)	(3.003)	(3.348)	(1.129)	(0.876)
CFt	0.302 ***	0.221	0.165 ***	0.539 **	0.617 *
	(5.556)	(1.481)	(4.516)	(2.404)	(1.945)
$DAt-1$	-0.159 **	-0.044	-0.066	-0.436 **	-0.384 *
	(2.189)	(0.335)	(0.747)	(2.396)	(1.951)
$HQ*DAt-1$	0.109	-0.178	-0.219 **	0.509 **	0.332
	(1.132)	(1.063)	(2.098)	(2.055)	(1.124)
$LQ*DAt-1$	0.052	-0.050	-0.270 **	1.448 ***	3.279 ***
	(0.475)	(0.247)	(2.359)	(4.901)	(8.106)
Year Dummy	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.156	0.177	0.350	0.073	0.122
Obs.	4797	2756	2788	2653	898
Hausmann	40.899 [.0000]	37.720 [.0000]	60.827 [.0000]	46.263 [.0000]	68.422 [.0000]

Table 6 Effects of Corporate Governance Structure (HQ Firms)

Samples are limited to firms with high growth opportunities, that is defined as firms whose Tobin's Q(beginning of the period, three years average) is higher than one third of whole samples. The dependent variable is *I*, the change in tangible fixed assets plus depreciation, divided by tangible fixed assets(year t-1). *Q* is Tobin's Q of the firm, calculated as the ratio of the market value of the firm(the market value of stock plus the book value of total debt) divided by the market value of the assets. *CF* is after tax profit plus depreciation minus dividrnd and bonus, divided by the market value of the assets(year t-1). *DA* is bonds and borrowings, divided by the market value of the assets. *FRGN* is the percentage of the share held by foreign investors. *MBD* is dummy variable which equals one if the main bank has not changed for five years and the ratio of main bank loan to the assets is higher than 5.1%, which is sample means. Model 1, 2 and 4 include the firm fixed effects. t-statistics are reported in parenthesis. ***, ** and * denote significance at the 0.01, 0.05 and 0.1 levels respectively.

	Model 1	Model 2	Model 3	Model 4
Period	1993-2000	1993-2000	1997-2000	1997-2000
Sample	Manufacturing Firms with High Q-ratio	Manufacturing Firms with High Q-ratio	Manufacturing Firms with High Q-ratio	Manufacturing Firms with High Q-ratio
Q_{t-1}	0.010	0.014 *	0.012 ***	0.008
	(1.313)	(1.952)	(2.943)	(1.496)
CF_t	0.394 ***	0.392 ***	0.285 ***	0.221 ***
	(4.447)	(4.650)	(5.975)	(3.888)
DA_{t-1}	-0.143 **	-0.081	-0.114 ***	-0.442 ***
	(1.973)	(0.902)	(4.511)	(4.441)
$FRGN_{t-1}$		0.000		0.001
		(0.270)		(0.877)
MBD_{t-1}		0.022		-0.033
		(0.717)		(0.936)
$FRGN_{t-1}*DA_{t-1}$		-0.003		0.007 *
		(0.656)		(1.787)
$MBD_{t-1}*DA_{t-1}$		-0.051		0.195 **
		(0.563)		(1.938)
Year Dummy	Yes	Yes	Yes	Yes
Adj. R2	0.137	0.155	0.111	0.370
Obs.	1752	1712	919	911
Hausmann	27.856 [.0005]	24.517 [.0396]	9.478 [.1484]	26.037 [.0037]

Table 7 Effects of Corporate Governance Stracture (LQ Firms)

Samples are limited to firms with low growth opportunities, that is defined as firms whose Tobin's Q(beginning of the period, three years average) is lower than one third of whole samples. The dependent variable is I, the change in tangible fixed assets plus depreciation, divided by tangible fixed assets(year t-1). Q is Tobin's Q of the firm, calculated as the ratio of the market value of the firm(the market value of stock plus the book value of total debt) divided by the market value of the assets. CF is after tax profit plus depreciation minus dividrnd and bonus, divided by the market value of the assets(year t-1). DA is bonds and borrowings, divided by the market value of the assets. $FRGN$ is the percentage of the share held by foreign investors. MBD is dummy variable which equals one if the main bank has not changed for five years and the ratio of main bank loan to the assets is higher than 5.1%, which is sample means. All Models include the firm fixed effects. t-statistics are reported in parenthesis. ***, ** and * denote significance at the 0.01, 0.05 and 0.1 levels respectively.

	Model 1	Model 2	Model 3	Model 4
Period	1993-2000	1993-2000	1997-2000	1997-2000
Sample	Manufacturing Firms with Low Q-ratio	Manufacturing Firms with Low Q-ratio	Manufacturing Firms with Low Q-ratio	Manufacturing Firms with Low Q-ratio
$Qt-1$	0.000	0.001	0.031	0.035
	(0.057)	(0.102)	(1.401)	(1.490)
CFt	0.187 ***	0.186 ***	-0.042	-0.038
	(2.644)	(2.620)	(0.733)	(0.677)
$DAt-1$	-0.180 ***	-0.199 ***	-0.340 ***	-0.300 ***
	(3.731)	(3.069)	(5.566)	(3.620)
$FRGNt-1$		-0.001		-0.001
		(1.396)		(1.021)
$MBDt-1$		0.030 *		0.043 **
		(1.748)		(2.257)
$FRGNt-1*DAt-1$		0.007 **		0.007 *
		(2.162)		(1.858)
$MBDt-1*DAt-1$		-0.115 *		-0.174 **
		(1.699)		(2.181)
Year Dummy	Yes	Yes	Yes	Yes
Adj. R2	0.185	0.188	0.213	0.221
Obs.	2064	2039	1019	1009
Hausmann	64.279 [.0000]	61.687 [.0000]	48.283 [.0000]	47.097 [.0000]

Table 8 PBR of City Banks and Long-Term Credit Banks

PBR is Price Book-Value Ratio, which is defined as stock price divided by the book value of net assets per stock. 10 banks consist of Industrial Bank of Japan, Daiichi Kangyo Bank, Sakura(Mitsui) Bank, Fuji Bank, Tokyo Mitsubishi(Mitsubishi) Bank, Asahi(Kyowa) Bank, Sanwa Bank, Sumitomo Bank and Daiwa Bank. Additional to these banks, 13 Banks include Long-Term Credit Bank of Japan, Nippon Credit Bank, and Hokkaido Takushoku Bank.

	Year	1889	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
13 banks	Median	4.38	3.90	2.49	2.67	2.48	2.36	3.51	2.33	.	.	.
	Mean	4.66	3.96	2.62	2.67	2.83	2.41	3.38	2.30	.	.	.
	Std.dev	1.10	0.99	0.60	0.80	1.11	0.82	1.23	1.14	.	.	.
	C.V.	0.24	0.25	0.23	0.30	0.39	0.34	0.36	0.50	.	.	.
10 banks	Median	4.34	3.90	2.51	2.79	2.96	2.59	3.71	2.41	2.12	1.17	1.40
	Mean	4.60	4.08	2.73	2.94	3.18	2.71	3.84	2.31	2.28	1.43	1.49
	Std.dev	1.09	1.01	0.57	0.69	1.00	0.63	0.93	0.54	0.95	0.77	0.61
	C.V.	0.24	0.25	0.21	0.23	0.31	0.23	0.24	0.23	0.42	0.54	0.41

Table 9 Effects of the Performance of Main Bank (1997-2000)

The Samples of PANEL A are limited to firms with high growth opportunities, that is defined as firms whose Tobin's Q(beginning of the period, three years average) is higher than one third of whole samples. The Samples of PANEL B are limited to firms with low growth opportunities, that is defined as firms whose Tobin's Q(beginning of the period, three years average) is lower than one third of whole samples.

The dependent variable is I, the change in tangible fixed assets plus depreciation, divided by tangible fixed assets(year t-1). Q is the market-book ratio of the firm, calculated as the ratio of the market value of the firm(the market value of stock plus the book value of total debt) divided by the market value of the assets. CF is after tax profit plus depreciation minus dividrnd and bonus, divided by the market value of the assets(year t-1). DA is bonds and borrowings, divided by the market value of the assets. FRGN is the percentage of the share held by foreign investors. GMB is dummy variable which equals one if the PBR of the main bank is higher than the median of PBR of each year and MBD equals one. BMB is dummy variable which equals one if the PBR of the main bank is lower than the median of PBR of each year and MBD equals one. PBR is Price Book-Value Ratio, which is defined as stock price divided by the book value of net assets per stock. All Models include the firm fixed effects. t-statistics are reported in parenthesis. ***, ** and * denote significance at the 0.01, 0.05 and 0.1 levels respectively.

PANEL A   HQ firms

	Model 1	Model 2	Model 3
	Manufacturing	Manufacturing	Manufacturing
	Firms with	Firms with	Firms with
Sample	High Q-ratio	High Q-ratio	High Q-ratio
Q_{t-1}	0.008	0.009 *	0.008
	(1.482)	(1.661)	(1.493)
CF_t	0.224 ***	0.213 ***	0.213 ***
	(3.884)	(3.690)	(3.716)
DA_{t-1}	-0.339 ***	-0.380 ***	-0.428 ***
	(3.784)	(4.275)	(4.519)
$FRGN_{t-1}$	0.002	0.002	0.002
	(1.280)	(1.297)	(1.120)
$FRGN_{t-1}*DA_{t-1}$	0.007 *	0.008 *	0.008 *
	(1.650)	(1.919)	(1.935)
$GMB_{t-1}*DA_{t-1}$	-0.013		0.109 **
	(0.414)		(2.010)
$BMB_{t-1}*DA_{t-1}$		0.064 **	0.153 ***
		(1.988)	(2.782)
Year Dummy	Yes	Yes	Yes
Adj. R2	0.366	0.369	0.372
Obs.	864	865	864
Hausmann	25.673 [.0023]	26.299 [.0018]	28.574 [.0015]

PANEL B   LQ firms

	Model 1	Model 2	Model 3
	Manufacturing	Manufacturing	Manufacturing
	Firms with	Firms with	Firms with
Sample	Low Q-ratio	Low Q-ratio	Low Q-ratio
Q_{t-1}	0.028	0.025	0.026
	(1.174)	(1.049)	(1.103)
CF_t	0.146 **	0.147 **	0.150 **
	(2.256)	(2.269)	(2.324)
DA_{t-1}	-0.422 ***	-0.370 ***	-0.373 ***
	(5.356)	(4.663)	(4.439)
$FRGN_{t-1}$	-0.001	-0.001	-0.001
	(1.067)	(1.045)	(1.007)
$FRGN_{t-1}*DA_{t-1}$	0.007 *	0.007 *	0.007
	(1.743)	(1.739)	(1.630)
$GMB_{t-1}*DA_{t-1}$	0.063 **		0.014
	(2.424)		(0.365)
$BMB_{t-1}*DA_{t-1}$		-0.080 ***	-0.070 *
		(2.858)	(1.646)
Year Dummy	Yes	Yes	Yes
Adj. R2	0.223	0.219	0.224
Obs.	973	978	972
Hausmann	38.295 [.0000]	36.056 [.0000]	36.171 [.0001]

Figure 1 Debt-Asset Ratio
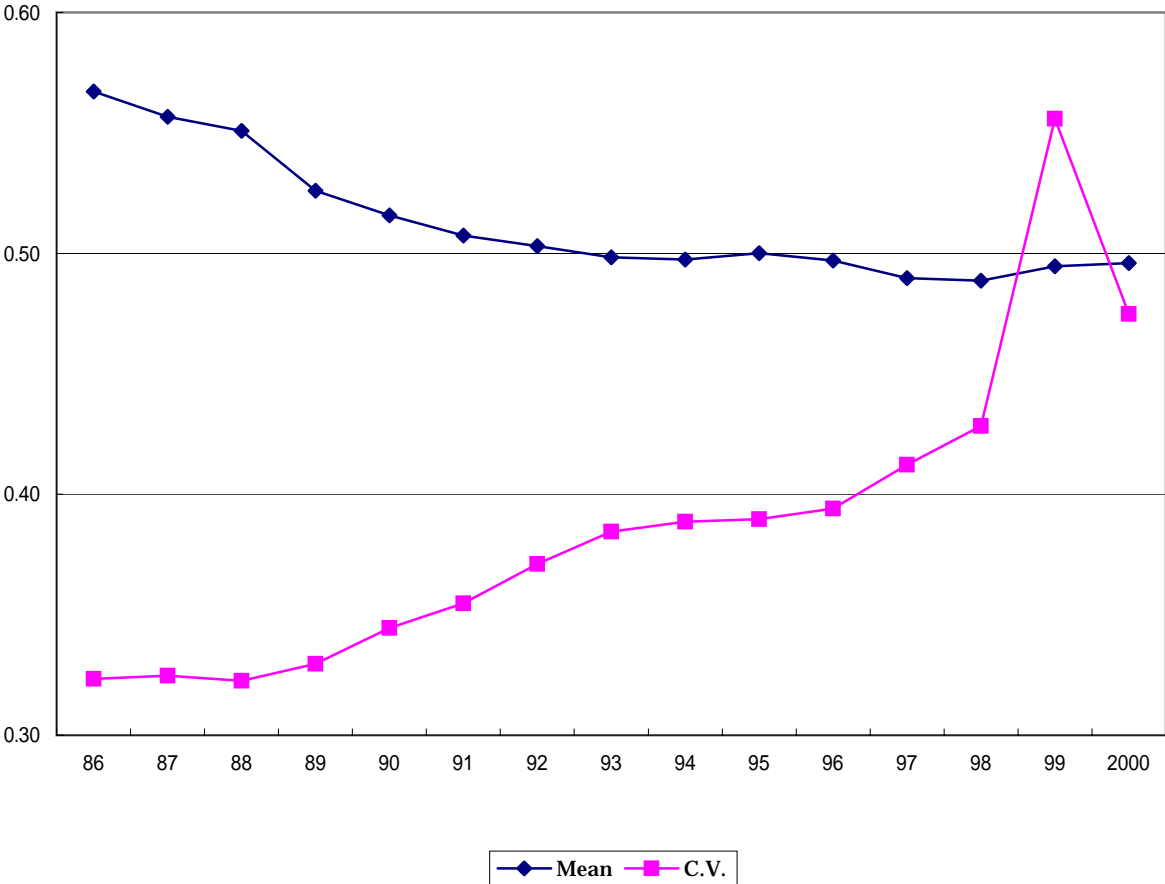
Debt-Asset Ratio is defined as the book value of total debt divided by the market value of assets. This figure includes all firms (except fonancial institutions) listed in Tokyo Ttock Exchange [about 1100 firms].

Figure 2 Investment Ratio
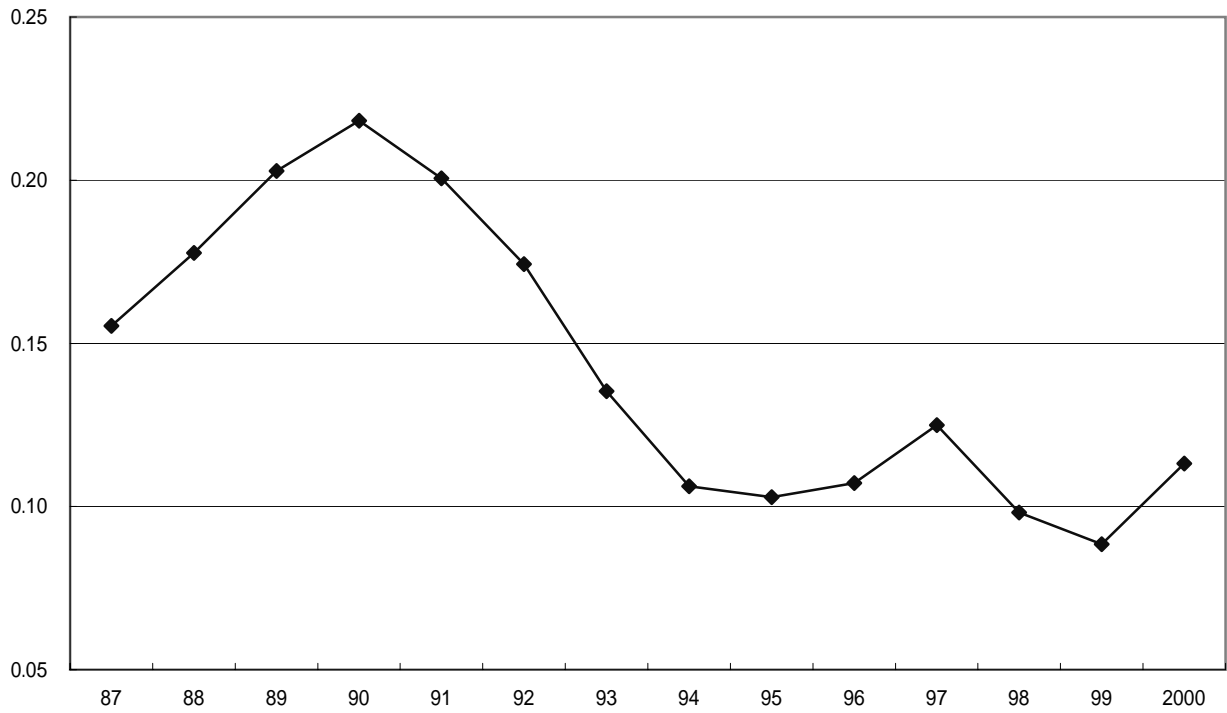
Investment Ratio is defined as increase of book value of tangible fixed assets plus depreciation, divided by the market value of tangible fixed assets. This figure includes all firms (except fonancial institutions) listed in Tokyo Ttock Exchange [about 1100 firms].