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Empirical Reassessment of Japanese Corporate Investment Behavior:
Features and Changes Since the 1980s,
Based on Micro-level Panel Data

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Contents

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Summary

1. Compared to GDP, business fixed investment generally shows greater volatility, but in the Japanese economy of the 1980s investment displayed stable high growth, particularly in the expansion years of the Bubble economy. To explain such unique investment dynamics, there was much debate on the existence of so-called "Japanese-style enterprise behavior," mainly in the sense that it must have been a source of competitive strength. After the Bubble burst, however, such views disappeared, and it is naively believed that Japanese corporate investment behavior has been switching toward the strict pursuit of capital efficiency. This report empirically reexamines the various points debated on Japanese corporate investment behavior, based on the latest micro-level panel data. The data sets used here include not only financial data but also the results of the "Corporate Investment Attitude Survey" released by The Development Bank of Japan in October 1999, which enriches our analysis. Analyzing the period of approximately 20 years from a consistent viewpoint, we will find some new evidence on the features of and changes in corporate investment behavior since the 1980s.

2. Observing investment fluctuations in the Japanese economy in the last two decades, we discern three phases: The first, to around 1986, displayed relatively stable moderate growth; the second, from 1987 to around 1992, saw a double-digit boom over roughly three years out of five; and the third, starting after 1993, was characterized by two large declines and instability, with no discernible upward trend.

3. Based on the Financial Statement Statistics of Corporations, we find a sharp divergence from the balanced growth path of assets, sales and profits since around the end of Phase 2, which means a substantial and prolonged decline in capital efficiency (i.e. ROA, or return on assets). Although the investment to capital stock ratio in principle has been closely correlated with ROA, it was relatively more stable than ROA in Phase 1, but in Phase 2 it grew far faster than ROA. As for the balance sheet structure, the ratio of liquidity to capital stock grew strongly in Phase 2. This suggests that abundant liquidity on hand promotes excessive investment and invites a decline in capital efficiency as a result.

4. According to the "Corporate Investment Attitude Survey," fewer firms focused on the pursuit of long-term profits, and following and emulating other companies as criteria for investment decision-making, while more firms put stress on certainty, compared to the situation in the 1980s. Fewer firms cited maintenance and expansion of sales and market share as the reasons for investment acceleration. These results reveal an overall shift toward holding back on investment, and combining the survey results with financial data, such a shift is far more evident for low ROA firms and high debt-equity ratio firms. In other words, major differences in investment behavior result from differences in management performance and financial conditions, again as compared to the 1980s.

5. Using micro-level financial data of listed or publicly traded companies in the years from FY 1980 to FY 1998, we carry out panel data estimation of micro-level investment equations respectively for each of the three periods: FY 1982-86 (corresponds to Phase 1), FY 1988-92 (Phase 2) and FY 1994-98 (Phase 3). The estimation results show two major features and changes in corporate investment behavior since the 1980s. First, the coefficient on ROA was always positive and statistically significant throughout the 1980s and thereafter, and its value grew significantly period by period, indicating that Japanese corporations' investment behavior became increasingly focused on capital efficiency. Second, the estimation result of Phase 2 is clearly different from those of other periods. Specifically, the coefficient on sales growth rate, which was positive and statistically significant in other periods, turns out to be not significant, and neither was the coefficient on debt-equity ratio, which was negative and statistically significant in other periods. Instead, the value of the coefficient on liquidity to capital stock ratio (positive and statistically significant in all periods) was far above those of the other periods, suggesting that investment was driven by abundant liquidity and diverged somewhat from fundamentals.

6. Next, we carry out another series of estimations by coupling the "Corporate Investment Attitude Survey" data to financial data, with the following key results. First, the coefficient on "Stress on certainty" as a dummy variable was negative and statistically significant in all periods, with no significant differences in the absolute value of the coefficient. In Phase 3, rather more companies attached importance to certainty, and this emphasis on certainty has tended to suppress investment. Second, the coefficient on "Following and emulating other companies" as a dummy variable was positive and statistically significant in Phases 1 and 2, but its influence disappeared in Phase 3. Third, the coefficient values of the liquidity to capital stock ratio and the debt-equity ratio of companies that cited main banks and cross shareholdings as reasons for accelerating investment had no significant differences in any period compared with those of companies that did not cite these reasons. We therefore believe that these Japanese style of corporate governance factors had no influence, neither positive nor negative, on investment behavior during and after the 1980s.

7. In conclusion, leaving aside the special differences of Phase 2, it is found that Japanese corporate investment behavior over the time horizon of this report, centering on listed or publicly traded companies, tended to sensitively reflect disparities and changes in capital efficiency, and there was a structural strengthening of emphasis on the likelihood of recouping investment. Against a background of stiffening global competition and merciless market evaluations on management performance and financial condition, we believe that such changes will surely accelerate in the future. The transition process toward investment behavior that pursues capital efficiency and certainty simultaneously tends to suppress investment and destabilize it on the macroeconomic level, but if Japanese corporations successfully link it with steady structural improvements, we anticipate that over the intermediate to long term, this will lead to expanded investment in growth fields.

Introduction

In the Japanese economy of the 1980s and 1990s,[1] there were great changes in macro-level patterns[2] of fluctuation in business fixed investment, and the widely-held views on Japanese corporate investment behavior changed substantially. In the 1980s, investment that usually tends to show high volatility relative to GDP trended steadily upward, and particularly in the Bubble era's expansionary period it attracted worldwide attention because of its high rates of growth that closely resembled those of the postwar high growth era. The situation triggered much discussion about Japanese-style investment behavior, to the effect that Japanese corporations do not worry overly about their current business conditions, but invest aggressively for the long term. It also attracted much interest in Japan's unique style of corporate governance, symbolized by the main bank system and the role of inter-corporate relationships underlying the aggressive investment behavior. However, the state of the economy changed completely after the Bubble burst: investment became erratic and entered a two-stage full-scale contractionary phase, causing the economic recession to deepen more than expected. As a result, there has been almost no discussion of Japan's unique characteristics in recent years; as worldwide competition intensifies and the market principle becomes entrenched, Japanese corporate investment behavior appears to be changing course toward stricter pursuit of capital efficiency.

Whether or not these changes are actually occurring is important in considering the future direction. But because the principal concern of empirical research has heretofore been the existence or otherwise of Japanese uniqueness, beginning with the effect of the main bank system, we believe that there has been insufficient examination of changes in investment behavior over time.[3] This report sets out to reorganize the various points of arguments developed on an ad hoc basis to date; investigates the features and changes in investment behavior over our time horizon with regard to Japanese uniqueness; and subjects the content and periods to a detailed empirical analysis. To that end, we will estimate investment functions by time period based on large-scale panel data constructed from financial data on about 2,800 listed or publicly traded companies and the results of the "Corporate Investment Attitude Survey" released by the Development Bank of Japan in October 1999.

This report is structured as follows. In Chapter 1, we will indicate the three phases into which macro-level patterns of investment fluctuation can be divided since the 1980s, and from aggregated corporate financial data, deduce the changes in investment behavior over time. Chapter 2 presents the theoretical backgrounds and establishes hypotheses related to Japanese uniqueness and its changes over time. We will also explain the construction and characteristics of our data set, and review the implications of cross-tabulation results of financial data and the attitude survey. Using these data sets, Chapter 3 estimates investment equations for each of Chapter 1's three phases. As a result, we will show that (1) Japanese corporate investment behavior from the 1980s has undergone continual structural change stressing pursuit of capital efficiency and certainty, (2) abundant liquidity almost caused the famous free cash problem discussed by Jensen (1986) during the Bubble era, in other words liquidity-driven investment diverged from fundamentals, and (3) Japanese style of corporate governance – the main bank

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1 Although the division here is a matter of convenience in a sense, it is used in this analysis to denote the end of the high growth period and a period of continuity to the present. We can also refer to Yoshikawa's (1992) division of the postwar Japanese economy into four periods: (1) Recovery (1945-55), (2) high growth (1955-70), (3) adjustment (1970-80) and (4) present stage (1980-).

2 In the discussion that follows, as to investment fluctuations over time we are assuming the existence of a fixed pattern characterized by average and standard deviation in the time series of growth rate for each period selected appropriately.

3 The issue of whether any Japanese uniqueness exists has not been resolved yet. Refer to Chapter 2 for future research.

system and stable stockholding – has had no influence on investment over our time horizon. In the final section, we present our conclusions based on all of the preceding discussions.

I Background and Evidence from Aggregated Data

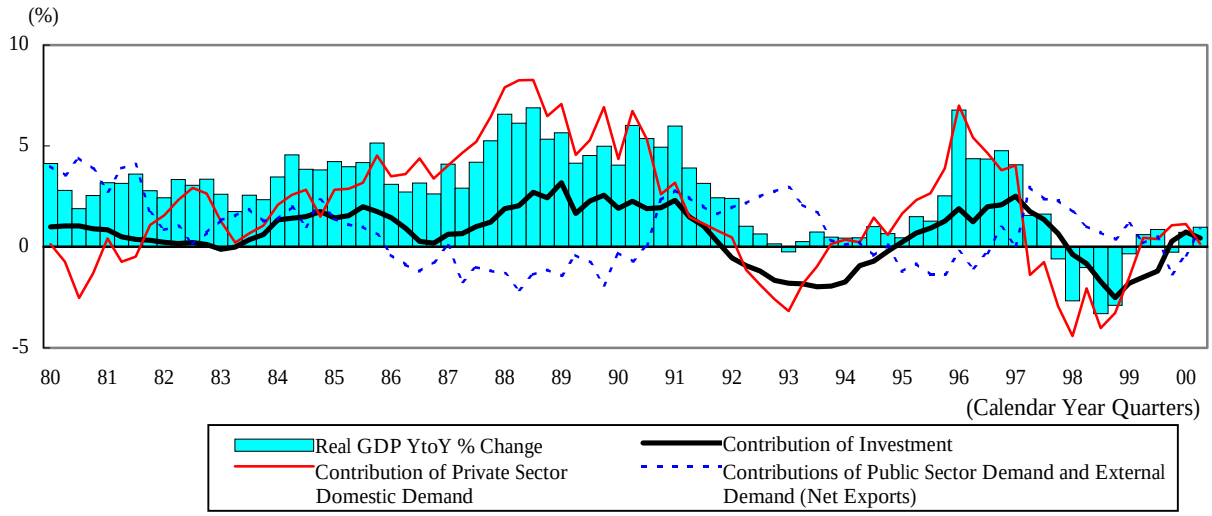
1. Three Phases of Business Fixed Investment Fluctuations Since the 1980s

As the premise of our analysis of investment behavior based on micro-level data, we outline the patterns of fluctuation in investment over our time horizon based on macroeconomic statistics, and consider the special characteristics of each decade.

Figure 1-1 displays quarterly trends in real GDP growth rates and the degree of contribution of each demand item, derived from the Annual Report on National Accounts.[4] Singling out the investment contribution, there were almost no negatives in the 1980s, but from 1988 to around 1990 there was an extended plateau that turned down in the 1990s and trended lower in two broad stages that caused GDP to fall.

Taking business cycle peaks and valleys into consideration, this report classifies the investment fluctuation patterns over the two decades into the following three phases: The first (1980 to around 1986) was one of relatively stable moderate growth; the second (1987 to around 1992) was characterized by about three years of double-digit investment boom; and the third (after 1993) saw a two-stage major decline to unstable low levels.[5] If we combine the average growth rates and standard deviations of the three phases in fixed periods and express them broadly, we arrive at Table 1-1.

Figure 1-1. GDP Growth Rates and Investment Contributions



Source: Cabinet Office's "Annual Report on National Accounts," 1990 basis

Table 1-1. Trends in Macroeconomic Investment Fluctuation Patterns

	Period 1	Period 2	Period 3
Average Growth Rate	Moderate	High	Low
Standard Deviation of Growth Rate	Low	Low (to high)	High

[4] The growth rate and degree of contribution are year-to-year comparisons. The same applies hereinafter unless otherwise specified.

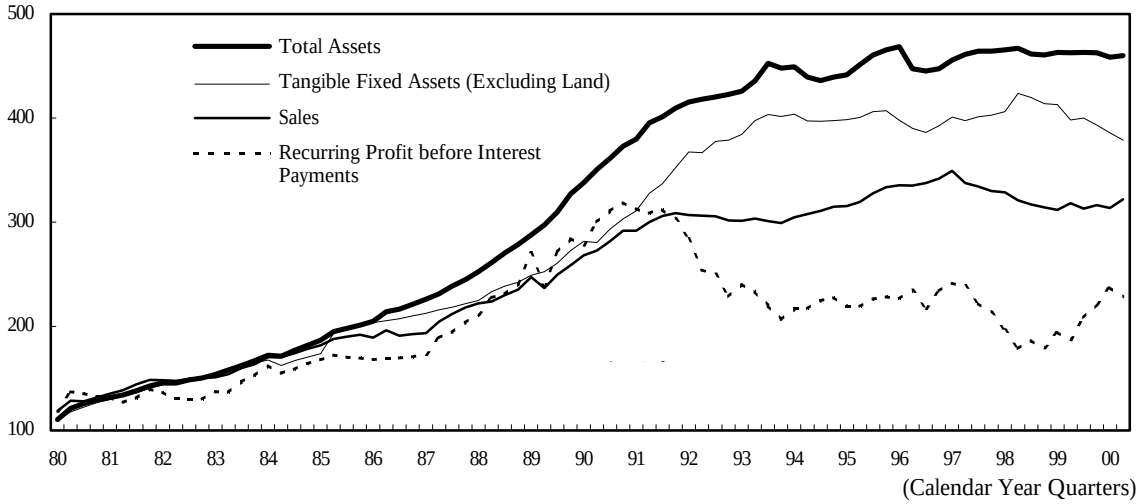
[5] The second phase coincides largely with what is generally called the "Bubble era" or "Bubble economy." But because our analysis does not focus on the effects of asset price variations we use a neutral designator to avoid preconceptions.

2. ROA and Business Fixed Investment Fluctuations

Keeping in mind the three phases related to investment fluctuation patterns, we now consider the changes over time in investment behavior since the 1980s, based on the corporate sector's aggregated financial indicators.

Figure 1-2 indexes on a real basis assets, sales and profit growth to 1979, based on Financial Statement Statistics of Corporations. As our concept of profit corresponding to total assets, we take recurring profits before interest payments[6], with the comparison between the two equivalent to ROA (return on assets, the ratio of profits to total assets). According to the figure, total assets, sales and profit grew in general balance with each other up to the second half of Phase 2, but from the end of that phase to the early stage of Phase 3, sales growth stopped despite the continuing increase in total assets, and profit started to fall, generating a divergence among the three elements that has since not narrowed. Thus from the end of Phase 2, ROA and other asset efficiency indicators for Japanese corporations as a whole declined significantly. The figure also illustrates no change in the basic situation of tangible fixed assets, as distinct from total assets, suggesting that the cause of the decline in asset efficiency lay principally in physical assets, not financial factors.

Figure 1-2. Assets, Sales and Profit Growth (Current Price, Indexed to the 1979 Average as 100)



Source: Ministry of Finance's "Quarterly Report on Financial Statement Statistics of Corporations," Cabinet Office's "Annual Report on National Accounts," 1990 basis

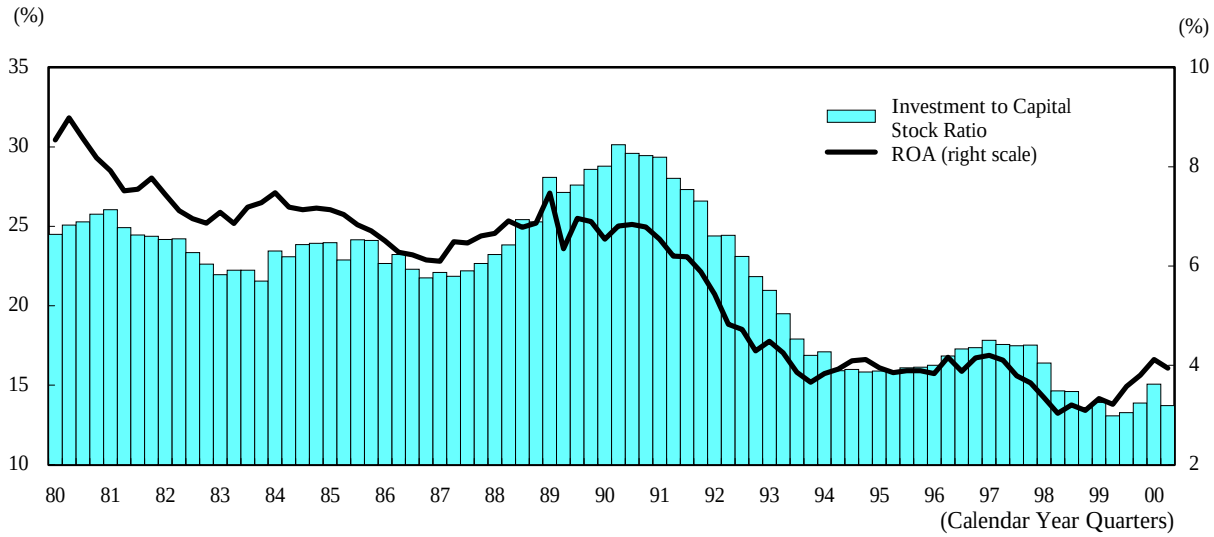
ROA indicates the investment efficiency of existing assets, in other words the results of past investment behavior. But if the earning rate on existing assets is a good substitute variable for investment profitability of new capital assets, it can also be considered as a cause of present investment behavior.[7] On the latter view, Figure 1-3 compares the ratio of investment to capital stock (the proportion of new investment amounts to the outstanding balance of existing tangible

[6] In Chapter 3's analysis on individual corporate data, the ROA numerator is defined as the sum of operating profit and interest and dividends received. Here, however, the data are limited, so recurring profit before interest payments is substituted. The difference between the two is other non-operating income/expenditure (profit/loss on sale of marketable securities equivalent to current assets, real estate lease fees paid or received if unrelated to principal business, and the like).

[7] In actuality, a direct correlation is normally recognized between corporate earnings and investment. As the reasons for this, besides those mentioned in this report, we can cite the effects of the fund procurement aspect, acting through increases in internal funds, in accelerating investment. These and other reasons are dealt with in the next chapter.

fixed assets), as an indicator of investment behavior aggressiveness, with ROA trends. As predicted, the ratio has a high correlation to ROA, but in Phase 1 it was stable in relation to ROA and then far exceeded ROA in Phase 2. Analyzing this together with the characteristics of investment fluctuation pattern in each phase seen in the preceding section, it appears that Phase 1 investment in energy-saving measures and R&D, and in such growth industries as services, was carried out regardless of the underlying ROA, and served to stabilize overall investment. And in Phase 2 when investment ballooned, a number of factors other than the investment earnings ratio suggested by ROA (whose level was lower than in Phase 1) served to fuel investment.

Figure 1-3. Investment to Capital Stock Ratio and ROA



Source: Ministry of Finance, "Quarterly Report on Financial Statement Statistics of Corporations"
Investment to capital stock ratio = new investment / tangible fixed assets (ex-land)

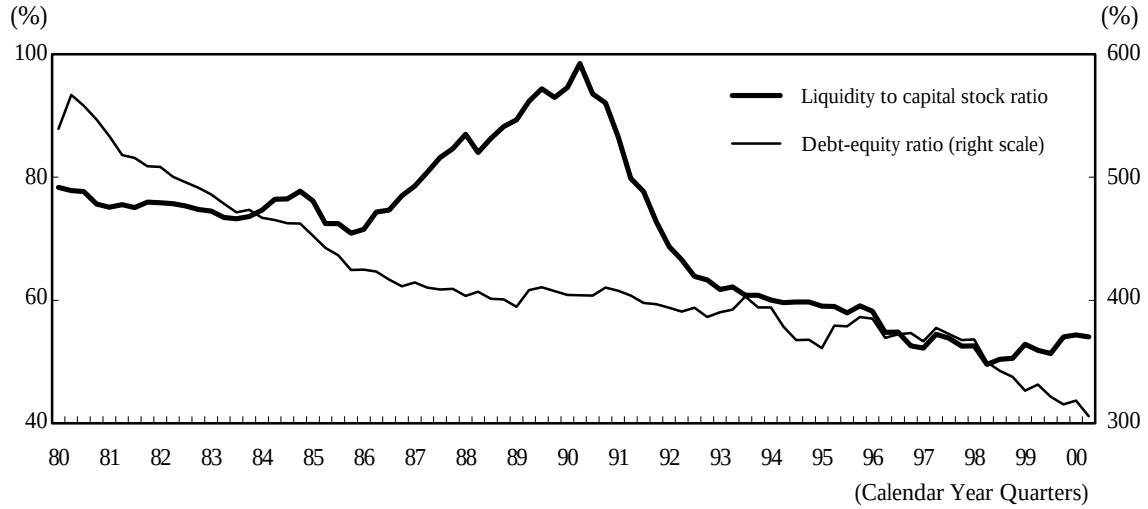
The stability of investment undertaken independently of immediate business conditions in Phase 1 attracted the attention of academic economists in the U.S., where the recovery of industrial competitiveness was a major problem at the time, and suggested the "long-term perspective" of Japanese corporations. Overcoming the sharp rise in the yen after 1985, the continuing active investment through Phase 2 seemed to be consistent with a series of hypotheses, the so-called "Japanese-style enterprise" theory, that the key to Japan's economic success was its unique investment behavior with a long-term perspective, supported by the Japanese style of corporate governance such as the main bank system and interlocking shareholdings. With hindsight, the subsequent collapse of the Japanese economy and full-scale retreat in investment proved that these hypotheses were simply incorrect. But did Japanese companies' investment behavior really change, or did those special characteristics never actually exist? And did the Japanese style of corporate governance have any real impact? These issues have never been resolved.

Regarding the Phase 2 surge in investment, there was an equity financing boom in those days, and it is likely that the ready availability of money (free cash[8]) which corporate managers could

[8] In this context, the term "free cash flow hypotheses" or simply "cash flow" is often used because they discuss in terms of the flow variable, but considering the true meaning of hypothesis we recognize it is more appropriate to discuss in terms of the stock variables, so in this report we will use "free cash."

use freely, for better or worse, accelerated investment.[9] If we look at the liquidity to capital stock ratio (the total of cash and deposits plus liquid marketable securities to tangible fixed assets) in corporate balance sheets, we see that such cash spurred the substantial growth in Phase 2 (Figure 1-4). Naturally, if the liquidity to capital stock ratio rises with liabilities it is not free cash in the true sense, but in this period the debt-equity ratio did not rise. Consequently, our interpretation including the subsequent ROA decline suggests that abundant liquidity on hand encouraged aggressive investment, leading to the decline in capital efficiency. The fact that the investment boom of Phase 2 involved everyone, independently of a company's performance, supports the hypothesis that the influence of free cash was dominant.

Figure 1-4. Balance Sheet Changes



Source: Ministry of Finance, "Quarterly Report on Financial Statement Statistics of Corporations"
Liquidity to capital stock ratio = (cash and deposits + marketable securities posted in current assets) / tangible fixed assets (ex-land)

[9] Regarding the investment acceleration effect of free cash, the debate continues with improvement of analytical methods, both theoretically and empirically, about whether or not there is such an effect, and whether accelerated investment is efficient or inefficient in maximizing a corporation's value. See the next chapter for details.

II Basic Concepts and Data Sets

1. Theoretical Background

1.1 Fundamentals and Non-fundamentals in Investment Decision-making

What is the theoretical background for our consideration of the special characteristics of investment behavior and their changes? Generally, when all markets satisfy the hypothesis that they are completely competitive, corporations' investment levels determined by dynamically optimized activity have a 1-to-1 correspondence with Tobin's *q* (marginal *q*); in other words, *q* is a sufficient statistic. Expressed another way, any difference in actually-observed investment levels is attributable to a difference in levels of *q* that summarize all the information related to fundamentals, in which case it is meaningless to consider characteristics of and changes in investment behavior.

Yet, even though the *q* theory of investment has a solid theoretical foundation, for empirical analysis the explanatory power of investment equations based on *q* is disappointing. And as an experiential fact, investment behavior certainly varies widely by country and time period. For that reason, both theoretical and empirical studies to explain actual investment movements have progressed on the hypothesis of imperfections in the various markets.[10] A typical example of market imperfection is information asymmetry and the conflicts of interest among shareholders, managers, creditors and other stakeholders, leading to additional costs of external fund raising.[11] At such times, the assumption underlying the *q* theory, namely that funds can be procured from the markets at a fixed cost, is not true,[12] and investment levels are influenced by the availability of internal funds. Further, the nature and magnitude of such influence are closely related to each country's particular social system and commercial practices (these are often called "economic system" generically). Therefore, many studies have been carried out on the basis that the unique investment behavior of Japanese corporations is greatly influenced by Japan's economic system, and that a company's targets (the objective function of the optimization problem) are not necessarily maximization of shareholder value.

Our empirical analysis follows a similar line of study; we predict that investment levels are influenced by non-fundamentals such as the size of internal funds and special features of corporate governance, as well as investment profitability fundamentals represented by *q*. Out of the large body of empirical literature, we especially refer to Takeuchi and Hanazaki (1997) regarding "stylized facts" of Japanese corporate investment behavior and empirical methodology. This report, however, makes no international comparisons, but focuses on the changes in investment behavior over time.

[10] As the most recent investment research survey, see Miyagawa (1997), for example.

[11] To expand on this more, we suppose shareholders and managers as insiders and new shareholders and creditors as outsiders. Besides, we assume that information related to investment project quality is imperfect, so that there is the risk of insiders pursuing their own private profit at the expense of outsiders. To raise funds from outsiders then, there are the costs of obtaining information required to avoid this risk, and monitoring costs, in addition to the normal cost of capital. Otherwise, a premium is required for the expected loss generated in the event that no countermeasures are taken. Such inefficiencies caused by leaving investment of assets to an agent or proxy are generally called agency problems, and the associated costs are called agency costs.

[12] We find the theoretical grounds for this assumption in the famous Modigliani-Miller Theorem (MM Theorem). Including matters not dealt with in this report, there are various cases in which the theorem does not come into play. Details of examples of empirical investment research in such cases are given in Asako, Kuninori, Inoue and Murase (1991).

1.2 Hypotheses on Japanese Corporate Investment Behavior

We will now establish hypotheses related to the special features and changes in Japanese corporate investment behavior, particularly the "non-fundamentals" aspect, to be tested in estimating the investment equations in Chapter 3. The hypotheses comprise the following five issues. All have mutual interrelations as components of the provisional "Japanese corporate image" alluded to in the preceding chapter's analysis of macroeconomic aspects. But from the viewpoint of empirical testing, these hypotheses are independent of each other since they are not derived deductively from original theoretical models. In Chapter 3, we will test and revise the hypotheses by using micro-level data, and thus reconstruct the final "Japanese corporate image" as a conclusion.

[Hypothesis 1] Long-term Perspective and Its Changes

In the past, investment focused on the pursuit of long-term profits and was not swayed by immediate differences and changes in underlying fundamentals (as a result, investment increased steadily). But with the recent stiffening of competitive pressure, investment projects are now screened carefully according to differences and changes in capital efficiency and profit margins (as a result, investment is suppressed and more unstable).

Our term "pursuit of long-term profits" is meant to be an issue of outward appearance, regardless of whether it means pure optimization activity as the exact opposite of myopia.

[Hypothesis 2] Growth Intentions and Their Changes

In the past, investment was undertaken not only to maximize shareholder profits, but also from the standpoint of growing the scale of the enterprise, including sales and market share, or supply responsibility based on customer trust (as a result, investment rose).[13] Recently, however, diffusion of the capital market principle has resulted in loss of scope for investment based on growth intent and supply responsibility, which does not always enhance shareholder value (and so investment is reduced).

[Hypothesis 2-1] The Model of Japanese Enterprises in Aoki (1988)

The Japanese enterprise is "a federated body in which a shareholder collective and an employee collective divide added value." Its management strategy tends to pursue high growth, rather than an enterprise dominated solely by shareholders seeking to maximize short-term stock price and one dominated solely by employees seeking to maximize their profit. If we assume schematically that the Aoki model of a federated body corresponds to the traditional Japanese corporation and a shareholder-dominated firm corresponds to the modern Japanese corporation, and suppose that other conditions are fixed, then investment rises at the traditional corporation, companies typically have a long history (number of years since establishment), decisions are made from the bottom up, and importance is placed on balancing investment among divisions.

[Hypothesis 2-2] Following and Emulating Investment Behavior and Its Changes

In the past, the Japanese style of business strategy based on boosting market share led to investment behavior that followed and emulated other companies, whatever the fundamentals and strategies of one's own company, and so investment rose by a corresponding amount. Recently, however, owing to the same causes as in Hypothesis 2, this style has been disappearing.

[13] Share expansion and supply responsibility are not short-term matters, but can be considered as being rationally carried out linked to long-term maximization of shareholder value. In that case, even if the capital market principle diffuses, changes in investment behavior will not be seen (the hypothesis is denied).

[Hypothesis 3] Certainty Tendency and Its Changes

Japanese corporations originally had a tendency to stress certainty over high earnings in their investment behavior because of the strong influence of banks on management. Recently, although the influence of banks has weakened, this tendency has become even stronger because the economic pie has stopped expanding and the markets have been taking a closer look at management results and financial conditions.

[Hypothesis 4] Influence of Internal Funds and Debt-Equity Ratios, and Their Changes

As we saw in the preceding chapter, trends in aggregated financial data of Japanese corporations showed that Phase 2 investment swelled beyond the trend of ROA, while the liquidity to capital stock ratio rose substantially in parallel. As mentioned briefly, if we agree that the availability of internal funds (the sum of cash flow in the current period and procurement by drawing down cash on hand) has a significant influence on investment level, then the welfare implications of this effect are the exact opposite depending on the financial status of the company.

In the first case, internal funds are limited while external funds incur extra costs due to information asymmetry and conflicts of interest among stakeholders, leading to under-investment in projects with positive discounted present value. In such a case, an increase in investment propelled by the accumulation of internal funds is desirable for the overall economy, and corporations with the institution to solve the agency problem, even with the same quantity of internal funds, can achieve higher corporate value.[14] Almost all theories and empirical research related to the effect of internal funds have assumed such financing constraints.

On the contrary, Jensen (1986) pointed out that plentiful internal funds enable all investment projects with positive discounted present value to be executed, and the remaining free cash is used for inefficient investment (negative present discounted value)15 by managers intent on scale expansion. In this situation, investment boosted by higher internal funds is the opposite of Case 1, and is not desirable for the economy as a whole.

An example of empirical analysis of the internal funds effect hypothesized in Case 1 is the famous 1988 study by Fazzari, Hubbard and Petersen (hereinafter abbreviated as "FHP") utilizing U.S. corporate micro-level data (financial data for 422 manufacturers over the period 1970-84). Its content was exhaustively explained in Asako, Kuninori, Inoue and Murase (1991), but in summary, it divides the analytical universe into three a priori classes by the degree of financing constraints they face, and estimates for each class the investment equations incorporating cash flow variables and stock variables that express internal liquidity. The result is that the greater a corporation's financing constraints, the greater its internal funds effect.

In this respect, Kaplan and Zingales (1997, hereinafter abbreviated as "KZ") used a portion[16] of the FHP sample and estimated investment equations by revising to more appropriate forms the *q* estimation method and the method of classification by degree of financing constraints. Their conclusion was contrary to FHP's, namely that the better the financial status of a company the greater the investment acceleration effect (the size of the coefficient on cash flow variables controlling *q*) of cash flow, and that investment-cash flow sensitivities are insufficient as a measure of financing constraints. In addition, Cleary (1999), using financial data for a large sample of 1,317 U.S. corporations (ex-financials, insurance and the like) over the period 1988-94,

[14] Jensen and Meckling (1976), for example, suggested the theoretical possibility that monitoring by banks can solve the agency problem, which had a major influence in forming the so-called "main bank theory."

[15] Jensen (1986) stated on page 323 that "Managers have incentives to cause their firms to grow beyond the optimal size. Growth increases managers' power by increasing the resources under their control. It is also associated with increases in managers' compensation."

[16] A group of 49 companies with the smallest dividend rates (the group that FHP thought of as facing the heaviest financing constraints).

obtained the same estimation results as KZ. The conclusion that the better the financial status of a company the higher its investment cash flow sensitivity is interpreted as supporting the assertions of Jensen (1986) related to the free cash effect.

The FHP-KZ dispute remains unresolved,17 but at least in respect of the Japanese investment jump that occurred in Phase 2, the free cash hypothesis seems to be more applicable than the financing constraint hypothesis, especially when we consider the large ROA decline thereafter. The empirical analysis undertaken below is not intended as a validation of both hypotheses, but by estimating micro-data based investment equations, and studying the sensitivity of investment to fundamentals along with the effects of debt-equity ratios and other financial matters, we will examine not only whether or not internal funds accelerate investment, but also their efficiency.

This report's hypotheses regarding the influence of internal funds and debt-equity ratios are as follows. The first is that independently of the financial status (financing constraint/abundant free cash) of the company, the abundance and increase of internal funds have the effect of accelerating investment. The second is that regarding the financing constraint hypothesis, the extent of the debt-equity ratio and its rise has the effect of holding investment back.18 The third is that, while internal funds boost investment, when sensitivity to fundamentals and the investment-limiting effect of liabilities are weak, then the free cash hypothesis holds true (i.e., inefficient investment is carried out). This case may be applicable to Phase 2.

[Hypothesis 5] Influence of Japanese Style of Corporate Governance Such As Main Banks and Stable Stockholding, and Their Changes

From the late 1980s to the early 1990s, there was heated debate about the effects of internal funds on investment, assuming the existence of information asymmetry and the agency problem. During this period Japanese corporations made huge investments and performed well, despite far higher debt-equity ratios than other leading advanced countries, and so attracted much research interest. To explain the miracle of Japanese corporations, researchers predicted that the Japanese style of corporate governance system, comprising main banks and stable stockholding, successfully controlled information asymmetry and the conflicts of interest among stakeholders, thus reducing the capital cost of investment and execution of optimal long-term investment (the so-called "Japanese-style enterprise" theory or the "Japanese style of corporate system" theory.

Many empirical studies were also carried out, such as that by Hoshi, Kashap and Sharfstein (1991, hereinafter abbreviated as "HKS"), using financial micro-level data for 145 Japanese manufacturers over the period 1977-82.[19] They divided their analytical universe into three groups: (1) Those clearly affiliated with "Keiretsu" (judged by main bank relations), (2) clearly independent companies, and (3) companies between the two. As with FHP, for each of (1) and (2) investment equations are estimated incorporating the cash flow variable. Because the internal funds effect detected in group (2) was not recognized in group (1), the conclusion was that the existence of main banks reduces agency costs and accelerates investment.

After the Bubble's collapse, however, the business performance of Japanese corporations worsened considerably, and those with high debt-equity ratios faced high capital costs demanded by banks and the markets, thus sending investment plunging. The emergence of this reverse

[17] Refer to Fazzari, Hubbard and Petersen (2000) and Kaplan and Zingales (2000).

[18] Because in the financing constraint hypothesis the higher the liability ratio (degree of dependence on external cash) the greater the agency problem, when raising new external funds either the procurement cost rises or the quantity obtainable becomes limited.

[19] Refer to Horiuchi and Hanazaki (2000) for a comprehensive survey of studies on the correlation between the states of financial intermediation functions like main bank relationship and managerial efficiency.

situation stopped the debate about the Japanese style of corporate system. Further, Hayashi in 1997 tested the existence of the internal funds effect in investment equations over the same 1977-82 period as in HKS, based on the sample in the 1991 study by Hayashi and Inoue, and concluded that differences in the internal funds effect do not stem from the existence or otherwise of a main bank relationship.

This report conjectures that the influence of the Japanese style of corporate governance, with its main banks and stable shareholders, has both merits and demerits, and is something that can change over time. We believe that the influence, if it exists, finds expression in differences in the investment promotion effect of internal funds and in the investment restraint effect of debt. Most previous studies, led by HKS, investigate whether or not influence is exerted in the "meritorious" aspects such as the easing of the agency problem, which causes financing constraints, thanks to the existence of main banks and stable shareholders, and accelerating investment with positive discounted present value. If such influence does exist, we would expect the effects of internal funds-driven investment acceleration and of liability-driven investment restraint to be smaller in companies with main banks and stable shareholders than in companies without them. But as has been previously noted, the internal funds effect is not caused solely by financing constraints; rather, in Japan's Phase 2, the free cash hypothesis appeared to hold true. Bearing this in mind, if a main bank uses appropriate monitoring to restrain managers from wasteful investment (the "meritorious" influence), then the internal funds investment acceleration effect in companies with main banks and stable shareholders would be smaller than in companies without them, as in the financing constraint hypothesis. Conversely, if an indulgent main bank's lending attitude and unprotesting stable shareholders lead to escalation of inefficient investment by managers intent on scale expansion to protect (the "culpable" influence), then the acceleration effect in companies with main banks and stable shareholders may be even larger than in companies without them.

2. Characteristics of Micro-level Data Sets

In this section we will explain the construction of individual company data sets necessary to test the foregoing hypotheses. The sets comprise corporate financial data and the results of the attitude survey related to investment behavior.

2.1 Analytical Subjects

In estimating investment equations by micro-level data, analytical subjects are usually limited to manufacturers (or some segment thereof).20 The reasons for excluding non-manufacturers are not clear, but it can be surmised that their business and financial data variability is wider than that of manufacturers, and especially in estimations based on precise theoretical models as q, the results are unstable and interpretation is difficult. But in recent years non-manufacturers' investment has been roughly double that of manufacturers, and we cannot exclude them from our analytical subjects[21] for a comprehensive explanation of Japanese corporate investment behavior in and after the 1980s. We therefore explore the special characteristics that are robustly observed to be common to all, even with non-manufacturers' wide variety and heterogeneity. As we give greater priority to breadth of analytical subjects, our investment equations mentioned later unavoidably depart somewhat from the *q* model. But in view of various limitations such as the historical or book price base of the original financial data and the arbitrariness of accounting methods (changes in account settlement policy and accounting methods), our approach is a valid

[20] The aforementioned Cleary (1999) is one of the few exceptions.
[21] Only finance and insurance are excluded, because their data are highly specialized.

one.

The analytical time frames follow those of Chapter 1, in which we established three periods for examination of the special features of macroeconomic investment: Phase 1 (FY 1982-86), Phase 2 (FY 1988-92) and Phase 3 (FY 1994-98) – each of five years, with intervals of one year. We will estimate investment equations for each, and analyze their characteristic features and changes.

2.2 Constructing the Basic Data Set from Corporate Financial Data

Regarding the corporate financial data set (hereinafter called "the basic data set"), we depend on The Development Bank of Japan's database that contains the financial report-based unconsolidated accounting data of about 3,100 domestic listed and publicly traded companies, excluding financial and insurance firms.[22] Because analytical data are limited to those easily obtainable for listed and publicly traded companies, as in other leading studies, it must be remembered when interpreting the estimation results for Japanese companies as a whole that the sample is biased.

The sample includes data on companies newly listed and taken public, and those delisted and removed from OTC registration. In other words, the analysis was undertaken on an unbalanced panel, with different numbers of cross section data (number of companies) for each fiscal year. This was because when analyzing the same companies over the target period (this type of data set is called an balanced panel), changes in the industrial structure and the tendency of rising new companies during the period cannot be taken account of. Further, the problem of survival bias, namely that the only companies eligible are those that survive competition and maintain their listings, arises.[23]

The data of the companies that close their accounts in months other than March are treated as being of the fiscal years to which their accounting year-end months belong (for example, a term from April 1980 to March 1981 becomes the data for FY 1980). But companies with multiple accounting year-ends due to accounting term changes are excluded from the samples for that fiscal year and the next. The "regularization" alternative is widely used when handling companies that change their fiscal year-ends, the longer period being used and profit/loss statement items converted to the full-year (12 months) basis. But we find scattered instances of clear seasonality in numbers due to the industrial characteristics and of special accounting treatment prior to accounting period changes, which can easily result in abnormal values, so regularization has not been undertaken in this report. Hence, whereas in other studies to build the aforementioned "balanced panel" data sets, companies that change their fiscal years even once during the analytical period are excluded from the sample for the entire period, in this report, to maximize information, we have chosen to exclude from the sample only the period on which the fiscal year change has a direct influence, since excluding the following fiscal year leads to abnormal growth rate values.[24] In the case of mergers (only those of listed or publicly traded companies), moreover, in "regularization" by summing the pre-merger numbers of both

[22] Those listed on the first and second sections of the Tokyo, Osaka, Nagoya and other regional stock exchanges, and those registered over-the-counter. Recognition by the existence of securities reports includes some companies just prior to listing or public trading, but not those on markets established after the analytical period (Mothers, NASDAQ Japan). The number of companies trended up, from no more than 1,615 in FY 1980 to over 3,000 recently (maximum of 3,099 in FY 1997). Data on company ages (the number of years since establishment) not included in the Bank's database were obtained from Tanaka (2000).

[23] Balanced and unbalanced types should be differentiated by the analytical objective; it is meaningless to say that the unbalanced type is always superior.

[24] Concern over exclusion from the sample arises because dropping the data for large corporations affects the whole. But in regard to the variables in our estimation, it is necessary to use ratios to standardize processing in order to eliminate the influence of corporate size. Therefore, we believe that there is no major distortion in the estimate results.

companies it is difficult to adjust for business relationships; as in fiscal year changes, therefore, they are excluded from the sample in the fiscal year of the merger and in the following year, and the pre- and post-merger companies are treated as entirely different entities.[25] New exchange listings and companies newly taken public are added to the sample starting with data for the preceding two fiscal years, to enable the year-to-year growth rates of the previous term to be computed.

2.3 Generating the Combined Data Set by Adding Results of Corporate Investment Attitude Survey

Matters related to the long-term perspective, growth intentions, following and emulating with others, pursuit of certainty and other investment determinants and strategies are not only surmised indirectly from movements of the amounts of investment and financial data; direct surveys of corporate attitudes can be used in our estimation to enable a more multivariate study. An example of research using questionnaire surveys to estimate investment equations is Guiso and Parigi (1999). With the principal Italian manufacturers as their subjects, in their analysis of the influence of demand uncertainty on investment they used as indicators of uncertainty the data of "subjective probability distribution of the evolution of the future demand for its product" found in the Bank of Italy's survey of investment in manufacturing, and obtained very interesting results.

As special research within its investment planning studies, The Development Bank of Japan in October 1999 released its "Results of corporate investment attitude survey."[26] This survey covered 3,302 companies capitalized at ¥1 billion or more, excluding financial and insurance firms, as did the survey on planned capital spending. Of these, as many as 2,113, or 64%, gave useful responses. The survey was designed to elucidate the present condition of and changes in investment behavior as the background of investment restraint in recent years,[27] a survey which had many points in common with this report.

Here we generate "the combined data set" by incorporating the results of the survey's question topics "II. Investment decision-making criteria and its changes" and "IV. Points at issue in causes of Japanese corporate investment acceleration in the 1980s"[28] as dummy variables into our basic data sets. The survey's questions gave two choices for each topic: Which applies more to your company now?, and, Which applied more in the 1980s? In relating the answers to the three analytical periods, responses related to "the 1980s" were considered to apply to Phase 1 (FY 1982-86) and Phase 2 (FY1988-92) in common, while answers related to the "present" were assumed to come under Phase 3 (FY 1994-98).

The correspondence between topics II and IV above and this report's hypotheses is as shown in Table 2-1. Although the survey's question topics were not prepared with this report in mind, the correspondence is self-evident from the explanations so far. It is not necessarily self-evident in relation to question II-1b, but as questions II-3a and 3b are assumed to be "Non-quantitative judgment factors", question II-1b is also considered to correspond to Hypothesis 2.

Table 2-1. Correspondence Between Investment Behavior Attitude Survey Results

[25] Given the special difficulties attendant on mergers with non-public companies, sales of business divisions, internal company spin-offs and the like, no adjustments are made for such cases.

[26] See pp. 36-42 of The Development Bank of Japan (1999).

[27] The main concern of this survey is not a simple decline in the amount of investment, but a structural tendency of increasing caution in investment behavior compared to the trends in cash flow and investment profitability. Hence even in the present situation of recovery in the amount, the basic perception is unchanged.

[28] The attitude survey did not necessarily cover listed and publicly traded companies, so the sample number obtainable from both financial data and attitude survey results was even recently about 1,000 companies.

(Question Topics Excerpts from Related Segments Only) in The Development Bank of Japan (1999)) and This Report's Hypotheses

II. Investment decision-making criteria and its changes
(Select the alternative that is closer to your company's decision-making criteria in consideration of inter-divisional investment allocation and individual investment proposals.)

II-1. Decision-making style and basic criteria

II-1a. Decision-making style regarding important investment projects → **Corresponds to Hypothesis 2-1**

Choice 1: Top down (other things being equal, there is a strong tendency for managers to exercise their guidance authority)
Choice 2: Bottom up (other things being equal, there is a strong tendency to attach importance to opinions of workers on the spot)

II-1b. Basic criteria for judgment in prioritizing investment projects → **Corresponds to Hypothesis 2**

Choice 1: In principle, depends on quantitative evaluation (profit margin, recovery period, etc.) of investment profitability
Choice 2: Many factors other than quantitative evaluation of investment profitability are taken into consideration (qualitative factors that are not quantifiable)

II-2. Criteria for quantitative evaluation of investment profitability

II-2a. Long-term growth or short-term profit? →**Corresponds to Hypothesis 1**

Choice 1: Pursue long-term profit, prioritize high growth even if profit is low for the time being
Choice 2: Even if growth potential is limited, prioritize rapid improvement of earnings

II-2b. High earnings or low risk? → **Corresponds to Hypothesis 3**

Choice 1: There is earnings variability risk, but prioritize business for which high average profit margins can be expected
Choice 2: Even if profit margins are somewhat low, prioritize business with high certainty

II-3. Judgment factors other than quantitative evaluation of investment profitability (when Choice 2 for question II-1b is selected)

II-3a. Diversified or concentrated? → **Corresponds to Hypothesis 2-1**

Choice 1: To improve workers' morale and to diversify all-company business risk, inter-division balance is considered
Choice 2: Concentration of management resources in priority divisions

II-3b. Mindful of other companies or independent? → **Corresponds to Hypothesis 2-2**

Choice 1: Do you follow or emulate other companies' investments for capacity increases and R&D?
Choice 2: Regardless of other companies, do you judge according to your own company's investment criteria?

IV. Points at issue in causes of Japanese corporate investment acceleration in the 1980s
(For each point, select the answer that is closer: It is a cause of investment acceleration, or not particularly related.)

Point a: Ease of fund procurement due to existence of main bank or main correspondent financial institution → **Corresponds to Hypothesis 5**

Point b: Long-term perspective because of existence of stable shareholders → **Corresponds to Hypothesis 5**

Point c: Long-term relationships of trust with business partners and customers → **Corresponds to Hypothesis 2**

Point d: Maintenance and expansion of sales and market share → **Corresponds to Hypothesis 2**

3. Evidence from Cross-tabulation of Financial Data and Survey Results

Of the survey respondents, about 1,000 companies sharing common financial data sets were listed or publicly traded. We cross-tabulated financial data and survey results, and observed the influence of good or poor management performance on investment behavior's special characteristics and changes. In the financial indicators subject to cross-tabulation, we selected FY 1998 ROA ((operating profit + interest and dividends received) / average of total assets at the beginning and end of the period), and the debt-equity ratio at the beginning of the period (liabilities / net worth) as representative of management results (flow aspect) and financial condition (stock aspect), respectively. Selecting boundary limit values for each indicator (4% and 2% for ROA, 100% and 300% for debt-equity ratios), we divided the sample into three approximately equal segments, and for each segment tabulated the survey responses. The results are shown in Table 2-2.

Table 2-2. Results of Cross-tabulation of Attitude Survey and Financial Data

1. Results of Cross-tabulation of Attitude Survey and ROA (return on assets)

How investment intentions should be determined, and their changes		ROA at beginning of FY 1998			Overall
		Under 100%	100-300%	Over 300%	
Bottom up (other things being equal, there is a strong tendency to attach importance to opinions of workers on the spot)	1980s	36.7%	42.1%	43.4%	40.7%
	Present	35.3%	36.9%	39.3%	37.2%
Many factors other than quantitative evaluation of investment profitability are taken into consideration (qualitative factors that are not quantifiable)	1980s	42.8%	45.9%	43.5%	43.9%
	Present	39.2%	39.7%	33.0%	37.0%
Pursue long-term profit, prioritize high growth even if profit is low for the time being	1980s	71.5%	74.1%	67.1%	70.6%
	Present	70.7%	64.8%	51.5%	61.8%
Even if profit margins are somewhat low, prioritize business with high certainty	1980s	70.2%	67.2%	60.7%	65.8%
	Present	72.7%	82.1%	78.6%	77.6%
To improve workers' morale and diversify risk, inter-division balance is considered	1980s	37.5%	32.5%	43.2%	37.8%
	Present	27.2%	18.4%	23.7%	23.4%
Follow or emulate other companies' investments for capacity increases and R&D	1980s	17.4%	30.4%	23.7%	23.5%
	Present	8.7%	14.8%	14.4%	12.4%
Points at issue in causes of Japanese corporate investment acceleration in the 1980s		ROA at beginning of FY 1998			Overall
		Under 100%	100-300%	Over 300%	
Ease of fund procurement due to existence of main bank, etc.	1980s	42.9%	52.5%	56.8%	50.8%
	Present	16.7%	21.8%	27.0%	22.0%
Long-term perspective because of existence of stable shareholders	1980s	21.3%	16.8%	23.9%	21.0%
	Present	18.8%	14.4%	21.5%	18.6%
Long-term relationships of trust with business partners and customers	1980s	47.7%	45.4%	51.4%	48.5%
	Present	44.4%	41.9%	46.5%	44.5%
Maintenance and expansion of sales and market share	1980s	81.7%	83.8%	85.3%	83.6%
	Present	74.4%	60.6%	59.9%	65.1%

2. Results of Cross-tabulation of Attitude Survey and DER (debt-equity ratio)

How investment intentions should be determined, and their changes		ROA at beginning of FY 1998			Overall
		Under 100%	100-300%	Over 300%	
Bottom up (other things being equal, there is a strong tendency to attach importance to opinions of workers on the spot)	1980s	36.9%	39.9%	46.0%	40.7%
	Present	35.3%	35.7%	41.6%	37.2%
Many factors other than quantitative evaluation of investment profitability are taken into consideration (qualitative factors that are not quantifiable)	1980s	43.1%	40.9%	49.3%	43.9%
	Present	39.3%	38.1%	32.9%	37.0%
Pursue long-term profit, prioritize high growth even if profit is low for the time being	1980s	71.3%	70.8%	69.4%	70.6%
	Present	66.9%	65.0%	51.4%	61.8%
Even if profit margins are somewhat low, prioritize business with high certainty	1980s	65.6%	66.7%	64.6%	65.8%
	Present	72.0%	76.6%	85.1%	77.6%
To improve workers' morale and diversify risk, inter-division balance is considered	1980s	33.0%	39.6%	40.4%	37.8%
	Present	23.5%	24.4%	21.3%	23.4%
Follow or emulate other companies' investments for capacity increases and R&D	1980s	17.2%	26.8%	25.3%	23.5%
	Present	9.5%	15.2%	11.0%	12.4%
Points at issue in causes of Japanese corporate investment acceleration in the 1980s		ROAat beginning of FY 1998			Overall
		Under 100%	100-300%	Over 300%	
Ease of fund procurement due to existence of main bank, etc.	1980s	41.0%	50.4%	62.1%	50.8%
	Present	14.4%	22.7%	29.1%	22.0%
Long-term perspective because of existence of stable shareholders	1980s	19.7%	22.5%	20.4%	21.0%
	Present	17.4%	21.3%	15.8%	18.6%
Long-term relationships of trust with business partners and customers	1980s	46.8%	48.8%	49.8%	48.5%
	Present	44.6%	45.3%	43.2%	44.5%
Maintenance and expansion of sales and market share	1980s	82.7%	85.6%	81.8%	83.6%
	Present	76.9%	65.1%	52.3%	65.1%

Remarks: Development Bank of Japan (1999), corporate financial data, others.
In this table, "Overall" denotes the result of the whole of the cross-tabulation sample, which is not the same as the results of the overall attitude survey.

Regarding the special characteristics seen in the cross-tabulation results, first we note that irrespective of management performance, there is a clear tendency of the changes in investment behavior. As for decision-making style and basic criteria, the rates of selection of "Bottom up," "Consideration of qualitative factors," "Pursuit of long-term profit," "Inter-divisional balance" and "Following and emulating other companies" have all declined since the 1980s, while only the rate for "Stress on certainty" has increased. All of these changes serve to restrain investment. Further, in regard to the causes of Japanese corporate investment acceleration in the 1980s, on all four points the selection rates declined, also signaling the emergence of a change to investment restraint.

A second characteristic is that the aforementioned tendency is stronger in the unsatisfactory management performance group (low return on assets, high debt-equity ratio), centering on topics related to investment decision-making criteria such as, "Pursuit of long-term profit, " "Stress on certainty" and "Maintenance and expansion of sales and market share." But regarding the effect of corporate governance organization – main banks and stable shareholders

– almost no differences were observed depending on the management performance.

In conclusion, the third characteristic is that in relation to the 1980s, the variations in investment behavior arising from management performance differences expanded, especially the portions related to investment decision-making criteria. Stated another way, the group of companies with poorer management efficiency and financial conditions were punished by unforgiving markets, and soon were forced to screen investment more stringently; aggregated investment was therefore held back and destabilized. The group with no management problems, on the other hand, saw no great changes in their Japanese-style "Pursuit of long-term profit" and "Maintenance and expansion of sales and market share" investment behavior. It is interesting to note that for the same "Japanese-style" element, the effect of main banks in accelerating investment declines considerably regardless of the management performance. To date, various components of the Japanese-style enterprise system have been debated as a single set under the fixed concept that "it was a good system up through the 1980s, but not during stiffer global competition in the 1990s, and the practice as a whole is likely to be abandoned". But the results of cross-tabulation challenge this concept, and suggest that the components should be distinguished from each other; structural and temporary, efficient and inefficient, pre-existing or not pre-existing. In the next chapter we will carry out panel data estimation of micro-level investment equations, to investigate not only the hypotheses set in the first section, but also to elicit suggestions resulting from these questions.

III Panel Data Estimation of Micro-level Investment Equations

1. Specification of the Empirical Model and Estimation Methods

In this chapter we will estimate investment equations using micro-level data, and test a series of hypotheses related to the investment behavior of Japanese corporations. In this section, as preparation, we will select an appropriate empirical model and estimation methods, bearing in mind the various forms of bias and noise in corporate financial data. As noted in the previous chapter, in this report's basic framework, in addition to the "fundamentals" of investment profitability as represented by *q*, we attached importance to the influence on investment levels of such non-fundamentals as the size of internal funds and the peculiarities of corporate governance. Accordingly, we will examine the selection of explanatory variables used in the estimation formulas by classifying them as "fundamental" and "non-fundamental." In this examination, reference is made to the 1997 study of Takeuchi and Hanazaki (hereinafter abbreviated as "TH"), which used individual company financial data for Japanese, U.S. and French manufacturers to estimate investment equations in the same form for each country, and from an international comparative standpoint to test hypotheses related to Japanese-style characteristics such as emulating behavior and long-term perspective.

1.1 Basic Framework of the Empirical Model

Our point of departure is the following investment equation based on the *q* model:

[1] $$I / K = \alpha + \beta q + \sum \gamma_i N_i$$

in which I: investment, K: capital stock at beginning of period, q: Tobin's q, and
N_i: non-fundamental explanatory variable

Assuming that adjustment costs of investment are expressed in the quadratic function of I/K, we obtain Formula [1][29] from corporate value maximization conditions related to capital stock K, and information about the fundamentals of investment profitability is concentrated in only one explanatory variable, q (marginal q). However, because marginal q as a shadow price of capital is a purely theoretical concept, expedients are required for use in empirical analysis. According to Asako and Kuninori (1989), the methods are broadly divided into two. One assumes equivalence of marginal q and average q (corporate value / current cost of capital) and uses average q instead, which can be derived from market capitalization and others. Another estimates marginal q from observed values of profit margins and discount rates on some assumptions. In estimating marginal q, however, market price information of balance-sheet items is necessary. For this reason TH, who used book value or historical cost-based corporate financial data, employed the latter concept but did not estimate marginal q. Instead, they made their estimation of investment equations using proxy variables for q's component elements (profit margins and discount rates) as fundamental explanatory variables (see pages 37-38).

This report, like TH, is based on book value or historical cost-based financial data and estimates investment equations using q's component elements as fundamental explanatory

[29] Refer to Asako and Kuninori (1999) for the process of deduction. Theoretically, being brought in from corporate value maximization terms is a correspondence relation between I/K and q, and there is no causal relation from q to I/K. Consequently, it is more precise to call Formula [1] an investment equation, not a function, but in this report the more familiar "function" is used in empirical analysis.

variables instead of *q* itself. In other words, we use the following form of equations:

[2] $$I / K = \alpha + \sum \beta_i F_i + \sum \gamma_i N_i$$

in which *I*: investment, *K*: capital stock at beginning of period, F_i: fundamental explanatory variable, and N_i: non-fundamental explanatory variable

As for the dependent variables, we use the book value-based *I*/*K*, denoted instead as I_{book} / K_{book} (the subscript *book* means book value), which can be derived from financial data as follows:

I_{book}: Net increase in the period's outstanding balance of tangible fixed assets (ex-land) + depreciation on the period's tangible fixed assets

K_{book}: Outstanding balance of tangible fixed assets (ex-land) at the end of the previous period

Because the I_{book} concept is "gross investment," depreciation is added back in. But there are no data on sales and disposals during the period, so revisions are not made. I_{book} / K_{book} may have a negative value, but in those cases it is treated as a loss value. Unless otherwise specified below, the entries are simply *I*/*K*.

1.2 Selection of Fundamental Explanatory Variables F_i

In the fundamental explanatory variables that are *q*'s component elements, TH too used *ROA*[30] as a proxy variable for the marginal profit of capital, and also incorporated the price-to-book ratio (*PBR* = ratio of stock market capitalization[31] to book value of net worth) and the real sales growth rate (*SGR* = sales growth rate adjusted for the 1990-based GDP deflator).[32] *PBR* and SGR are concepts more closely related to average *q* than to marginal *q*, and do not have a precise theoretical foundation. But the intention is to assure robustness suitable for estimation encompassing the widely diverse and qualitatively different data for non-manufacturers, through incorporation of a wide range of fundamental information.

ROA, *PBR* and *SGR* are all variables that impact positively on *q*, and its coefficients in respect of investment are normally expected to have a positive sign. But in the most extreme cases of the Japanese enterprise model wherein investment behavior is dominated mainly by non-fundamentals, the estimated coefficients are considered to become statistically insignificant or have a negative sign.

All of these variables use data from previous periods (the end of the previous period for *PBR*). Actually, in *q* model-based investment equation estimation, the question of when to use *q* (or its component elements) as an explanatory variable is not obvious due to the following two problems. The first is that in Formula [1], *I*/*K* and *q* are theoretically determined simultaneously, and even in Formula [2], which breaks *q* down into its components, there can occur a simultaneity bias in the ordinary least-squares (OLS) estimator. The second problem lies in the existence of a time lag (time to build) from the decision to invest to recognition as assets, with the length of lag diverging widely depending on the type and scale of asset (buildings, machinery, etc.). The time to build problem, moreover, makes it more difficult to resolve the simultaneity bias. The report chooses to use *ROA*, *PBR* and *SGR* data not for the current but for the previous period, in order to ease the simultaneity problem.

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[30] (Operating profit + interest and dividends received) / average of total assets at beginning and end of period. For the relation between the marginal profit of capital and the realized value of profit margin, see Asako and Kuninori (1989).

[31] Valued at the average of the period's highest and lowest stock prices.

[32] Here the real sales growth rate is taken as a proxy variable for the expected profit growth rate. The realized value of the profit growth rate has a higher conceptual conformability as a proxy variable than the real sales growth rate, but the problem of high volatility and red ink loss values led us to use the more stable sales growth rate.

The proxy variable used for discount rate is excluded from our explanatory variables. Although many previous studies including TH used the ratio of interest to interest-bearing liabilities (interest and discount fees paid / outstanding balance of interest-bearing liabilities) as the discount rate proxy variable, there are scattered cases of widening gaps between beginning- and end-of-period balances and the average balance during the period, owing to such causes as (1) short-term cash balance adjustments at the end of the fiscal year, (2) time slippage in interest payments based on special treatments related to deferred and accrued accounts, and (3) use of derivatives. The reasons for excluding the discount rate proxy variable are that it is especially easy for abnormal values to emerge in companies with small interest-bearing debt balances and in the non-manufacturers not analyzed in TH, and because no other appropriate proxy variables can be obtained.

1.3 Selection of Non-fundamental Explanatory Variables N_i

As non-fundamental variables unrelated to investment profitability, we used three based on the previous chapter's series of hypotheses about Japanese corporate investment behavior: The liquidity to capital stock ratio LNK, the debt-equity ratio DER and the company age AN.

LNK takes the sum of the previous year-end's liquidity on hand (cash and deposits + marketable securities posted under current assets) and the current year's cash flow (after-tax net profit – dividends and bonuses to directors + depreciation), standardizes it by the previous year-end's outstanding balance of tangible fixed assets (ex-land), and uses it as a proxy variable for internal funds in Hypothesis 433, so the coefficient's sign is expected to be positive.

DER is the previous year-end's ratio of liability balance to net worth, and is used as a variable to express the seriousness of the agency problem in Hypothesis 4. It is expected that if the agency problem exists, the sign of the coefficient will be negative. If, despite any positive influence exerted on investment by LNK the debt-equity ratio's coefficient is not statistically significant, it is considered that the internal funds effect will not be based on financing constraints, and instead Jensen's free cash hypothesis (in which surplus funds encourage inefficient investment) may emerge.

AN, the number of years since a company's establishment, is related to Hypothesis 2-1, wherein the older the company the greater the tendency to consider not only shareholders but also employee benefit in growth-oriented investment behavior (Japanese enterprise model of Aoki (1988)). If this is true, the coefficient's sign is expected to be positive. However, there is another aspect of corporate age, that is, the younger the company the greater its growth opportunities, thus pushing up its investment rate. If this aspect cannot be accounted for only by fundamental-related variables, the coefficient may become negative.

In addition to the foregoing, estimation combined with the investment behavior survey data introduces one serial dummy variable for each hypothesis (including its sub-hypotheses), as in Table 2-1. When multiple question topics correspond to a single hypothesis, while looking at the statistical characteristics of each we have used as explanatory variables the following five series to select only one which we believe best captures the essence of the hypothesis, or combined them.

(1) Growth Tendency Dummy *D20* (corresponds to Hypothesis 2): We attach 1 if the company answers to Question IV-d that focus on maintaining and expanding sales and market share drive investment acceleration, 0 otherwise. The sign of the coefficient is expected to be positive as a constant term dummy.

(2) Bottom Up Dummy *D21* (corresponds to Hypothesis 2-1): We attach 1 if the

[33] The financial balance (procurement, repayment) is not considered. The stock variable is incorporated in LNK, so the simultaneity bias problem can be ignored.

company chooses "bottom up" as its investment decision-making style in Question II-1b, 0 otherwise. The sign of the coefficient is expected to be positive as a constant term dummy.

(3) Following and Emulating Tendency Dummy *D22* (corresponds to Hypothesis 2-2): We attach 1 if the company chooses "following and emulating other companies" as a judgment factor other than quantitative evaluation of investment profitability in Question II-3b, 0 otherwise. The sign of the coefficient is expected to be positive as a constant term dummy.

(4) Certainty Tendency Dummy *D30* (corresponds to Hypothesis 3): We attach 1 if the company answers to Question II-2b that it gives priority to high certainty as a criterion for quantitative evaluation of investment profitability, 0 otherwise. The sign of the coefficient is expected to be negative as a constant term dummy.

(5) Main Bank, Stable Shareholder Dummy *D50* (corresponds to Hypothesis 3): We attach 1 if the company answers to Questions IV-a and IV-b that the existence of main banks (or main correspondent financial institutions) and stable shareholders accelerates its investment, 0 otherwise. As coefficient dummies for *LNK* and *DER*, we will investigate the role played by the Japanese style of corporate governance (main banks and stable shareholders) in relation to the influence on investment exerted by internal funds and debt-equity ratios (Hypothesis 4). If the impact of Japanese-style governance is a "meritorious" aspect, then the expected sign of the coefficient dummy for *LNK* is negative and that for *DER* is positive, and vice versa.

In the foregoing, we can consider constant dummies (1) to (4) as "Japanese-style special characteristics" related to criteria for investment choices, and coefficient dummy (5) as a "Japanese-style special characteristic" of the influence on investment of corporate governance.

1.4 Estimation Methods for Panel Data

Based on the foregoing specified formulations and variables, we will estimate investment equations for Phase 1 (FY 1982-86), Phase 2 (FY 1988-92) and Phase 3 (FY 1994-98) using the panel data constructed in the previous chapter.[34] In our estimation methods, the principal technique used is what is called panel analysis. In this, cross section and time series data are pooled without distinction as equal samples. Compared to using the ordinary least-squares method (plain OLS, hereinafter abbreviated as "POLS"), this enables us to take account of the peculiarities (individual effects) of each company (that is, cross section direction). In panel analysis, various models can be considered, but generally two are used: The fixed effect model (hereinafter "FE"), in which individual effects are considered to be shown in a constant term such as a corporate dummy variable, and the random effect model ("RE"), in which individual effects are assumed to be expressed by an error term. In cases wherein the cross section number of samples constitutes a huge volume of data, as in this report, there is almost no meaning in analyzing the differences between constant terms company by company, so RE is normally used. But when there are correlations between individual effects and explanatory variables, values of coefficients estimated by RE are no longer consistent estimators and therefore the use of FE is more appropriate. We arrive at our estimation by POLS, FE and RE, and use statistical verification techniques in relation to model selection. Where in the first place there are no special company-by-company special characteristics (individual effects) POLS is used, and where there

[34] Regarding dummy variables, the content of responses for the 1980s is treated as the data for Phases 1 and 2, and for responses related to the present is processed as Phase 3 data. This is as noted in the previous chapter when constructing the data.

exist individual effects but with correlation between explanatory variables we use FE; otherwise we use RE. These are the methods, thought to be optimum for each sample, used for the estimation results.

In the actual estimation process, we eliminate negative values that are never present in theory, and use all other data after logarithmic conversion of percentages (the original numbers for *ROA* and *SGR* are used as is). Including these points, the final definitions for all variables and estimation formulae are brought together in Table 3-1.

Table 3-1. Summary Table of Definitions of Variables and Estimation Formulas

1. Definitions of Variables

Dependent Variables

Designation	Name	Definition	Remarks
I/K	Investment ratio	(This period's net increase in tangible fixed assets balance (ex-land) + tangible fixed asset depreciation) / balance of tangible fixed assets at end of previous period (ex-land)	Logarithmic conversion of percentages

Explanatory Variables

a. Fundamentals-related (data for one previous period are used)

Designation	Name	Definition	Remarks
ROA	Return on assets	(Operating profit + interest and dividends received) / average of total asset balances at beginning and end of period	
PBR	Price book-value ratio	Average of highest and lowest stock prices in period x number of issued shares at end of period / balance of paid-in capital at end of period	Logarithmic conversion of percentage
SGR	Real sales growth rate	Nominal sales growth rate – growth rate of GDP deflator	

b. Matters Related to Non-fundamentals

Designation	Name	Definition	Remarks
LNK	Liquidity to capital stock ratio	((End-of-period balance of cash and deposits + securities posted as current assets) + (after-tax net profit – dividends and director's bonuses + depreciation)) / balance of tangible fixed assets (ex-land) at end of previous period	Logarithmic conversion of percentage
DER	Debt-equity ratio	Balance of liabilities / Net Worth, both at end of previous period	Logarithmic conversion of percentage
AN	Age of company	Fiscal year – year of establishment	Logarithmic conversion
D20	Growth tendency dummy	Companies that responded to Question IV-d (maintenance/expansion of sales and share is a cause of investment promotion) = 1, otherwise = 0	Constant dummy
D21	Bottom-up dummy	Companies that responded to Question II-1b (bottom-up selection) = 1, otherwise = 0	Constant dummy
D22	Following and emulating tendency dummy	Companies that responded to Question II-3b (following and emulating other companies) = 1, otherwise = 0	Constant dummy
D30	Certainty tendency dummy	Companies that responded to Question II-2b (selection of high priority to certainty) = 1, otherwise = 0	Constant dummy
D50	Main bank/stable shareholder dummy	Companies that responded to Question IV-a (existence of main bank, etc.) and Question IV-b (existence of stable shareholders) as investment promotion causes = 1, otherwise = 0	*LNK*, *DER* coefficient dummy

2. Estimation Formulas for the Basic Data Set (Note: Subscript *i* denotes individual company, subscript *t* denotes fiscal year (time).)

Least-squares Method

$$I/K_{i,t} = \alpha + \beta_1 ROA_{i,t-1} + \beta_2 PBR_{i,t-1} + \beta_3 SGR_{i,t-1} + \gamma_1 LNK_{i,t} + \gamma_2 DER_{i,t} + \gamma_3 AN_{i,t} + \varepsilon_{i,t}$$

Panel analysis (fixed effect model) α_i = fixed effect

$$I/K_{i,t} = \alpha + \beta_1 ROA_{i,t-1} + \beta_2 PBR_{i,t-1} + \beta_3 SGR_{i,t-1} + \gamma_1 LNK_{i,t} + \gamma_2 DER_{i,t} + \gamma_3 AN_{i,t} + \varepsilon_{i,t}$$

Panel analysis (random effect model) δ_i = random effect

$$I/K_{i,t} = \alpha + \beta_1 ROA_{i,t-1} + \beta_2 PBR_{i,t-1} + \beta_3 SGR_{i,t-1} + \gamma_1 LNK_{i,t} + \gamma_2 DER_{i,t} + \gamma_3 AN_{i,t} + \delta_i + \varepsilon_{i,t}$$

3. Estimation Formulae for the Combined Data Set

Least-squares Method

$$I/K_{i,t} = \alpha + \beta_1 ROA_{i,t-1} + \beta_2 PBR_{i,t-1} + \beta_3 SGR_{i,t-1} + (\gamma_1 + \gamma_{1d} D50) LNK_{i,t} + (\gamma_2 + \gamma_{2d} D50) DER_{i,t} + \gamma_3 AN_{i,t} + \gamma_4 D20 + \gamma_5 D21 + \gamma_6 D22 + \gamma_7 D30 + \varepsilon_{i,t}$$

Panel analysis (fixed effect model) α_i = fixed effect

$$I/K_{i,t} = \alpha + \beta_1 ROA_{i,t-1} + \beta_2 PBR_{i,t-1} + \beta_3 SGR_{i,t-1} + (\gamma_1 + \gamma_{1d} D50) LNK_{i,t} + (\gamma_2 + \gamma_{2d} D50) DER_{i,t} + \gamma_3 AN_{i,t} + \gamma_4 D20 + \gamma_5 D21 + \gamma_6 D22 + \gamma_7 D30 + \varepsilon_{i,t}$$

Panel analysis (random effect model) δ_i = random effect

$$I/K_{i,t} = \alpha + \beta_1 ROA_{i,t-1} + \beta_2 PBR_{i,t-1} + \beta_3 SGR_{i,t-1} + (\gamma_1 + \gamma_{1d} D50) LNK_{i,t} + (\gamma_2 + \gamma_{2d} D50) DER_{i,t} + \gamma_3 AN_{i,t} + \gamma_4 D20 + {}_{\gamma 5}\, D21 + \gamma_6 D22 + \gamma_7 D30 + \delta_i + \varepsilon_{i,t}$$

2. Estimation Results Using the Basic Data Set and Its Interpretation

In this section, we examine the estimation results for a large sample based on the basic data set. The number of samples after eliminating companies in the case of accounting term alteration, mergers, right after new listings and new public trading, loss values, etc., is a maximum of 2,845 in cross section (number of companies), which becomes 12,380 on pooling with time series (FY 1994-98). Estimated coefficient values with results of significance testing are shown in Table 3-2. The objective of this report's analysis is to examine special characteristics across industries, so the discussion focuses on estimation results derived from the all-industry data shown in Table 3-2, but for reference Table 3-3 shows estimation results for manufacturers and non-manufacturers.

2.1 Increasing Sensitivity to *ROA*

Looking at the coefficient on *ROA*, which is believed to be the most important of the fundamentals-related variables, we obtain significantly positive estimation values in all three phases. This shows that investment was carried out basically in accordance with the tendency of *ROA* or implied marginal profit of capital (Table 3-2). But note particularly the chronological changes in the size of the coefficient: Estimated values of the coefficient on *ROA* were 1.20 (0.77-1.62) for Phase 1, 2.96 (2.23-3.69) for Phase 2 and 5.05 (4.53-5.57) for Phase 3, i.e., the number increases each period by a statistically significant margin (the figures in parentheses are for the 95% confidence level, which also applies hereinafter), indicating that the sensitivity of investment to capital efficiency increased steadily. This tendency was almost the same for both manufacturers and non-manufacturers (Table 3-3). In other words, investment behavior moved away from seeking long-term profit regardless of differences and changes in capital efficiency, thus generally supporting Hypothesis 1 (long-term perspective and its changes). However, it is also clear that this phenomenon is not new to recent years, e.g., post-Bubble, which was never expected before estimating micro-level investment equations.

Table 3-2. Estimation Results Using the Basic Data Set

	Sign	FY 1982-86 (Phase 1)	FY 1988-92 (Phase 2)	FY 1994-98 (Phase 3)
ROA	+	1.20	2.96	5.05
		5.48 **	7.95 **	19.2 **
PBR	+	19.6×10^{-2}	-5.33×10^{-2} ×	13.7×10^{-2}
		10.8 **	-2.03 *	7.80 **
SGR	+	8.95×10^{-1}	0.00×10^{-1}	9.19×10^{-1}
		10.6 **	0.15	12.0 **
LNK	+	6.83×10^{-2}	17.6×10^{-2}	8.95×10^{-2}
		6.63 **	14.8 **	9.91 **
DER	−	-18.8×10^{-2}	-1.17×10^{-2}	-6.95×10^{-2}
		-16.8 **	-0.71	-6.39 **
AN	+	-8.11×10^{-2} ×	-13.1×10^{-2} ×	-0.09×10^{-2} ×
		-2.64 **	-3.59 **	-0.04
Model Used		RE	FE	RE
p-value of F test related to existence of individual effects		0.001	0.000	0.000
p-value of Hausman test's χ^2 statistic		0.801	0.001	0.122
Number of Valid Samples		7,578	9,172	12,380
Number of Companies (Maximum Values)		1,681	2,199	2,845

Remarks:

1. For definition of variables and estimation formulas, see Table 3-1.
2. The numbers in the upper segment of each cell are estimated values of the coefficient (a cross X to the right indicates that sign conditions are not satisfied), and those in the lower segment are t-values (a double asterisk ** to the right indicates the 1% significance level, a single asterisk * indicates the 5% level). As a result of the Breusch-Pagan and White tests, there is a high possibility of heteroscedasticity, so in calculating t-values we make use of the heteroscedasticity consistent standard error (HCSE) based on White's modification.
3. The abbreviations for the models used are POLS for the ordinary least-squares method, FE for the fixed effect model and RE for the random effect model. As the process of model selection we first perform an F test for the null hypothesis that the individual effect does not exist. If the hypothesis is rejected, we use panel analysis (FE or RE); if not, we use POLS. When panel analysis is used and we test (the Hausman test) for the null hypothesis that there is no specification error in RE, we select RE if the hypothesis is rejected and FE if it is not. Further, if in all tests the p-value does not amount to 0.05 (5%), the null hypothesis is rejected.

Table 3-3. Estimation Results Using the Basic Data Set, by Industry Category

Manufacturers

	Sign	FY 1982-86 (Phase 1)	FY 1988-92 (Phase 2)	FY 1994-98 (Phase 3)
ROA	+	1.79	2.96	6.03
		5.36 **	7.87 **	15.7 **
PBR	+	14.3×10^{-2}	-8.77×10^{-2} ×	6.97×10^{-2}
		6.43 **	-2.70 **	2.75 **
SGR	+	10.6×10^{-1}	5.88×10^{-1}	10.1×10^{-1}
		8.33 **	4.87 **	7.54 **
LNK	+	10.1×10^{-2}	18.7×10^{-2}	6.77×10^{-2}
		4.86 **	10.5 **	4.45 **
DER	−	-13.9×10^{-2}	2.24×10^{-2} ×	-2.92×10^{-2}
		-8.34 **	1.03	-1.64
AN	+	-9.69×10^{-2} ×	-7.00×10^{-2} ×	7.30×10^{-2}
		-2.93 **	-1.63	2.22 *
Model Used		POLS	FE	POLS
p-value of F test related to existence of individual effects		0.109	0.000	0.219
p-value of Hausman test's χ^2 statistic		—	0.000	—
Number of Valid Samples		5,140	5,829	7,189
Number of Companies (Maximum Values)		1,137	1,371	1,619

Non-manufacturers

	Sign	FY 1982-86 (Phase 1)	FY 1988-92 (Phase 2)	FY 1994-98 (Phase 3)
ROA	+	0.52	2.01	4.41
		1.14	4.30 **	10.1 **
PBR	+	17.5×10^{-2}	-1.67×10^{-2} ×	15.3×10^{-2}
		4.69 **	-0.52	5.46 **
SGR	+	5.96×10^{-1}	-0.02×10^{-1} ×	8.02×10^{-1}
		2.90 **	-1.24	6.91 **
LNK	+	8.05×10^{-2}	19.7×10^{-2}	13.2×10^{-2}
		4.57 **	13.8 **	9.96 **
DER	−	-17.5×10^{-2}	-1.67×10^{-2}	-3.44×10^{-2}
		-7.91 **	-0.79	-1.94
AN	+	-20.1×10^{-2} ×	-19.9×10^{-2} ×	-22.8×10^{-2} ×
		-3.68 **	-4.47 **	-5.78 **
Model Used		POLS	RE	RE
p-value of F test related to existence of individual effects		0.593	0.038	0.013
p-value of Hausman test's χ^2 statistic		—	0.143	0.383
Number of Valid Samples		2,438	3,343	5,191
Number of Companies (Maximum Values)		550	834	1,234

Remarks: See Table 3-2. The fiscal years are different for the maximum values of numbers of manufacturing and non-manufacturing companies, so the combined sums of both exceed the all-industry totals, even though the sampling population is exactly identical.

2.2 Uniqueness of Investment Behavior in Phase 2

Turning our attention to variables other than *ROA*, the uniqueness of Phase 2 becomes apparent. In Phases 1 and 3, *PBR*, *SGR*, *LNK* and *DER* all significantly satisfied the sign conditions. But in Phase 2, only the coefficient on *LNK* satisfied the sign conditions and was statistically significant. Further, the estimation value of the coefficient on *LNK* was prominently high at 17.6 (15.3-20.0) in Phase 2, compared to Phase 1's 6.83 (4.81-8.85) and Phase 3's 8.95 (7.18-10.7), indicating a remarkable degree of sensitivity. In its relation to Hypothesis 4 (influence of internal funds and debt-equity ratios, and its changes), we see in Phases 1 and 3 that an abundance of internal funds and its increase promote investment, and a high debt-equity ratio and its increase serve to restrain it, suggesting a financing constraint situation. In Phase 2, in contrast, while the result is the same in respect of an abundance of internal funds and its increase, the coefficient on *DER* is not statistically significant, the coefficient on *LNK* is significantly larger relative to other phases, and the values of fundamental variables *PBR* and *SGR* do not satisfy sign conditions and lose significance. In summary, the suggestion is that Jensen's free cash hypothesis applies. These special characteristics of Phase 2 are macro-level observation results and coordinated, and even when estimating by industry category are basically unchanged (Table 3-3).[35]

2.3 Testing the Existence of Internal Funds Effect

To test further the implications of the investment promotion effect of internal funds, we divided the sample corporations into two groups related to the degree of financing constraint, and assessed whether there are differences in the size of the coefficient on *LNK*. Specifically, we added the *LNK* coefficient dummy *Dnfc* to the estimation formula based on the basic data set. For the company group with debt-equity ratios less than 300% and a low probability of being faced with financing constraints, we estimated using *Dnfc* = 1, and for the group with debt-equity ratios exceeding 300% and a high probability of being faced with financing constraints, we used *Dnfc* = 0. If the financing constraint situation is predominant, the coefficient on *Dnfc* is expected to become negative (equivalently the coefficient on *LNK* will be larger for the group of companies with a high probability of being faced with financing constraints); conversely, the coefficient becomes insignificant or even significantly positive if the free cash hypothesis predominates.

The estimation results are shown in Table 3-4, with the coefficient on *Dnfc* significantly positive for all phases. Looking at the estimation values, 1.40 (0.16-2.65) for Phase 1, 4.02 (2.55-5.49) for Phase 2 and 4.11 (2.75-5.47) for Phase 3, we see that they become larger in and after Phase 2, especially large compared to the coefficient on *LNK* in Phase 3. As for the coefficient on *DER*, it was significantly negative in Phase 1, the same result as the estimation not including the coefficient dummy, while in Phases 2 and 3 different results were obtained (significantly positive /negative but not significant, respectively). Similarly, in the estimation for manufacturers and non-manufacturers, the coefficient on *Dnfc* was significantly positive for the most part and the overall tendency corresponds closely between both categories (Table 3-5).

[35] If we venture to cite the differences with all industries, the coefficient on *SGR* has a positive significance for manufacturers in Phase 2, and the coefficient on *DER* has no significance for either manufacturers or non-manufacturers in Phase 3. If, however, we consider that in Phase 2 even manufacturers' *PBR* has negative significance, and that in Phase 3 both of these industries significantly satisfy all sign conditions for fundamental variables, the uniqueness of Phase 2 remains unchanged.

Table 3-4. Estimation Results Using the Basic Data Set (with Coefficient Dummies)

		Sign	FY 1982-86 (Phase 1)		FY 1988-92 (Phase 2)		FY 1994-98 (Phase 3)	
ROA		+	1.17		2.90		5.00	
			5.36	**	7.80	**	19.0	**
PBR		+	19.4×10^{-2}		-4.15×10^{-2}	×	14.2×10^{-2}	
			10.7	**	-1.58		8.13	**
SGR		+	8.91×10^{-1}		0.00×10^{-1}		9.01×10^{-1}	
			10.5	**	0.18		11.8	**
LNK		+	6.33×10^{-2}		15.7×10^{-2}		6.44×10^{-2}	
			6.01	**	12.6	**	6.47	**
	Dnfc (coefficient dummies for companies with DER under 300%)	−	1.40×10^{-2}	×	4.02×10^{-2}	×	4.11×10^{-2}	×
			2.21	*	5.37	**	5.92	**
DER		−	-16.0×10^{-2}		5.84×10^{-2}	×	-1.62×10^{-2}	
			-9.61	**	2.67	**	-1.15	
AN		+	-8.03×10^{-2}	×	-13.3×10^{-2}	×	0.50×10^{-2}	
			-2.62	**	-3.66	**	0.21	
Model Used			RE		FE		RE	
p-value of F test related to existence of individual effects			0.001		0.000		0.000	
p-value of Hausman test's χ^2 statistic			0.705		0.001		0.137	
Number of Valid Samples			7,578		9,172		12,380	
Number of Companies (Maximum Values)			1,681		2,199		2,845	

Remarks: See Table 3-2

Table 3-5. Estimation Results Using the Basic Data Set (with Coefficient Dummies), by Industry Category

Manufacturers

		Sign	FY 1982-86 (Phase 1)		FY 1988-92 (Phase 2)		FY 1994-98 (Phase 3)	
ROA		+	1.75		2.88		5.94	
			5.26	**	7.69	**	15.4	**
PBR		+	14.1×10^{-2}		-6.77×10^{-2}	×	8.74×10^{-2}	
			6.33	**	-2.07	*	3.40	**
SGR		+	10.6×10^{-1}		5.82×10^{-1}		9.91×10^{-1}	
			4.36	**	4.94	**	7.37	**
LNK		+	9.27×10^{-2}		15.8×10^{-2}		3.76×10^{-2}	
			4.36	**	8.21	**	2.22	*
	Dnfc (coefficient dummies for companies with DER under 300%)	−	1.88×10^{-2}		3.87×10^{-2}		4.00×10^{-2}	
			2.34	*	4.29	**	4.02	**
DER		−	-10.3×10^{-2}		8.02×10^{-2}	×	0.90×10^{-2}	×
			-4.35	**	3.11	**	0.45	
AN		+	-9.61×10^{-2}	×	-7.41×10^{-2}	×	7.67×10^{-2}	
			-2.91	**	-1.73		2.34	*
Model Used			POLS		FE		POLS	
p-value of F test related to existence of individual effects			0.092		0.000		0.234	
p-value of Hausman test's χ^2 statistic			—		0.000		—	
Number of Valid Samples			5,140		5,829		7,189	
Number of Companies (Maximum Values)			1,137		1,371		1,619	

Non-manufacturers

		Sign	FY 1982-86 (Phase 1)		FY 1988-92 (Phase 2)		FY 1994-98 (Phase 3)	
ROA		+	0.54		1.70		4.39	
			1.18		2.29	*	10.1	**
PBR		+	17.7×10^{-2}		-5.70×10^{-2}	×	15.5×10^{-2}	
			4.73	**	-1.17		5.52	**
SGR		+	6.01×10^{-1}		-0.02×10^{-1}	×	7.92×10^{-1}	
			2.94	**	-0.59		6.83	**
LNK		+	8.45×10^{-2}		17.4×10^{-2}		11.6×10^{-2}	
			4.56	**	9.03	**	7.85	**
	Dnfc (coefficient dummies for companies with DER under 300%)	−	-1.17×10^{-2}	×	3.92×10^{-2}	×	2.76×10^{-2}	×
			-0.95		3.01	**	2.58	**
DER		−	-19.7×10^{-2}		5.93×10^{-2}	×	0.64×10^{-2}	×
			-5.84	**	1.58		0.27	
AN		+	-20.3×10^{-2}	×	-31.2×10^{-2}	×	-22.0×10^{-2}	×
			-3.71	**	-5.17	**	-5.56	**
Model Used			POLS		FE		RE	
p-value of F test related to existence of individual effects			0.605		0.022		0.013	
p-value of Hausman test's χ^2 statistic			—		0.007		0.488	
Number of Valid Samples			2,438		3,343		5,191	
Number of Companies (Maximum Values)			550		834		1,234	

Remarks: Remarks: See Table 3-2. The fiscal years are different for the maximum values of numbers of manufacturing and non-manufacturing companies, so the combined sums of both exceed the all-industry totals, even though the sampling population is exactly identical.

From the foregoing results we can infer the following three points. First, in all estimation periods, as in Kaplan and Zingales (1997) and Cleary (1999), the better a corporation's financial status the higher the investment sensitivity to internal funds, suggesting that even in Phases 1 and 3 the financing constraint situation is not clearly supported. Rather, there always exists the possibility of a liquidity surplus situation, which implies the potential free cash problem. In and after Phase 2 in particular, the liquidity surplus situation is more likely to dominate over the financing constraints situation.[36]

The second point is that in Phases 1 and 3, the coefficients on variables related to fundamentals such as *PBR* and *SGR* are significantly positive, and there is no further proof that the liquidity surplus situation was linked to inefficient investment; that is, the potential free cash problem emerged. In contrast, in Phase 2, in light of the loss of explanatory power of *PBR* and *SGR*, there is a high possibility that the free cash problem existed, as internal funds had a much greater effect in promoting investment than in other periods and so had a stronger influence.

The third point is that in the estimation not including coefficient dummies, in Phases 1 and 3 the coefficient on *DER* was significantly negative, which can be interpreted consistently with the above two points as follows. Namely, for the reason that the greater the pressure to pay principal and interest, the greater the caution about using internal funds for investment, in the estimation not including coefficient dummies the coefficient on *DER* becomes negative, and in the estimation including them the coefficient on *LNK* becomes smaller for the group having high

[36] This is not a denial of the financing constraint situation. Actually, companies in that situation are intermixed with those in a liquidity surplus situation, meaning that we cannot say that the financing constraint situation is dominant overall. If it is considered that this report's analytical universe is companies listed or publicly traded in and after the 1980s, this result should not be surprising.

debt-equity ratios. In Japanese-style financing, which demands that corporations possess certain amounts of cash and deposits or marketable securities as one type of collateral for bank loans, the appearance of this situation is not unnatural. The problem lies in whether the investment restricted by this mechanism was the efficient type that maximizes corporate value, or the inefficient type in which management pursues private benefit. Even if the coefficient on *LNK* is small for the high debt-equity ratio group, if the result is restriction of efficient investment, the effect is not one of debt-driven discipline but of a variant of the "financing constraint problem." The fact that in Phases 1 and 3 the coefficients of fundamental-related variables were all significant suggests that the characteristics of a metamorphosed "financing constraint problem" became more pronounced. We shall leave clarification of this point for future study.

2.4 Interpretation of the Coefficient on Corporate Age

Returning to estimation not including coefficient dummies, we see that the coefficient on *AN* was significantly negative in Phases 1 and 2, and negative but statistically not significant in Phase 3. There was thus no verification in relation to Hypothesis 2-1 on the effect that "the greater the age of a corporation, the stronger the tendency to consider not only maximization of shareholder benefits but also those of employees, boosting investment to that extent." Rather than a rejection of Hypothesis 2-1, however, this suggests that another characteristic of corporate age as a proxy variable for growth opportunities arose. In actuality, looking at estimation results by industry category, among manufacturers which are more mature in comparison to the non-manufacturing industry where there are fewer companies newly listed or publicly traded, we see in Phase 3 a positive significance for the coefficient on corporate age (Table 3-3). Regarding Hypothesis 2-1, we will test further estimation incorporating the results of the attitude survey.

2.5 Comparison of Manufacturers and Non-manufacturers

As we have seen, there are no great differences between manufacturers and non-manufacturers regarding the principal points at issue. But focusing on those differences, we note the following regarding the effect of fundamentals. Although differences in *ROA* and *SGR* are not statistically significant, for manufacturers the coefficient estimation values are consistently higher, while those for PBR are higher for non-manufacturers (though again the differences are not statistically significant). Broadly, we hypothesize that manufacturers are responsive to the immediate situation, and non-manufacturers to evaluation of their future potential. However, this conjecture needs to be verified separately.

3. Estimation Results Using the Combined Data Set and Its Interpretation

We now examine estimation results using a relatively small sample combining financial data and the results of the investment behavior attitude survey. The number of samples in cross section (number of companies) is a maximum of 1,038, and 4,620 on time series pooling (FY 1994-98), and was thus just over one-third the size of the estimation using the basic data set (financial data only). Estimated coefficient values with the results of significance testing are shown in Table 3-6. The estimation results of financial data-related explanatory variables show almost the same tendencies as estimation using the basic data set, and we believe that the sample bias arising from combination with the attitude survey can be ignored.

3.1 Testing Hypotheses on Japanese Style of Investment Decision-making Criteria

Looking at the estimation results of four constant dummies – growth tendency, bottom-up style of decision-making, following and emulating tendency, and certainty tendency – we observe overall that all of the coefficients on the four constant dummies satisfy the sign conditions

(certainty tendency is negative, all others positive), and are statistically significant in at least two phases. From this we infer the existence of Japanese special characteristics related to investment decision-making criteria, namely, the broad tendency toward higher investment by companies where there is focus on growth, bottom-up style of decision-making, and following and emulating tendency (Hypotheses 2, 2-1 and 2-2), but lower investment among companies focusing on certainty (Hypotheses 3).

Table 3-6. Estimation Combining Financial Data and Attitude Survey Results

		Sign	FY 1982-86 (Phase 1)	FY 1988-92 (Phase 2)	FY 1994-98 (Phase 3)
D20	(Growth tendency dummy)	+	8.77×10^{-2}	7.60×10^{-2}	15.3×10^{-2}
			2.32 *	2.19 *	4.52 **
D21	(Bottom-up dummy)	+	1.34×10^{-2}	6.80×10^{-2}	11.3×10^{-2}
			0.49	2.50 *	3.46 **
D22	(Following and emulating tendency dummy)	+	17.3×10^{-2}	11.8×10^{-2}	4.77×10^{-2}
			4.41 **	2.48 *	0.86
D30	(Certainty tendency dummy)	−	-9.73×10^{-2}	-7.24×10^{-2}	-12.7×10^{-2}
			-3.44 **	-2.58 *	-3.33 **
ROA		+	1.28	4.49	5.77
			3.11 **	11.2 **	9.06 **
PBR		+	18.2×10^{-2}	-2.68×10^{-2} ×	12.7×10^{-2}
			6.89 **	1.00	3.45 **
SGR		+	8.77×10^{-1}	-0.00×10^{-1} ×	9.58×10^{-1}
			5.51 **	-0.74	4.01 **
LNK		+	5.92×10^{-2}	18.0×10^{-2}	7.21×10^{-2}
			3.33 **	13.4 **	3.77 **
	D50 (Main bank, stable shareholder dummy)	−	0.67×10^{-2} ×	-0.22×10^{-2}	7.06×10^{-2} ×
			0.18	-0.08	1.34
DER		−	-21.2×10^{-2}	-3.23×10^{-2}	-8.74×10^{-2}
			-10.5 **	-1.75	-3.73 **
	D50 (Main bank, stable shareholder dummy)	+	-2.53×10^{-2} ×	-0.38×10^{-2} ×	-5.89×10^{-2} ×
			-0.80	-0.15	-1.39
AN		+	-3.96×10^{-2} ×	-4.99×10^{-2} ×	-20.2×10^{-2} ×
			1.00	-1.26	-3.63 **
Model Used			POLS	RE	FE
	p-value of F test related to existence of individual effects		0.087	0.000	0.000
	p-value of Hausman test's χ^2 statistic		—	0.115	0.000
Number of Valid Samples			3,438	3,833	4,620
Number of Companies (Maximum Values)			751	897	1,038

Remarks: See Table 3-2

Looking now at individual special features for each, we see that the coefficient on growth tendency dummy is statistically significant for all phases, with estimation values (those in parentheses are for the 95% confidence level; the same applies hereinafter) of 8.77 (1.35-16.2) for Phase 1, 7.60 (0.78-14.4) for Phase 2, and 15.3 (8.68-22.0) for Phase 3; the Phase 3 values are large but the differences are not statistically significant. The coefficient on bottom-up dummy is not statistically significant for Phase 1, but is for Phases 2 and 3; as we would expect, the Phase 3 values are larger, but the differences among the estimation values are not statistically significant (Phase 2, 6.80 (1.46-12.1), Phase 3, 11.3 (4.90-17.7)). It is not correct to conclude from this that the so-called “Japanese characteristics” are becoming more pronounced, inasmuch as in the

previous chapter we saw that in both the growth and bottom-up types the Phase 3 selection rates declined in comparison to those of the 1980s (Phases 1 and 2). Consequently, even though Phase 3's coefficients are larger, this is not the overall trend; rather, it is more appropriate to interpret that the companies focusing on growth and bottom-up style at present have stronger tendencies than others. In contrast, the coefficient on following and emulating dummy was the exact opposite of that of the bottom up, being significant in Phases 1 and 2 – 17.3 (9.59-25.0) and 11.8 (2.47-21.1), respectively – and with values being larger in Phase 1, although the differences were not statistically significant. Phase 3's estimation values were not significant by themselves. The decline in the selection rate for following and emulating tendency reveals the weakening influence of this Japanese special characteristic compared to the 1980s. At first glance growth, bottom up and emulating appear to be similar modes of behavior, but the reason why the influence of emulating tendency alone has clearly weakened is thought to be closely linked to the recent abandoning of industry practices such as fixed market shares and strong regulatory guidance.

The coefficient on certainty tendency dummy was statistically significant for all phases. The estimation value for Phase 1 was–9.73 (-15.3 to -4.19) and for Phase 2 was–7.24 (-12.7 to -1.75). In comparison, the value for Phase 3 was larger (in absolute value) at –12.7 (-20.1 to -5.20), though the difference is not statistically significant. Despite the fact that in comparison to the 1980s the proportion of companies selecting certainty increased, it is noteworthy that this characteristic was not diluted. In other words, regarding emphasis on certainty of recouping investment, we believe that intensifying global competition and the consequent difficulty of forecasting the business environment have had a more pronounced effect as a "Japanese special characteristic" in comparison to the 1980s.

3.2 Testing Hypotheses on Influence of Japanese Style of Corporate Governance on Investment

Moving to the estimation results for the main bank/stable shareholder dummy, which is the coefficient dummy for *LNK* and *DER*, we see that none of the coefficient dummies are statistically significant. As for Hypothesis 4 (influence of internal funds and debt-equity ratios, and its changes), the estimation results using the basic data set of the previous section suggests that listed and publicly traded companies in their entirety have been in a situation of liquidity surplus rather than financing constraints during the 1980s and 1990s. Then in Phase 2, internal funds and the disappearance of investment restrictions of debt had a notable investment acceleration effect, and consequently abundant internal funds suggested the existence of the free cash problem that is linked to inefficient investment. Besides, the estimation results with the coefficient dummy of this section show that in such a situation, main banks/stable shareholders (more precisely, main banks/stable shareholders as investment accelerants) did not influence the acceleration effect of internal funds and the restrictive effect of debt. As for listed and publicly traded companies since the 1980s, if Japanese style of corporate governance played no role in resolving the financing constraint problem or preventing the free cash problem, neither did they worsen them; they were in fact generally neutral factors that had no influence.

Supplement: Testing the Existence of Free Cash Problem

The logic of the free cash problem is that, if a corporation already possesses ample cash for efficient investment, then an additional increase in internal funds will result in inefficient investment. By analyzing the empirical evidence, however, it is relatively easy to prove the proposition that "the increase in internal funds is used for investment" but it is difficult to examine whether or not a company "originally had ample cash to fund efficient investment." In previous studies as well, classification of a company's financial status continues to rely on trial

and error. In this report, the analysis was carried out with the debt-equity ratio as a proxy variable, leading to a tentative conclusion, so further verification is necessary.

In addition to refining our methods of classifying corporate liquidity situations, we can examine from individual corporate data the effects of investment on subsequent corporate performance. For reference here, we will use the same samples as in the panel analysis for a simple test following the tendency of the latter, and vis-à-vis FY 1998's *ROA* we will examine by cross section its correlation with investment behavior for each fiscal year since the 1980s. If we consider the number of years of useful life of facilities, those acquired in the first half of the 1980s are unlikely to have had any direct influence on FY 1998's *ROA*, but here we focus on whether or not the behavioral "pattern" exhibited in each fiscal year's investment is consistent with present *ROA*s (market evaluations).

Specifically, we will first conduct a regression analysis for each fiscal year t where the fixed dependent variable FY 1998's ROA_{98} is explained by standardized investment ratio $NIK_t = (I/K)_t - (I/K)_{80}$ as a single explanatory variable with a constant term. Standardization is required to control the industrial attributes (number of years of useful life of facilities, differences in growth potential, etc.) reflected in I/K and to educe only the portion related to pure corporate strategy. We take FY 1980, which is believed to be broadly neutral in respect of such major changes as the appearance and collapse of the Bubble, as the benchmark year. The estimation results are shown in Table 3-7 (estimation formula 1). Because this is a cross sectional analysis by each fiscal year, the estimation's performance in respect of statistic significance is not very good, but only over a seven-year period (FY 1986-92) centering on Phase 2 it is noteworthy that the sign of the coefficient became negative. Of course, changes in the industrial structure have led to great differences (negative correlation) between the former investment behavior (NIK_t) and the present market evaluation (ROA_{98}), but we would generally expect such tendency to become stronger with greater differences in time, and the positive values prior to FY 1985 are not in conformity.[37] Consequently, the FY 1986-92 coefficient suggests the special investment behavior characteristics of Phase 2, similar to the results of the macroeconomic analysis and panel analysis of micro-level data. This is supported by the fact that within the seven-year period FY 1991's estimation values were the largest and most significant.

Table 3-7. Correlations Between Each Fiscal Year's Investment Ratio and FY 1998's ROA

Estimation formula 1

$$ROA_{98} = \alpha + \beta NIK_t + \varepsilon \quad \text{in which } NIK_t = (I/K)_t - (I/K)_{80}$$

Note: *ROA* is expressed as a percentage, and *I/K* is a logarithmic conversion value of a percentage expression.

Estimation formula 2 (with an additional explanatory variable of previous period's *ROA*)

$$ROA_{98} = \alpha + \beta_1 NIKR_t + \beta_2 ROA_{t-1} + \varepsilon$$

Note: Regarding *NIKR*, we first compute the elements not explained by the previous period's *ROA* based on the results of panel data estimation and others, and then like *NIK*, take the differential relative to FY 1980. Others are the same as in estimation formula 1.

[37] Although FY 1981's coefficient estimate values are large and statistically significant, there is not much sense in seeking a reasonable interpretation for this because of the closeness to the benchmark year.

Overview of estimation results

Fiscal Year	Estimation Formula 1			Estimation Formula 2					
	NIKt			*NIKRt*			*ROAt-1*		
	Estimation Value	(t-value)		Estimation Value	(t-value)		Estimation Value	(t-value)	
97	2.92	(7.90)	**	2.59	(6.18)	**	0.015	(0.22)	
96	2.31	(3.37)	**	1.40	(2.56)	*	0.120	(3.32)	**
95	1.17	(2.41)	*	0.89	(1.82)	•	0.042	(2.02)	*
94	0.68	(1.79)	•	0.67	(1.69)	•	0.002	(22.7)	**
93	0.09	(0.23)		0.05	(0.12)		-0.002	(-0.21)	
92	-0.66	(-1.46)		-0.73	(-1.53)		-0.000	(-0.02)	
91	-0.97	(-2.14)	*	-0.97	(-1.98)	*	0.017	(1.27)	
90	-0.16	(-0.38)		-0.44	(-0.95)		-0.016	(-1.69)	•
89	-0.64	(-1.28)		-1.06	(-2.21)	*	0.024	(1.29)	
88	-0.39	(-0.70)		-0.72	(-1.30)		0.020	(0.77)	
87	-0.34	(-0.66)		-0.48	(-0.87)		0.048	(2.09)	*
86	-0.30	(-0.68)		-0.28	(-0.63)		-0.004	(-0.15)	
85	0.03	(0.04)		-0.52	(-0.99)		0.022	(1.39)	
84	0.65	(1.56)		0.53	(1.27)		0.037	(2.55)	*
83	0.37	(0.76)		0.26	(0.52)		0.083	(2.15)	*
82	0.15	(0.27)		0.21	(0.39)		0.071	(2.08)	*
81	1.35	(2.25)	*	2.36	(3.48)	**	0.088	(3.98)	*

Remarks
1. The shaded areas denote negative coefficient estimation values.
2. Two asterisks ** to the right of the t-value show the 1% significance level, one asterisk * the 5% level and a dot • the 10% level. As in Table 3-2, the heteroscedasticity consistent standard error (HCSE) is used in computing t-values.

Using only the analysis results of estimation formula 1, however, we cannot link the special characteristics of investment behavior of Phase 2 to the free cash problem, because we cannot remove the possibility that this phenomenon merely reflects changes in ROA, which is the most important determinant of investment level. If so, the special characteristics of Phase 2's investment behavior may merely reflect a completely changed result of the ROA or market evaluation itself, and not a change in the corporation's investment principles.

Next, we extract from the investment ratio I/K_t the components not explained by ROA_{t-1}[38] and, as with *NIK*, define as *NIKR* the standardized level of FY 1980. With $NIKR_t$ and ROA_{t-1} as explanatory variables, we then conduct another regression analysis using Formula 2 for each fiscal year t. Looking at the estimation results in Table 3-7, we see that, in the seven-year period in which the coefficient on *NIK* was negative, there were only three years in which the ROA_{t-1} coefficient was negative, whereas the $NIKR_t$ coefficient was negative in all fiscal years and was, moreover, statistically significant in FY 1989 and FY 1991. The special characteristics of investment behavior in Phase 2, in other words, were very likely caused by other than *ROA* changes, which supports the conclusion of the panel analysis that the free cash problem appeared in Phase 2.

[38] This is equivalent to the remaining difference after subtracting from I/K_t the panel analysis-derived ROA_{t-1} coefficient estimation value x ROA_{t-1}. The coefficient on ROA_{t-1} is fixed within each estimation period (phase), and we took the average of the beginning and ending of the estimation period as for the central year.

Conclusion

In this report we have sought to rearrange various points of dispute related to Japanese corporations' investment behavior, and have approached its special features and changes in and after the 1980s using both macro and micro-level data for a comprehensive verification. Although some issues related to further proof and empirical analysis methods remain to be improved, we review below the results and summarize Japanese corporate investment behavior centering on listed and publicly traded companies.

1. Japanese corporate investment behavior in the 1980s and 1990s has tended to increasingly reflect differences in ROA and their changes, and to focus on certainty of recouping investment. This has been a consistent metamorphosis, prompted by intensifying global competition and harsh business outlook, a shift in inter-company relations from informed mutuality to arm's length, and greater predominance of market evaluations of management results and financial condition.

2. This trend was disturbed by the special characteristics of investment behavior in the Bubble years. This was a long-lasting period of good business conditions and a financial environment that favored borrowers, thus causing the free cash problem which likely pushed up investment to inefficient levels. Unless this point is considered, a simple comparison of investment behavior in and after the Bubble may lead to overestimation of the magnitude of change. The characteristics of investment behavior today have more in common with those of the first half of the 1980s than the Bubble years.

3. Investigating the points of dispute regarding the Japanese-style enterprise theory for listed and publicly traded companies in and after the 1980s, we broadly confirm the existence in the 1980s of special characteristics related to such investment decision-making criteria as long-term perspective, growth and emulating tendency. A growth tendency and others also exert some influence at present. However, we were unable to confirm the influence of main banks and stable shareholders, i.e. the special characteristics of Japanese-style corporate governance. Therefore, following on from this report's analysis, we need to identify the various causes of the fixed concept of Japanese-style special characteristics in more detail, and investigate which of them are essential characteristics.

4. Regarding the major changes in investment behavior – pursuit of capital efficiency and stress on certainty – in light of the Japanese-style enterprise theory, we conclude that the former is a convergence toward worldwide trends (or, departure from the Japanese focus on long-term perspective and steady investment behavior), and that the latter is a strengthening of Japanese-style focus on certainty. The shift in investment behavior toward capital efficiency and pursuit of certainty is restraining and destabilizing investment during the transition process, and this influence is seen on macro-level investment as well. However, by improving the quality of Japanese corporations over the intermediate and long term, we anticipate that investment will flourish in growth fields.

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