Development Bank of Japan
Research Report
No. 23

Microstructure of persistent ROA decline in the Japanese corporate sector:
Inter-company disparities and investment strategies

March 2002

Economic and Industrial Research Department
Development Bank of Japan

Contents

Microstructure of persistent ROA decline in the Japanese corporate sector: Inter-company disparities and investment strategies

Summary

1. The stagnation in ROA (return on assets) and other asset profitability ratios of Japanese companies has been called into question reflecting the intensification of global competition and the harsh evaluation of the market in recent years. Their improvement has become perceived not only as an issue of management targets of individual companies but also as an issue in the revitalization of the macro-economy.

   In this report, we investigate the background of aggregated (overall corporate sector) ROA decline over a long time period based on listed company data from the micro perspective. We furthermore focus on the inter-company disparities thought to be the key to aggregated ROA improvement and empirically analyze their characteristics and relationships to capital investment strategies.

2. There has been a persistent trend of decline in the aggregated ROA of Japanese companies since the 1980s in both manufacturing and non-manufacturing industries.

   The transitions in ROA in Japanese, U.S. and German companies since the 1980s indicate that, aside from cyclical movements, the U.S. and Germany, unlike Japan, have generally maintained a certain level.

3. Based on corporate statistics, decade-long transitions in ROA by industry show that ROA declined in virtually all industries in both the 1980s and 1990s regardless of whether manufacturing or non-manufacturing, growth industry or not, regulated industry or not.

   Changes in ROA of all industries are decomposed into the contribution of ROA changes within individual industries ("within" effect) and the contribution of resource reallocation based on changes in the total assets weight between companies ("between" effect). It becomes clear that the "between" effect, in which a positive contribution would normally be anticipated, was small with the inclusion of some negative years and was essentially zero on average while the "within" effect was negative on average in both manufacturing and non-manufacturing industries.

4. The frequency distribution of ROA every five years of some 1,400 companies (common firms) listed continuously since the 1980s indicates that the distribution location shifted consistently to the left (low ROA), and that for the distribution configuration the breadth of the right-hand tail (high ROA) has been lost.

   Based on individual company data, unlike the situation of industry data near total collapse, 14% of the common firms experienced an increase in ROA even in the stagnant

1990s. However, that rate represents a broad decline compared to the 30% of the 1980s, and dynamism to create opportunities for profit has weakened. In addition, when comparing the transitions in ROA of all the listed companies, including those newly listed since the 1980s and those that delisted from the stock market, with the common firms base, it is possible to see an ROA boosting effect through new entries and exits, limited though it has been in scale.

5. There was a tendency toward an expansion in inter-company ROA disparities throughout the 1990s. Inter-company disparities are decomposed into disparities due to industry characteristics (variability between industries, namely, inter-industry variability) and disparities between companies within individual industries (variability within the same industry, namely, intra-industry variability). It becomes evident that variability within the same industry explains virtually everything, and expanded during the 1990s in most industries; however, there was also a considerable tendency toward a decline in ROA of the industry overall as the disparities expanded, suggesting that this was a disparity expansion in the direction of a decline in ROA (loss of profit opportunities).

   Changes in ROA of listed companies (common firms) overall are decomposed into the contribution of ROA changes of individual companies ("within" effect) and the contribution of resource reallocation due to changes in total assets weight between companies ("between" effect). The "within" effect, which accounted for the majority, was negative on average while the year-by-year contribution of the "between" effect was small, though a consistent positive tone was evident unlike the breakdown by industry. By company level, the shift of the total assets weight (resource reallocation) to companies with high ROA supported the ROA of the macro-economy, though not greatly.

6. The differences between the ROA of individual companies and the industry average are defined as excess profit rate. A certain degree of persistence is observed in time-series transitions of the excess profit rate, i.e., inter-company disparities in ROA.

   Such persistence strongly suggests that inter-company disparities in ROA are mainly due to firm-specific factors such as capital investment strategies. To examine this point, we extract the characteristics of investment strategies by the principal components analysis from the results of the Corporate Investment Attitude Survey released by the Development Bank of Japan in October 1999. The relationship to the excess profit rate is empirically investigated using the extracted data and the following can be pointed out. First of all, the characteristics that have had a crucial impact on ROA disparities are significantly related to the order of priority between qualitative and quantitative factors when making investment decisions. "Discretionary investment behavior" such as taking into account inter-divisionary balance, strategies of other companies and other qualitative factors, has had a negative impact on the excess profit rate, while "non-discretionary investment behavior" such as placing the priority solely on quantitative assessments of investment profitability, has had a positive impact. In this respect, so-called Japanese-style management that is closely related to "discretionary investment behavior" has not been effective at least since the 1980s. Secondly, no significant relationship was observed between excess profit rate and characteristics such as risk preference (low-risk or high-return) or attitude toward sales or market share. In this sense, there have not been any particular problems with "Japanese-style" investment decisions (low risk orientation and sales or market share orientation).

7. The expansion of the disparities between companies in the direction of increasing the ROA (creation of profit opportunities) can be seen as the key to realizing an enhancement of

aggregated ROA. The disparities in ROA between companies are largely attributable to disparities between companies within the same industry rather than disparities based on industry characteristics, that is, investment strategies and other individual company factors. Implementing quantitative assessments consistently in investment decisions is an especially crucial issue in ROA improvement.

It has become evident recently that the penetration of investment decisions based on quantitative assessments and a move toward restructuring operations and assets are also steadily accelerating in Japanese companies. It is anticipated that such changes in behavior will lead to aggregated ROA improvements not only through the enhancement of ROA of individual companies (enhancing the positive "within" effect) but also the shift of assets to companies that are more highly efficient ("between" effect).

Junichi Nakamura (e-mail: junakam@dbj.go.jp)

Introduction

The stagnation in ROA (return on assets) and other asset profitability ratios of Japanese firms has been called into question in recent years reflecting the intensification of global competition and the harsh evaluation of the market in recent years. Though an improvement in aggregated ROA (of the corporate sector overall) and the enhancement of the per capita welfare level are not always compatible propositions, it is probably natural that attention should be focused on the stagnation in ROA, a symbol of the efficiency and dynamism of the corporate sector (process of growth and culling through competition) when compared to the U.S., which enjoyed an unprecedented favorable business climate during the 1990s. Nevertheless, regardless of how strong that attention may be, it would seem that the empirical examination of the mechanism for aggregated ROA variability is still inadequate.

It is not necessarily appropriate to discuss changes in the ROA at an aggregated level, looking upon the overall corporate sector as if it were, so to speak, a single firm (or, in other words, setting up the hypothesis of the representative firm). First of all, since changes in aggregated ROA offsets changes of rise and decline on the corporate level, the more heterogeneous these individual changes (the greater the variance of the individual growth rates) become, the less representativeness there is. Secondly, ROA on the aggregated level does not consist only of changes in the ROA of individual firms but is also the result of the inter-company reallocation of resources (changes in individual weight of total assets) as well as new market entries and exits. Thirdly, the ROA of individual firms does not move in mutually independent directions. If one firm wins out in the competition and improves its ROA, there is a strong possibility that that will bring about a drop in the ROA of industry peers. On the other hand, an abrupt change in a number of firms to management that gives priority to ROA could possibly result instead in a decline in ROA overall due to the intensification of competition.

Taking these points into account, it is important when attempting to elucidate the mechanism behind aggregated ROA variability not only to look at the aggregate amount but also to use analysis procedures building from micro-data. Actually, the mechanism for variability in employment, productivity and the like using this approach has already become clear in the U.S.[1]

In this study, we clarify the actual situation surrounding the persistent decline in aggregated ROA since the 1980s (1980-99)[2] from the micro-structural perspective of ROA variability at the level of individual firms as well as inter-company ROA disparities and resource reallocation using broad-based panel data developed from financial data of 3,300 listed companies (excluding financial institutions and insurance firms) and the results of the Corporate Investment Attitude Survey released by the Development Bank of Japan in October 1999. We furthermore focus on the issue of inter-company disparities, the possible key to realizing improvement in the ROA hereafter, and empirically analyze the nature of this issue and relationship with investment strategies.

The study is organized as follows. In Chapter I, after pointing out the theoretical background and measurement issues relating analysis by ROA, we show some evidence of persistent ROA decline in Japan and confirm the crux of the problem using the aggregated data of the Corporate Statistics while exploring trends by industry and their implications. In Chapter II, we develop a framework for empirical analysis using individual corporate financial data and analyze the background of the persistent decline in aggregated ROA from the standpoint of microstructure, namely trends and disparities of individual ROA, the inter-company resource reallocation and so forth. In Chapter III, after once verifying a certain persistence in inter-

[1] Refer to Haltiwanger (1997, 2000) for a survey of research in this field.
[2] Refer to Nakamura (2000), p. 1, footnote 1, for the meaning of the analysis period of "since the 1980s."

company ROA disparities (excess profit rate), we combine that with the outcome of the above attitude survey and examine the correlation with investment strategies. In the Conclusion, we summarize the implications obtained from the outcome of empirical analyses of the persistent decline in the ROA and the direction leading to improvement.

I. Persistent ROA Decline of the Japanese Corporate Sector

1. Theoretical Background and Measurement Issues

In this study, we conduct analyses focusing solely on ROA (return on assets)[1] as a representative variable of corporate profitability and asset efficiency. From the standpoint of traditional corporate financial analyses, ROA can be thought of as the index that expresses in the most straightforward manner how effectively assets entrusted by investors (in the form of liabilities or shareholder capital) are being used. For example, since the level of ROE (return on equity)[2], frequently used in tandem with ROA, depends on the distribution of risk between creditors and shareholders through capital structure (the extent of leverage)[3], it is subordinate to ROA as an index expressing corporate profitability. In addition, due to the simplicity of ROA, it is readily available as data and also has the great advantage of lending itself well to empirical analysis through longitudinal data as in the present study.

It is also necessary, however, to keep the following points in mind in order to appropriately interpret the results of the analyses of this study.

a. Distortions in accounting data

Since ROA is calculated based on publicly released accounting data, it is difficult to avoid various distortions arising from the accounting system, taxation, discretionary accounting procedures and the like.

The effect of accounting and taxation systems is an especially great hindrance when making international comparisons and, as indicated in this chapter, statements based on comparisons of ROA level are extremely limited. However, from a different perspective such as, for example, comparisons of time-series transitions between countries, it becomes possible to extract implications in a form with few distortions. It could furthermore be said that fewer changes and differences in systems in time-series and cross-sectional comparisons within the same country, which is the primary purpose of the analysis of this study, will result in relatively fewer distortions than in international comparisons.

Discretionary accounting procedures (in which a choice of various accounting methods is available and their revision is also possible), regardless of how acceptable they may be in terms of accounting theory, are the cause of distortions when measuring true profitability. On the other hand, even if ROA varies due to the transfer of assets or liabilities to the off-balance sheet or other unsubstantial transactions[4], such variation will not be linked to changes in true profitability.[5] Nevertheless, even if it were possible to produce ROA with all of these distortions modified in analyses of individual firms, it would not be realistic in analyses of all listed companies as in this study. It would moreover be difficult to find a practical index as an alternative to ROA. Conversely, even with serious distortions in individual firm analyses, as long as they are not

---

[1] Though opinions regarding what to use in the concept of the profit as the numerator are not necessarily unanimous, based on the idea that it is gross profit obtained through the investment of total assets for distribution to the providers of total capital, it is appropriate to use profit before payment of interest and before taxes. In this study, in principle, business profit/loss (≡ operating profit/loss + interest dividends) is used.

[2] The general practice is to use current income after payment of interest and after taxes in the concept of the profit as the numerator in the form of returns to the equity provider.

[3] Refer, for example, to Kurosawa and Wakasugi (1982) for the general interpretation of this point.

[4] This applies to asset sale and lease back, debt assumptions and other similar transactions and the practices of accounting rules for account settlement manipulation using this type of substantial transaction are gradually becoming more strict.

[5] It seems, for example, that the use of a robust cash-flow based profitability index for certain settlement manipulations is increasing among investors and others; however, the acquisition of longitudinal data is not only especially difficult but, since noise cannot be eliminated completely, it cannot be considered suitable for the purposes of this study.

systematic in nature accompanying system revisions and so forth, they would present no particular problem in certain respects in analyses consisting of pooled data. Thus, in this study, these distortions in accounting are all deemed to be a part of the disturbance term (i.e., not engendering bias in a certain fixed direction) and analyses are conducted without the addition of any special modification of the ROA.

b. Microeconomics interpretation

Although it is clear that ROA must be improved intuitively in Japan, it would not likely be such a simple matter to provide a lucidly defined basis in economics for this insight. In terms of economics, ROA corresponds to average return on assets[6]; however, the goal of firms is to maximize firm value (current discounted value of firm profit in future years) and it is necessary to take note of the fact that the average return on capital is nothing other than the outcome.

It is possible, for example, to conceive of the following argument in opposition to the view that persistent ROA decline is a problem. Assuming the usual productivity function in which marginal productivity gradually decreases[7], if the capital-labor ratio (capital per worker) rises together with changes in the rate of time preference of consumers, the return on capital (both marginal and average) would drop[8]. The decline in the ROA under such circumstances is the natural consequence of the maximization of profit and attempting to increase the capital-labor ratio and enhance the return on capital means deviating from economic rationality. In addition, the real interest rate also declines along with the marginal return on capital; however, if this is the result of the maximization assuming a new consumer utility function, there is no problem in terms of economic welfare.

However, we should not overlook two important points. The first is that the level of the return on capital is not determined only by the factor input ratio (capital-labor ratio) but is also affected by total factor productivity (TFP)[9]. If we assume that the decline in capital productivity is due more to changes (decline) in the TFP than to changes in the rate of time preference, then consumer utility will decline together with the real interest rate. It would not be appropriate to claim at this time that there is no problem because the marginal conditions for the maximization of profit are satisfied. Likewise, increases in the ROA are also not caused solely by changes in the factor input ratio. If it is an increase in the ROA associated with an increase in the TFP, the level of welfare will be raised without any deviation from the marginal conditions.

The second is the possibility of a failure in maximization by misreading demand. In actual firm operations, it would be difficult to conceive that it is possible to fully foresee demand in relation to its own output and, looking at it after the fact, there is a strong possibility that marginal conditions will not be satisfied or that production will be implemented within a potential frontier. If the ROA declines as the result of such failures in maximization, that means profit and economic welfare are not maximized, and so its improvement is important.

In simple terms, the judgment of whether or not to see persistent ROA decline as a problem ultimately depends on which of the following two aspects has actual importance. These are, namely, the aspect of the optimization by the firm in regard to changes in the rate of time preference or labor supply and the aspect originating in management inefficiency such as TFP

---

[6] In economics, capital usually means tangible fixed assets but, here, it is also considered to include other corporate assets.

[7] In the production function $Y = F(K, L)$, decreasing marginal productivities means $\partial Y / \partial K > 0$, $\partial^2 Y / \partial K^2 < 0$, $\partial Y / \partial L > 0$, $\partial^2 Y / \partial L^2 < 0$. Note that this is not decreasing returns to scale $\lambda Y > F(\lambda K, \lambda L)$.

[8] ∵ marginal return on capital = marginal capital productivity – capital depletion rate (constant). Average return on capital also declines along with the decline in the marginal return on capital.

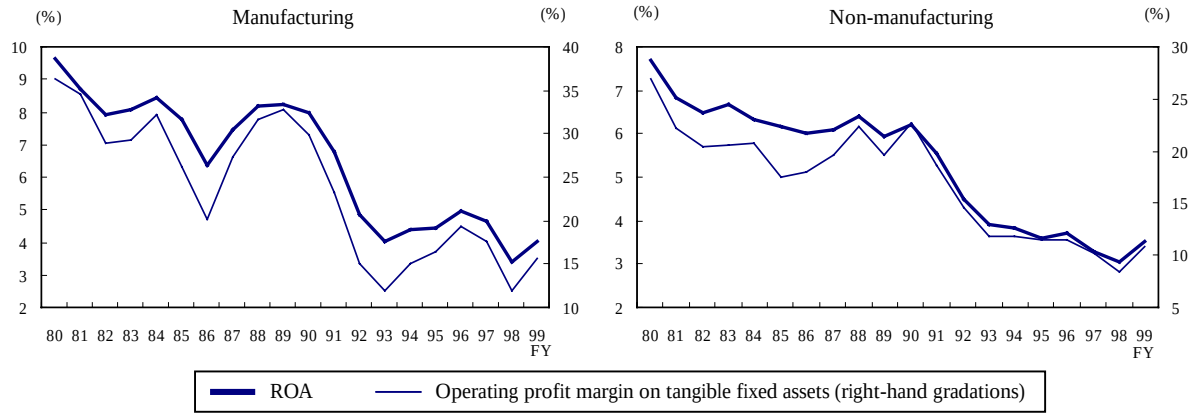
[9] Assuming the Cobb-Douglas production function $Y = AK^{\alpha}L^{1-\alpha}$ (A ≡ TFP), marginal capital productivity $\partial Y / \partial K = A\,\alpha\,(L/K)^{1-\alpha}$.

stagnation or misreading demand. Verifying this point based on data would in itself be a difficult task and would have to be seen as an issue for the future; however, the fact that corporations with high shareholding rate by foreign investors who are considered to engage in more rational and selective investment behavior than Japanese investors also have a high level ROA[10] can be considered strong supporting evidence that addresses the practical importance of ROA as an index of management efficiency. We proceed below with an analysis based on the general view that ROA decline is an expression of a decline in efficiency of the corporate sector.

2. Evidence from Aggregated Data

Aggregated ROA of Japanese corporations since the 1980s has continued a trend of decline in both manufacturing and non-manufacturing industries (Fig. 1-1). According to aggregate data of the corporate sector based on the Quarterly Report on Financial Statement Statistics of Corporations, ROA[11] indicating management efficiency of total assets showed a decline from 9.7% in FY 1980 to 3.4% in FY 1998 for the manufacturing industry total and a decline from 7.7% in FY 1980 to 3.1% in FY 1998 for the non-manufacturing total. This is a drop by more than half in both cases. Though this has improved somewhat since FY 1999 due to recovery in the business climate, excluding cyclical variation, aggregated ROA has maintained a consistent and clearly-defined downward sloping trend. Likewise, operating profit margin on tangible fixed assets excluding land as an index of management efficiency of real assets indicates a drop that is essentially the same as ROA. In spite of the many arguments pointing to the failure of financial management technology (*zai-teku*) at the time of the collapse of the bubble economy as the cause of ROA decline, it is evident from a long-term perspective that it is possible to conclude that it was primarily a decline in efficiency in real terms.

Fig. 1-1 Persistent ROA Decline in the Japanese Corporate Sector



Notes: 1. ROA = ordinary profit before interest payment/average total assets at the beginning and end of the term
2. Tangible fixed assets exclude land.

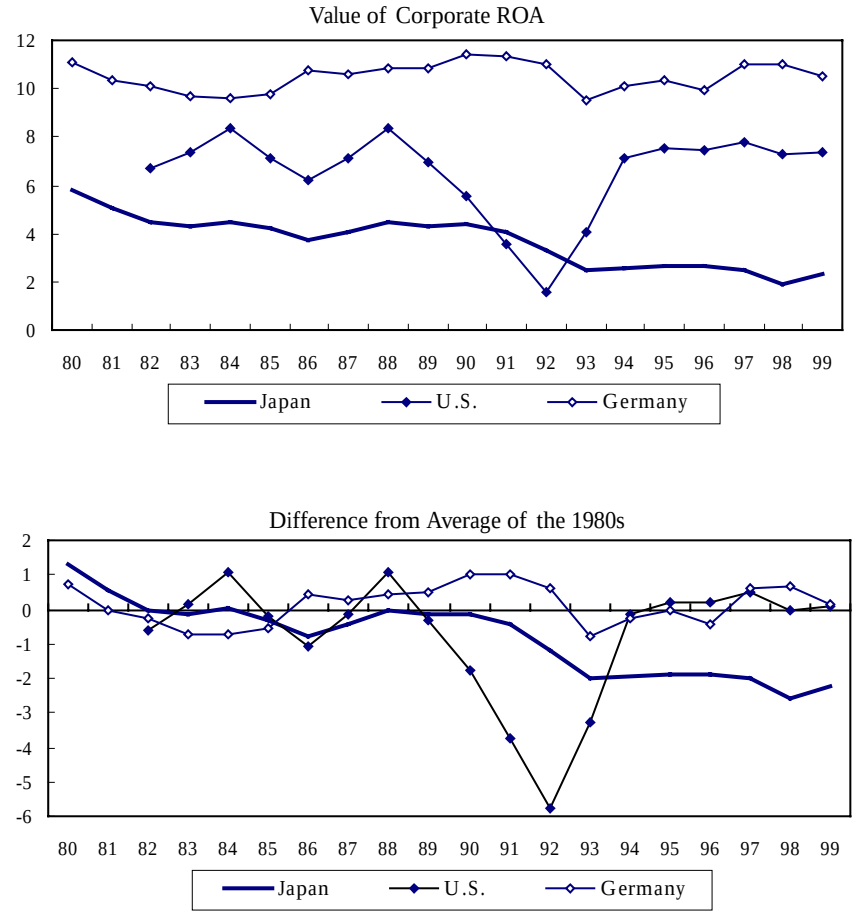
Source: Prepared based on the Quarterly Report on Financial Statement Statistics of Corporations (Ministry of Finance)

[10] Refer to Fig. 7, p.33, Maeda and Yoshida (1999).

[11] The definition of ROA used below is based in principle on (operating profit/loss + interest dividends)/average total assets at the beginning and end of the term; however, ordinary profit before interest payment/average total assets at the beginning and end of the term is used here due to limitations in quarterly Statistics of Corporations report data.

Next is a simple international comparison for the purpose of determining whether or not persistent ROA decline is a phenomenon unique to Japan. Transitions in aggregated ROA since the 1980s based on corporate statistical data from the U.S. and Germany[12] (Fig. 1-2) indicate that, while there was a temporary decline in the U.S. corporate sector together with the slowdown in the business environment at the beginning of the 1990s, there was a recovery by the late 1990s to about 7-8%, no less than that of the 1980s. Corporate ROA also recovered in Germany (former West Germany) after dropping immediately after the unification, reaching a stable level of some 10-11% by the late 1990s, a level comparable to the 1980s. Meanwhile, the ROA of Japanese corporations calculated according to the same criteria shows a consistent trend of decline from about 5% in the early 1980s to about 2% recently. Though we must avoid reaching the conclusion that the ROA in Japan is at a low level in a simple comparison of levels neglecting differences in the accounting rules, the range of aggregation and other factors, the slump in the Japanese economy is striking when compared to time-series transitions in other countries where this problem is not so serious (Fig. 1-3).

Fig. 1-2 International Comparison of Corporate ROA in Japan, the U.S. and Germany



[12] Since data limitations render it impossible to calculate ROA as defined above from Statistics of Corporations in the U.S. and Germany, we carried out the comparisons between Japan and the U.S. with ROA defined as operating profit and loss/average total assets at the end of the term and between Japan and Germany with current income before payment of interest and before taxes/total assets at the end of the term. Since differences in the accounting rules and the industries being aggregated still remain (refer to the diagram notes), comparisons of level are not possible in the strict sense.

Notes: 1. Due to data limitations, operating profit and loss/average total assets at the end of the term is used for comparisons between Japan and the U.S. and current income before payment of interest and before taxes/total assets at the end of the term is used for comparisons between Japan and Germany.
2. Not included are the financial and insurance industries in Japan, non-manufacturing industries other than the mining, wholesale and retail industries in the U.S. and non-manufacturing other than electricity, natural gas, water supply, mining, construction, wholesale/retail and transportation industries in Germany. In addition, figures for Germany are limited to corporations in the former West Germany only.
3. Not indicated due to the considerable discontinuity in ROA data in the U.S. prior to 1981 and the fact that 1999 ROA by industry in Germany has not yet been released.
4. Values for the period 1982-89 are used to determine the average for the 1980s in the U.S.

Source: Prepared based on the Annual Report on Financial Statement Statistics of Corporations (Japanese Ministry of Finance), Quarterly Financial Report for Manufacturing, Mining and Trade Corporations (U.S. Department of Commerce) and Monthly Reports (Deutsche Bundesbank, Germany). The term is fiscal year for Japan and calendar year for the U.S. and Germany.

3. Overview of Trends by Industry

Before proceeding with an analysis based on individual company data, we will give an overview of ROA trends by industry, the effects of changes in the industrial structure and so forth based on the Statistics of Corporations. Since aggregate data is used, there is the limitation of being unable to grasp internal trends within industries, though it does have the advantage of coverage that is wider than that of listed companies only when observing the relationship between the macro-level and industry level.

Aggregated ROA is equivalent to the weighted average of the ROA of each component element, such as individual industry or individual company (expressed by the subscript i; the superscript line expresses average) by weight W of total assets.

$$\overline{ROA} = \sum_i (ROA_i \times W_i) \quad \text{.....(1)}^{13}$$

The five charts, known as skyline charts because of their configuration, of Fig. 1-3 attempt to visually grasp the background of the decline of aggregated ROA since the 1980s. Charts (1), (3) and (5) express industry-specific ROA every ten years (FYs 1980, 1990 and 1999) (vertical axis) and the weight of total assets of individual industries in proportion to the sum of all industries (horizontal axis). Meanwhile, (2) and (4) express the breadth of decade-long changes in industry-specific ROA (vertical axis).

The major characteristic is the decline in ROA in virtually all industries during both the 1980s and 90s, as is evident in charts (2) and (4). Though the extent of the decline differs according to the industry, the important bottom line of manufacturing and non-manufacturing industry averages indicates that, while manufacturing industries managed to maintain a structure of relatively higher ROA, they kept pace with one another in declining during both the 1980s and 1990s. In other words, the direct cause of aggregated ROA decline since the 1980s is not the stagnation of those industries that have been dubbed the “losers” but is thought rather to be the overall deterioration.

[13] Derived as indicated below.

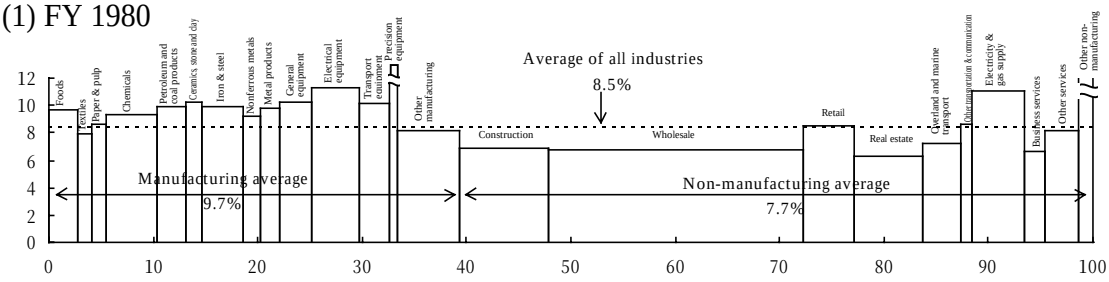
$\overline{ROA} = \Sigma_i E_i / \Sigma_i A_i = \Sigma_i (E_i / \Sigma_i A_i) = \Sigma_i ((E_i / A_i)(A_i / \Sigma_i A_i)) = \Sigma_i (ROA_i \times W_i)$

Where, E: operating profit/loss, A: total assets, W: total assets weight

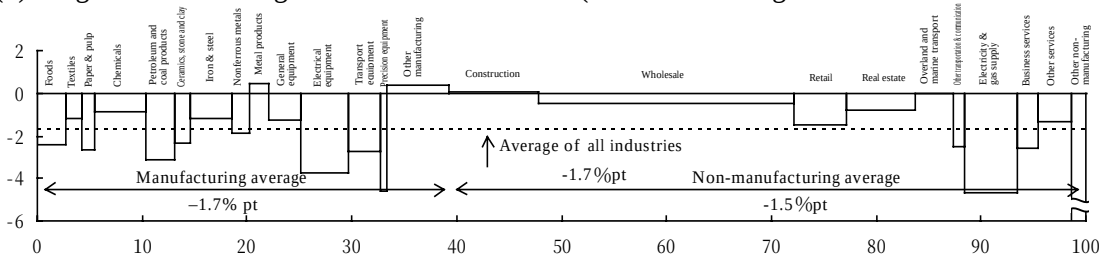
Fig. 1-3 Transitions in Industry-Specific ROA (skyline charts)

Vertical axis: ROA (%), horizontal axis: Total assets weight (%)

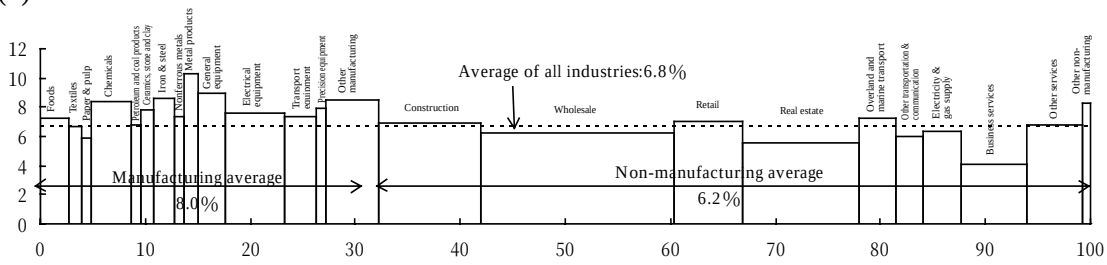
(1) FY 1980



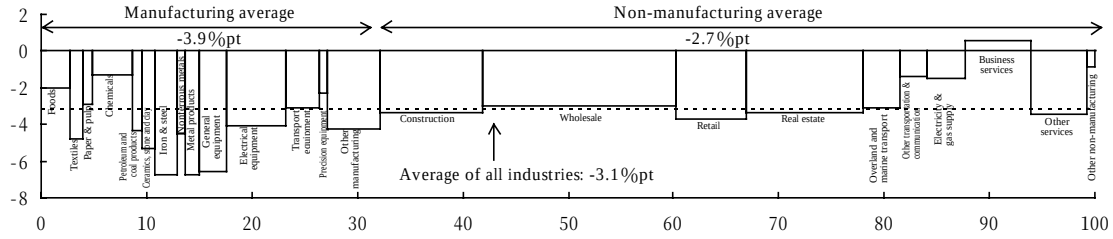
(2) Magnitude of change FY 1980 → FY 1990 (total assets weights are based on FY 1980)



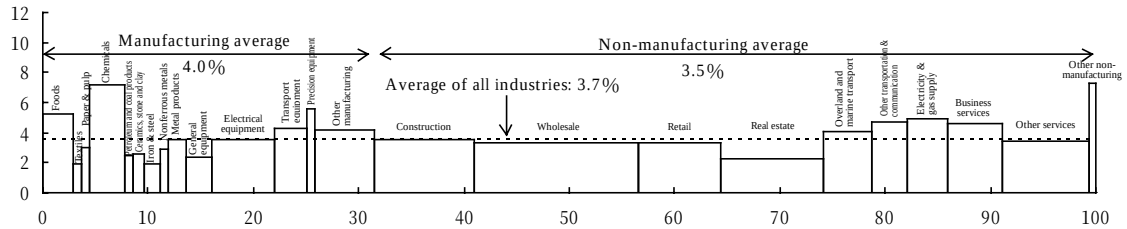
(3) FY 1990



(4) Magnitude of change FY 1990 → FY 1999 (total assets weights are based on FY 1990)



(5) FY 1999



Note: ROA = ordinary profit before interest payment / average total assets at the beginning and end of the term

Source: Prepared based on Quarterly Report on Financial Statement Statistics of Corporations (Ministry of Finance)

We will look now at changes in relative performance between industries expressed in the charts in order to confirm this point. In the case of manufacturing industries, precision equipment (12.5%), electrical equipment (11.3%) and other equipment industries were outstanding in FY 1980. These dropped broadly, however, during the 1980s for various reasons including the sharp appreciation of the yen. Relatively good performance in the metal product and iron & steel industries was notable in FY 1990 urged on by increased construction demand during the so-called *Heisei* boom; however, there was a broad drop during the 1990s and equipment industries also continued to decline in the midst of stiff global competition. As a result, among manufacturing industries, the situation during FY 1999 indicates an improvement in the relative status of chemicals and foods, which had demonstrated a narrow range of decline in the 1990s. At the same time, transport equipment and electrical equipment achieved no more than the overall manufacturing industry average while general equipment and steel plummeted.

In the case of non-manufacturing industries, regulated industries such as electricity, natural gas, water supply, other transport and communication and retail were outstanding in 1980 but declined broadly during the 1980s due to the intensification of competition following deregulation and other reasons. A broad decline was evident during the 1990s not only in construction, real estate and other industries that were strongly impacted by the collapse of the bubble economy but also in other services and other industries. As a result, the situation in FY 1999 shows that the relative status of electricity, natural gas, water supply and other transport and communication, which declined slightly during the 1990s, improved again. Meanwhile, the service industry, which had been a growth industry, did no better than the non-manufacturing industry average. It can thus be pointed out that changes in the relative performance between industries throughout the twenty-year period since the 1980s did not reflect progress to an industrial structure of being outperformed by growth industries.

Using the above industry level data, we shall attempt a decomposition analysis of the changes in aggregated ROA. Analyses heretofore focused solely on changes in industry-specific ROA as the background of aggregated ROA decline; however, changes in the total assets weight of each industry to the sum of all industries W*j* (changes in the industrial structure) also have an impact on aggregated ROA. That is because, even if, for example, industry-specific ROA were at the same level as previously in all industries, aggregated ROA will also increase to the same extent as increases in the weight of industries with a relatively high ROA. That is, changes in aggregated ROA (compared to the previous year) according to formula (1) can be decomposed as indicated below (subscripts *t* and *t*-1 express points in time; superscript lines express weighted average).

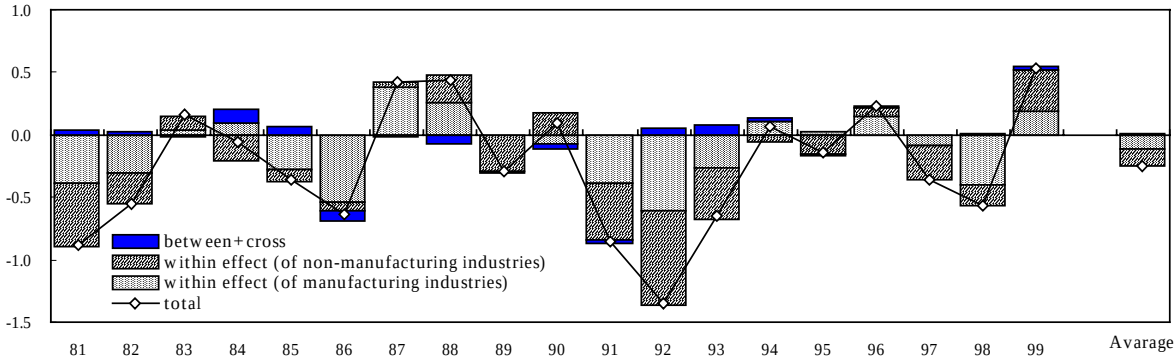
$$
\begin{aligned}
\overline{\mathrm{ROA}_t} - \overline{\mathrm{ROA}_{t-1}} &= \sum_j (\mathrm{ROA}_{j,t} \times \mathrm{W}_{j,t} - \mathrm{ROA}_{j,t-1} \times \mathrm{W}_{j,t-1}) \\
&= \sum_j (\mathrm{ROA}_{j,t} - \mathrm{ROA}_{j,t-1}) \times \mathrm{W}_{j,t-1} \quad \text{.....(a)} \\
&\quad + \sum_j (\mathrm{ROA}_{j,t-1} - \overline{\mathrm{ROA}_{t-1}}) \times (\mathrm{W}_{j,t} - \mathrm{W}_{j,t-1}) \text{.....(b)} \\
&\quad + \sum_j (\mathrm{ROA}_{j,t} - \mathrm{ROA}_{j,t-1}) \times (\mathrm{W}_{j,t} - \mathrm{W}_{j,t-1}) \text{.....(c)}
\end{aligned}
$$

..... (2)

Term (a) of formula (2) is described below as the "within" effect as a factor that expresses the contribution of changes in industry-specific ROA and reflects the efficiency of the

reallocation of resources within industries. Term (b) is described below as the "between" effect as a factor that expresses the contribution of changes in the industrial structure and reflects the efficiency of the reallocation of resources between industries[14]. Term (c) is a cross term of the "within" and "between" effects. Though industrial structure is not something that changes to any sizable extent within a short time, the direction of the changes is thought to reflect dynamic efficiency of resource allocation in the overall economy and the "between" effect of term (2) also has the potential for strongly dominating the aggregated ROA level. Accordingly, to wrap up this section, we will conduct a contribution decomposition analysis (referred to below as "within-between" analysis) based on formula (2) of aggregated ROA variability and quantitatively observe the structure of aggregated ROA decline since the 1980s.

Fig. 1-4 Industry-based "Within-Between" Decomposition of Changes in Aggregated ROA from the Previous Year



Notes: 1. ROA = ordinary profit before interest payment/average total assets at the beginning and end of the term
2. The change in aggregated ROA from the previous year ("total") is decomposed into the contribution of the change in ROA for each industry from the previous year ("within" effect), contribution of the change in total assets weight for each industry from the previous year ("between" effect) and the cross term of both ("cross"). In the chart, the "within" effect is divided between manufacturing and non-manufacturing industries, and the "between" effect is indicated summed up with the cross term.

Source: Prepared based on Quarterly Report on Financial Statement Statistics of Corporations (Ministry of Finance)

In Fig. 1-4, "within-between" decomposition of the previous year change in ROA for all industries is carried out for each year since FY 1981, the "within" effect is divided between manufacturing and non-manufacturing industries and the "between" effect is indicated aggregated with the cross term. As the chart clearly shows, the contribution of the "between" effect to changes in aggregated ROA each year is rather small; however, this is nothing other than the reverse of the fact that changes in the industrial structure are small in the short term. What is more noteworthy, however, is that there are also negative years that emerge sporadically in the direction of the contribution of the "between" effect and that the twenty-year average contribution shown at the far right is essentially zero. This means that changes in the industrial structure did not move in a definite direction such as a shift in resources from industries with low profitability to those with high, which is also consistent with the results of the skyline charts. We confirmed from the results of the analyses based on the individual industry data above that the decline in aggregated ROA since the 1980s was due to a decline in the efficiency of resource

[14] The term $\overline{ROA}_{t-1}$ proves to be the redundant because ($\Sigma_j (\overline{ROA}_{t-1} \times (W_{j,t} - W_{j,t-1}))=0$), but is indicated in order to clarify the meaning of the "between" effect in which aggregated ROA rises as the increase in the weight of industries with relatively high ROA.

allocation within industries, whether manufacturing or non-manufacturing (negative "within" effect), and also to the lack of apparent progress in the industrial structure in which growth industries would realize high returns and boost growth overall (the "between" effect was also essentially zero). In the next chapter, we will examine even more closely those causes that induce this deterioration throughout all industries based on individual company data.

II. Microstructure of ROA Decline

1. Significance of Analysis Using Individual Company Data

As stated in the Introduction, it is not necessarily appropriate taking corporate heterogeneity into account to see the decline in aggregated ROA as if it were a phenomenon appearing upon one firm. The same can be said of the variability in ROA at the industry level analyzed in the previous chapter. Of course, if there is no more than a small degree of heterogeneity, this would be nothing more than a trivial problem. However, in the background of the analyses using micro-data that have been conducted so enthusiastically in recent years, especially in the U.S., there is a shared awareness that heterogeneity at the micro-level exerts an effect on aggregated data variability that cannot be neglected. Haltiwanger (1997), for example, points out based on longitudinal establishment level data of the manufacturing sector that the fraction of cross-sectional variance of establishment level growth rates for employment, output, productivity and other indices explained by 4-digit industry fixed effects is no more than 10% of the total, that is, even if considerably minute industry characteristics are taken into account, significant heterogeneity still remains.

In the analyses based on individual industry data in the previous chapter, although changes were apparent in relative performance between industries, the ROA of all industries declined with virtual uniformity. Based on the outcome of empirical analyses in the U.S., however, there is a strong possibility that the variability in ROA seen in firms may be far more heterogeneous than that in industries. "In the fastest-growing industries, a large fraction of establishments experience substantial declines, whereas in the slowest growing industries, a large fraction of establishments exhibit dramatic growth. During severe recessions virtually all industries decline, but within each industry a substantial fraction of establishments exhibit substantial growth. Likewise, during robust recoveries, a substantial fraction of establishments are contracting" (Haltiwanger, 1997, p.55). If this were to apply to Japan since the 1980s in a situation that could almost be called total defeat when viewed by industry, analyses of variability in ROA at the firm level and its background may make it possible to identify the factors behind this total defeat or signs of revitalization. In this chapter, we will observe first of all the situations and changes of distribution of the ROA at the corporate level both for the whole sample and for each industry as the first stage in the analysis of the microstructure. Following that, we will analyze the microstructure of the persistent decline in ROA both aggregated and at the industry level from the standpoint of inter-company disparities and the inter-company reallocation of resources and point out the importance of disparities between firms within the same industry.

The source of the data in the following analyses is non-consolidated settlement financial data[1] of listed companies[2], excluding financial institutions and insurance firms, stored in the corporate financial data bank at the Development Bank of Japan and, the following analyses mainly focus on some 1,400 firms listed continuously from FY 1980 through FY 1999 (referred to as "common firms") as the statistical population[3].

[1] Based on normalized data adjusted for irregular accounting data brought about by changes in settlement periods, mergers, etc.

[2] Listed companies in regional stock exchanges (other than the Tokyo Stock Exchange, Osaka Stock Exchange and Nagoya Stock Exchange), NASDAQ Japan and TSE Mothers are not included. In addition, since records of OTC (JASDAQ) listed company data begin in December 1987, they are not included in common firms from FY 1980.

[3] There were about 3,300 firms listed in FY 1999.

2. ROA Distribution of Individual Companies and Its Changes – Descriptive Statistical Observations –

Observing the situations and changes of distribution of individual companies' ROA can be considered the most fundamental approach for the purpose of comprehending the microstructure of ROA at the aggregated or industry level. Though the purpose here is not to verify the anticipated distribution based on a specific theoretical model, we will conduct a conceptual simulation before proceeding with histogram (frequency distribution table) observations as a way of clarifying the points that should be noted.

First of all, assuming a state in which all markets are perfectly competitive and the risk of profit variability does not exist, it is thought that ROA distribution itself would degenerate since the ROA of any firm would converge in an equilibrium, at a single required profit rate (minimum profit rate required by investors). Next, if individual firms confront common profit variability risk occurring randomly, the ROA distribution would probably approach a normal distribution. Furthermore, under conditions in which the degree of profit variability risk confronted by firms differs by industry, it is anticipated that, in the economy overall, the distribution would have a broader tail than the distribution within the industry since the level of the required profit rate would differ according to the industry[4].

The discussion thus far has remained within a static framework and, setting aside random profit variability, the ROA of individual firms corresponds to the required profit rate[5]. However, in dynamic processes in which creative destruction[6] occurs constantly through innovation, there would be both firms that achieve an excess profit rate higher than the required profit rate (creation of profit opportunities) and firms that lose out in the competition with profit dropping below the required profit rate (loss of profit opportunities)[7]. In economies both the creation and the loss of profit opportunities frequently occur through creative destruction, the distribution would have an asymmetric configuration with the broader tail on the high profit side, since firms dropping below the required profit rate are not sustainable.

In addition, it is possible to position the "bipolar and "winner-takes-all" phenomena, a frequent topic of discussion in recent years, as dynamic processes and, if the expansion of inter-company disparities actually occurs in a form such as this, the distribution could possibly in extreme cases be of a double-peak or uniform configuration.

We shall now proceed with ROA histogram observations taking the conceptual simulation above into account. Let us first attempt a histogram for every five years since FY 1980 not divided by industry[8] (Fig. 2-1). The characteristics that draw attention include that, in shape, it generally resembles a normal distribution with a single bell-shaped peak and that the distribution

---

[4] In an industry such as mining, for example, firms are seen that record an abnormally high ROA but, on the other side of the coin, there is also the possibility of high profit variability risk.

[5] Excluding cases of imperfect competition.

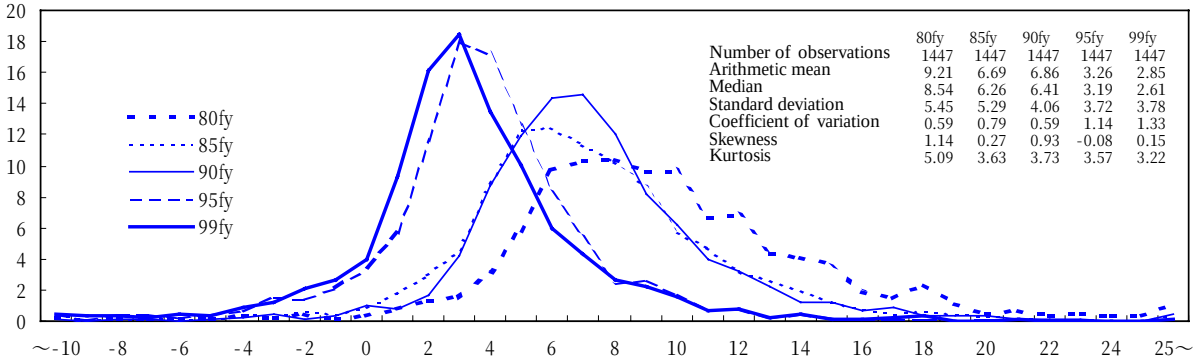
[6] Needless to say, creative destruction is a concept that forms the core of Schumpeter's economic growth theory but it draws attention again in the early 1990s within the context of endogenous growth theory. In addition, since creative destruction means that both creation and destruction occur simultaneously, it is a field in which analyses using micro-data are most effective (refer to the Introduction of this study) and it also has strong links to a line of empirical studies relating to employment, productivity and the like such as those referred to in this report. Refer to Caballero and Hammour (1996) and associated references for the flow of theoretical research and to Haltiwanger (1997, 2000) and associated references for the flow of empirical research.

[7] Profit opportunities are considered to be a sort of intangible asset theoretically equivalent to the numerator of Tobin's *q*. The ideas relating to the creation or loss of profit opportunities are suggested by the concepts of total job creation and total job destruction already established in employment analyses. Refer to Tanaka (2000) and associated references for the analysis of job creation and destruction in Japan.

[8] The Development Bank of Japan industrial classification mid- and sub-categories summarized into 32 groups, as in the table in the appendix of this study, are used as the industrial classification in the analysis of individual company data beginning with this chapter.

shifts overall to the left as average ROA drops. Other basic statistics indicate that, although standard deviation reduces in size along with the decline in the average, the coefficient of variation indicates that inter-company disparities increase from 1995 on. Skewness (0 with normal distribution; a positive value indicates a broader right-hand tail and a negative value indicates a broader left-hand tail)[9] in the past had a shape with the right-hand tail somewhat broader than a normal distribution. Beginning in the mid-1990s, however, it significantly approached a normal distribution.

Fig. 2-1 ROA Frequency Distribution of the Common Firms for Every 5 years (horizontal axis: ROA (%), vertical axis: relative frequency (%))



	80fy	85fy	90fy	95fy	99fy
Number of observations	1447	1447	1447	1447	1447
Arithmetic mean	9.21	6.69	6.86	3.26	2.85
Median	8.54	6.26	6.41	3.19	2.61
Standard deviation	5.45	5.29	4.06	3.72	3.78
Coefficient of variation	0.59	0.79	0.59	1.14	1.33
Skewness	1.14	0.27	0.93	-0.08	0.15
Kurtosis	5.09	3.63	3.73	3.57	3.22

Notes: 1. The population consisted of those firms listed continuously from FY 1980 through FY 1999. Refer to the text for details.
2. Since deviation readily increases due to outliers, skewness and kurtosis were calculated with the two upper and two lower values both eliminated. Since the sample skewness and sample kurtosis formulae in the spreadsheet software Excel were used in numerical calculations, they different in strict terms from skewness and kurtosis as defined in the text, though that does not have any particular effect on the analyses.

Since it is also possible to interpret this point as suggesting the stagnation of creative destruction, further verification along with the analyses below is considered to be necessary. Kurtosis (0 with a normal distribution; a positive value indicates that the tail is shorter than a normal distribution and a negative value indicates that the tail is longer)[10] indicates that the tail is consistently shorter than a normal distribution. This may also suggest that either the effect of inter-industry disparities or the effect of random profit variability risk or both of them are small; however, this too must verified along with later analyses.

We will next observe the transitions every five years in like manner with the population divided between manufacturing and non-manufacturing industries (Fig. 2-2). First of all, the trend toward decline of the average and the trend toward increase in the coefficient of variation (expansion of inter-company disparities) are recognized to be shared by both. In regard to skewness, manufacturing industries have been relatively close to a normal distribution since the 1980s and the direction of time-series changes has been ambiguous. With non-manufacturing industries, a clearly-defined broadening of the right-hand tail greater than a normal distribution was observed until FY 1990 but this has rapidly approached a normal distribution since 1995. If

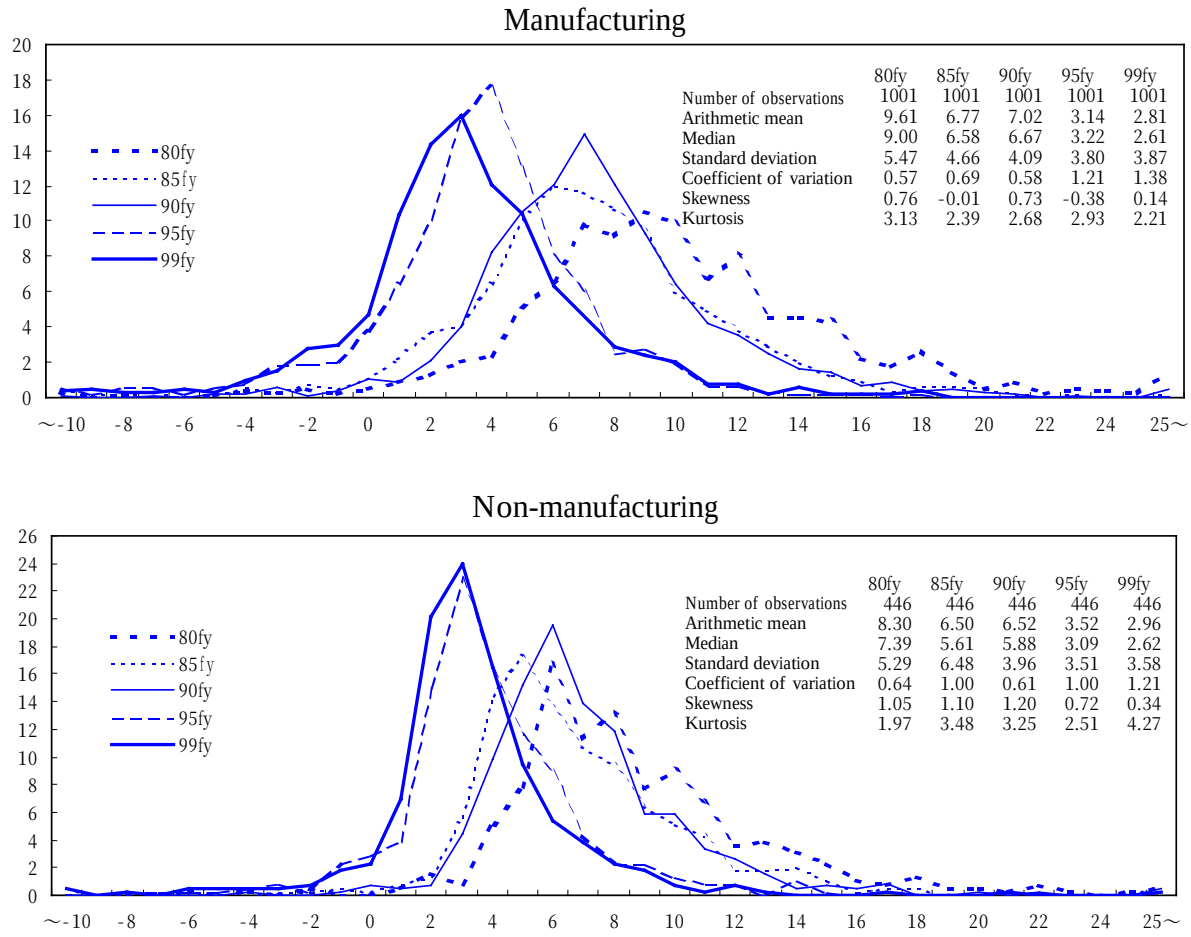
[9] Third order moment (central moment) divided by the third power of standard deviation. Since deviation readily increases due to outliers, calculations have been made with the two upper and lower two data both eliminated.

[10] Fourth order moment (central moment) divided by the 4th power of the standard deviation less 3, standardized so that it has the value of 0 in the case of a normal distribution. Since deviation readily increases due to outliers as in the case of skewness, it was calculated with the two upper and lower values both eliminated.

we accept the hypothesis above that the reduction of the left-hand tail is indicative of stagnation in creative destruction, then it would also be possible to interpret that manufacturing had already lost that dynamism in the 1980s and non-manufacturing industries by the latter half of the 1990s[11]. Focusing next on the left-hand tail of the distribution, the ratio of firms showing red ink has increased substantially from 1995. Conceptually, businesses that would not pay even if the cost of capital were zero are clearly not sustainable and the left-hand tail of the distribution should exhibit a truncated shape.

Fig. 2-2 ROA Frequency Distribution of the Common Firms for Every 5 years – By Industry

(horizontal axis: ROA (%), vertical axis: relative frequency (%))



Note: Refer to the notes of Fig. 2-1.

The fact that the left-hand tail remains unchanged even in the red-ink zone suggests a delay in structural adjustment (exit of stagnating firms or the reallocation of resources to growth industries). Kurtosis indicates consistent shortness in the tail in relation to a normal distribution in both manufacturing and non-manufacturing industries, and, in the case of non-manufacturing industries, this tendency is gradually becoming stronger.

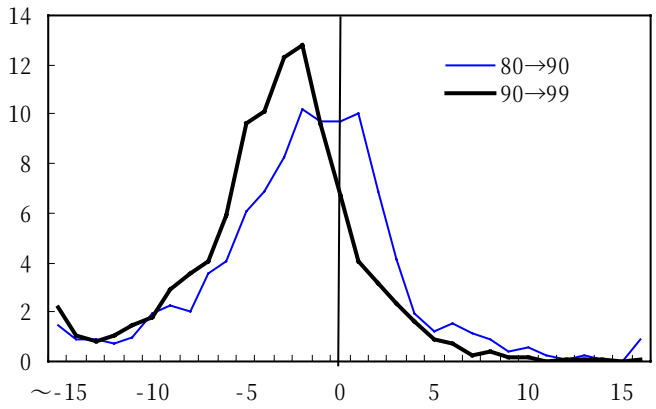
[11] It is necessary to note, however, that, since many previously regulated industries are included among non-manufacturing industries, there is also the effect of excess profit rate that is generated because the market is not competitive.

In comprehending the situations of creative destruction, that is, the situations of the creation and loss of profit opportunities, besides the distribution of ROA level, the distribution of change is also important. Let us consider, for example, an economy in which, even though the ROA declines by 1% in the economy overall, all firms drop by 1% and another economy in which there is a substantial number of firms with an increase in ROA (however, the contribution of these firms is overwhelmed by the stronger effect of the declined firms). No margin exists in the case of the former for an enhancement of the ROA in the economy overall through the reallocation of resources. However, a margin does exist in the latter case for a future enhancement of the ROA in the economy overall through the reallocation of resources from weakly competitive to strongly competitive firms. In that respect, there are considerable discrepancies in latent vitality within these economies. Observing the distribution of changes makes it possible to precisely comprehend these differences in potential. In addition, the observation of changes is also important for the purpose of verifying bipolarization. That is because, even if the distribution (of level) were currently a bell-shaped curve, if the distribution of change were bipolarized persistently, there is a strong possibility that the distribution of level would also become bipolarized in the future.

Fig. 2-3 illustrates by histogram the magnitude of ROA change of each firm from FY 1980 through FY 1990 (i.e., “1980s”) based on all industries and the same for the period of FY 1990 through FY 1999 (“1990s”). First of all, the shape is a single-peak bell-shaped curve generally resembling a normal distribution and the distribution in the 1990s has shifted overall to the left compared to the 1980s.

Fig. 2-3 Frequency Distribution of the Magnitude of ROA Change of the Common Firms in the 1980s & 1990s

(horizontal axis: ROA (%), vertical axis: relative frequency (%))



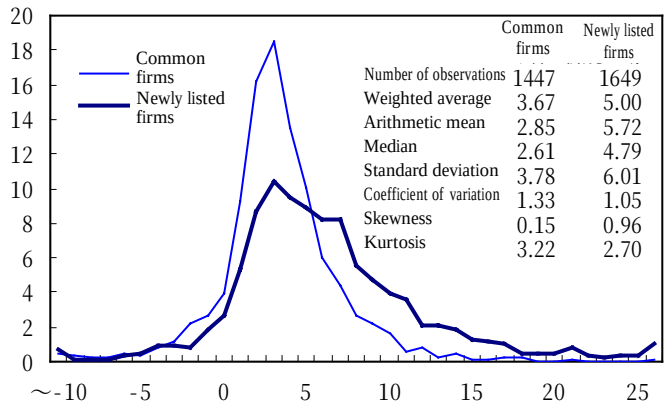
Note: Refer to the notes of Fig. 2-1.

Thirty percent of the firms increased their ROA during the 1980s, which then dropped to 14% during the 1990s with mounting stagnation in the move toward the creation of profit opportunities. The view is also important, however, that, while in the analyses of data by industry in Chapter I, only business service firms increased their ROA during the 1990s, when viewed by firm, 14% managed to increase their ROA during the so-called “lost decade” of the 1990s.

To wrap up this section, we will take a look at the situations of ROA distribution with the inclusion of both newly listed companies and those that withdrew from the market. Analyses thus far have all been conducted based on the common firms since FY 1980 and the population has

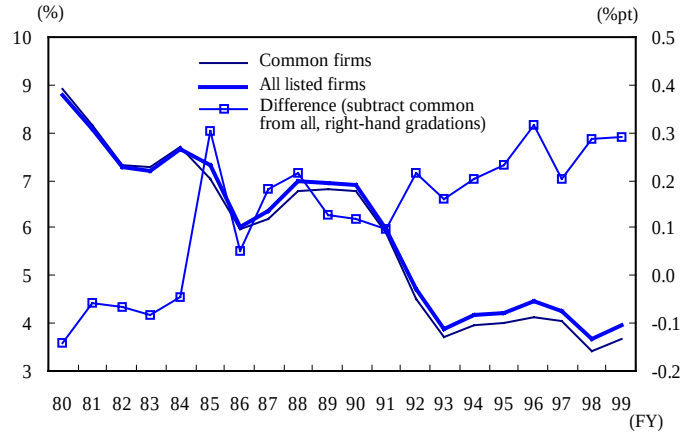
consisted of traditional firms that have been listed for at least twenty years. If the ROA of firms such as these does decline, we naturally suspect that they are perhaps not typical of the economy overall. In addition, the contribution due to the exit of inefficient firms from the stock market is also not taken into account on the common firm basis. If we then proceed with a comparison of the distribution of ROA of the some 1,650 firms newly listed since FY 1981 with that of the common firms as of FY 1999 (Fig. 2-4), we see that they are positioned somewhat to the right of the common firms and are dominant with a weighted average ROA of 5% compared to 3.7% for the common firms. In regard to other fundamental statistics, while the coefficient of variation was somewhat higher for the common firms, skewness and kurtosis were characterized, like the common firms, by a broader right-hand tail and shorter tail than a normal distribution. However, the right-hand tail broader and somewhat longer than the common firms suggests greater relative vitality. Next, transitions in the weighted average ROA of all firms (approx. 3,300) including firms that delisted (approx. 200) along with the newly listed companies in the population compared to the common firm base (Fig. 2-5) indicate that the total assets weight of newly listed firms to all firms was not particularly great, amounting to no more than 22% even in FY 1999, and the divergence between the two was only about 0.3% at most. In addition, transitions in weighted average ROA of newly listed companies alone (Table 2-1) show that they maintained a dominant position over the common firms in the range of about 1 – 2% since the latter half of the 1980s, while following a downward trend virtually in parallel with them. Considering all of these points, though the newly listed companies, as may be expected, have a higher ROA than that of the common firms and also have greater potential vitality, the effect of eliminating them from the population is limited.

Fig. 2-4 Comparison of ROA Frequency Distribution in FY 1999 for the Common Firms and Firms Newly Listed Since FY 1981
(horizontal axis: ROA (%), vertical axis: relative frequency (%))



Notes: 1. Refer to the notes of Fig. 2-1.
2. Refer to the main text for newly listed firms.

Fig. 2-5 Comparison of ROA of Common Firms and All the Listed Firms



Notes: 1. Refer to the notes of Fig. 2-1.
2. All listed companies include firms newly listed since FY 1981 and those that have delisted since FY 1981. The number of firms differs by year (3,309 in FY 1999).

Table 2-1 Total Assets Weight and ROA of Firms Newly Listed Since FY 1981

(unit: %)

	Total assets weight	ROA	(Reference) ROA of common firms
80fy			8.9
81	0.3	33.0	8.1
82	0.8	13.5	7.3
83	1.1	12.0	7.3
84	1.4	12.5	7.7
85	2.0	27.0	7.0
86	7.1	7.5	6.0
87	7.4	8.7	6.2
88	8.1	9.6	6.8
89	9.7	8.3	6.8
90	10.5	8.2	6.8
91	11.1	7.1	5.9
92	11.5	6.8	4.5
93	13.6	5.2	3.7
94	15.2	5.5	40
95	17.1	5.6	4.0
96	18.0	6.1	4.2
97	19.8	5.3	4.1
98	20.8	4.8	3.4
99	21.7	5.0	3.7

Notes: 1. Refer to the notes of Fig. 2-1.
2. Total assets weight is calculated as the weight to all the listed firms.
3. There is considerable variation in the figures for the ROA of firms newly listed since FY 1981 due to the small number of firms through about 1985.

3. Structure of ROA Decline from the Perspective of Inter-Company Disparities and Resource Reallocation

It is possible to decompose the relative position of ROA of Firm *i* in relation to average ROA of all the firms into the two primary elements of the characteristics of Industry *j*, to which Firm *i* belongs, and the positioning of Firm *i* within Industry *j*. Thus (superscript lines express average):

$$\mathrm{ROA}_i - \overline{\mathrm{ROA}_{all}} = \underbrace{(\overline{\mathrm{ROA}_j} - \overline{\mathrm{ROA}_{all}})}_{\text{Characteristics of Industry } j} + \underbrace{(\mathrm{ROA}_i - \overline{\mathrm{ROA}_j})}_{\text{Positioning of Firm } i \text{ within Industry } j} \quad \text{.....(3)}$$

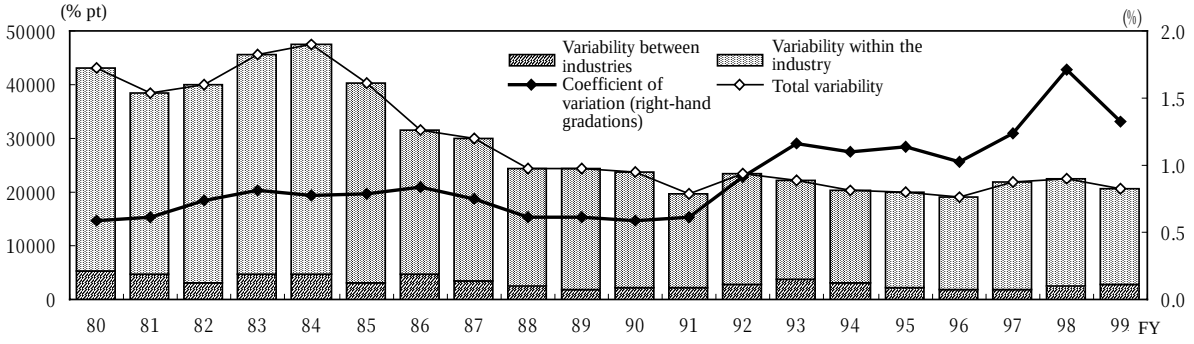
If this way of thinking were extended to the overall population, it would be possible to decompose the magnitude (total variability) of inter-company disparities from a macro perspective into disparities due to the characteristics of the industries to which each firm belongs (variability between industries) and disparities between firms within the relevant industry (variability within the industry). Thus:

$$\sum_i (\mathrm{ROA}_i - \overline{\mathrm{ROA}_{all}})^2 = \underbrace{\sum_i (\overline{\mathrm{ROA}_j} - \overline{\mathrm{ROA}_{all}})^2}_{\text{Variability between industries}} + \underbrace{\sum_i (\mathrm{ROA}_i - \overline{\mathrm{ROA}_j})^2}_{\text{Variability within the industry}} + \underbrace{2\sum_i (\overline{\mathrm{ROA}_j} - \overline{\mathrm{ROA}_{all}})(\mathrm{ROA}_i - \overline{\mathrm{ROA}_j})}_{\text{Cross term}} \quad \text{.....(4)}$$

Here, variability refers to the sum of the squares of mean deviation, variability divided by the number of observations is variance, while variance standardized by the arithmetic mean is the coefficient of variation. In addition, the summation of variability within the industry for all the firms *i* in Industry *j* coincides with the total variability of Industry *j*.

Fig. 2-6 indicates the transitions in total variability since FY 1980 in the common firms and their decomposition in accordance with the definition above. Incidentally, the cross term is indicated included in variability between industries. Total variability declined broadly in the latter half of the 1980s and continued to decline slowly subsequent to that, reflecting the downward

Fig. 2-6 Inter-company ROA Disparities (Total Variability) and Their Decomposition for the Common Firms



Notes: 1. Refer to the notes of Fig. 2-1.
2. Variability between industries indicates ROA disparities attributable to industry characteristics and variability within the industry indicates ROA disparities within the same industry.
3. Coefficient of variation = standard deviation/arithmetic mean

trend of average ROA. However, in spite of stable movement during the 1980s in the degree of inter-company disparities evident in the coefficient of variation, this tended to expand during the 1990s. The outcome of the decomposition of total variability indicates that inter-company disparities were largely due to variability within industries (89% on a 20-year average).

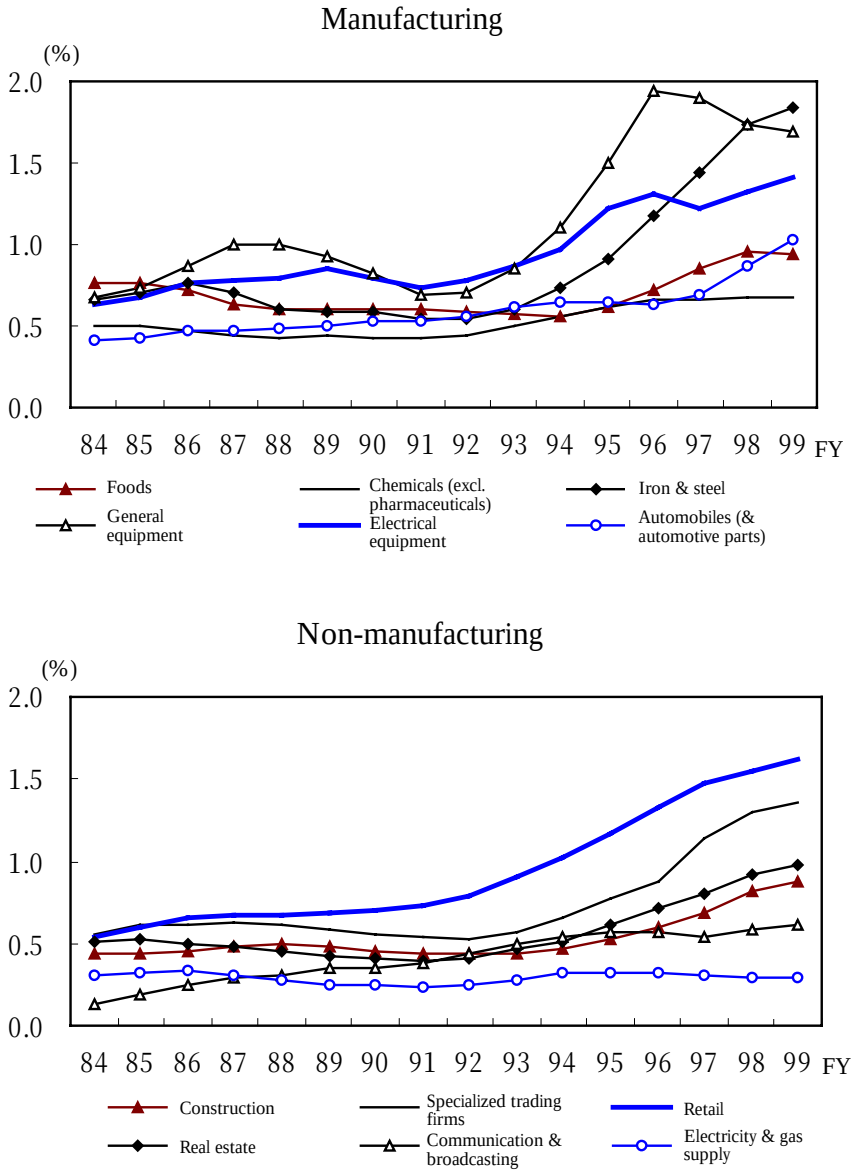
Thus, viewing transitions in disparities between firms within the same industry, which played an important role in forming inter-company disparities, by industry (Fig. 2-7) indicates that (coefficient of variation, moving average after 5 years), as one may expect, to a greater or lesser extent, after the beginning of the 1990s, there was a confirmable tendency toward expansion in inter-company disparities in virtually all industries. In addition, in manufacturing industries, there was a conspicuous trend toward an expansion of disparities in the iron & steel and general equipment industries, while those in the food and chemical (excl. pharmaceuticals) industries were more gradual. Electrical equipment and automobiles can be positioned in a group intermediate between these. When compared with the results of the skyline analyses of Chapter I, industries experiencing a larger expansion in inter-company disparities tend to face a broader decline in industry ROA. It can thus be seen that it is the loss of profit opportunities, rather than their creation, that plays the primary role in the expansion of disparities between firms within the same industry, which for the most part explains aggregated inter-company disparities.

Finally, we will now apply the "within-between" decomposition technique to individual company ROA of the common firms (refer to section 3 of Chapter I for an explanation of the concept and terminology). In the analysis of individual industry data in Chapter 1, we decomposed the changes in aggregated ROA into the factors that reflect changes in ROA of each firm or the efficiency of resource allocation within the industry ("within" effect) and factors that reflect changes in the structure of the industry or the efficiency of resource allocation between industries ("between" effect). In contrast to this, in this section, the factors that reflect changes in ROA of each firm or the efficiency of resource allocation within the firm is considered to be the "within" effect and factors that reflect changes in the share of total assets between firms or the efficiency of resource allocation between firms is considered to be the "between" effect. For the record, when decomposition identity is shown, as in formula (5) (W_i = weight of total assets of Firm i, subscripts t and t-1 express points in time and superscript lines express weighted average), (a) is the "between" effect, (b) is the "within" effect and (c) is the cross term.

$$
\begin{aligned}
\overline{ROA_t} - \overline{ROA_{t-1}} &= \sum_i (ROA_{i,t} \times W_{i,t} - ROA_{i,t-1} \times W_{i,t-1}) \\
&= \sum_i (ROA_{i,t} - ROA_{i,t-1}) \times W_{i,t-1} \quad \text{.....(a)} \\
&\quad + \sum_i (ROA_{i,t-1} - \overline{ROA_{t-1}}) \times (W_{i,t} - W_{i,t-1}) \quad \text{..... (b)} \\
&\quad + \sum_i (ROA_{i,t} - ROA_{i,t-1}) \times (W_{i,t} - W_{i,t-1}) \quad \text{.....(c)}
\end{aligned}
$$

..... (5)

Fig. 2-7 Within-Industry ROA Disparities for the Common Firms (Coefficient of Variation Based on Moving Average of the last 5 years)



Notes: 1. Refer to the notes of Fig. 2-1.
2. Calculated as coefficient of variation based on the moving average of the last 5 years = standard deviation (moving average of the last 5 years) / arithmetic mean (moving average of the last 5 years)

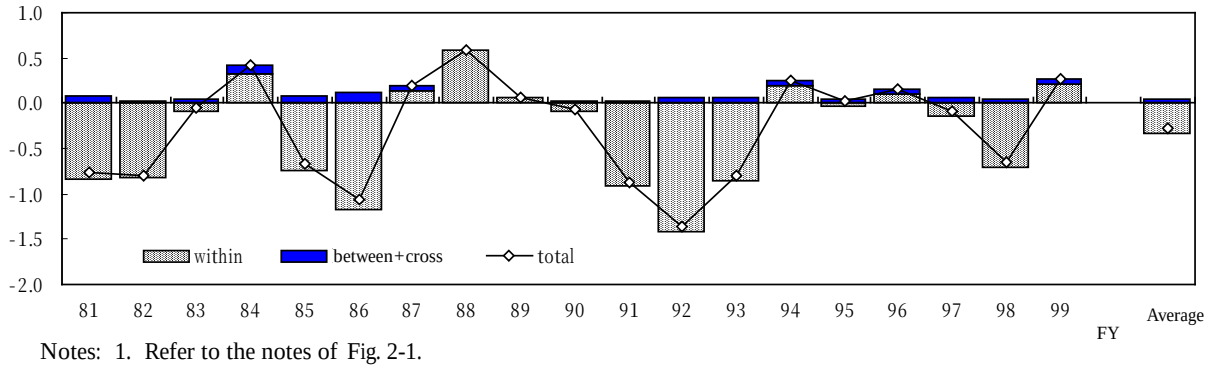
The results of the decomposition are as indicated in Fig. 2-8[12]. The fact that the "within" effect explains virtually all of the ROA changes in each year and is negative on average is the same as the case seen by industry (Fig. 1-4); however, in the case of the "between" effect, although the year-to-year contribution is small, it has a consistent positive tone that differs from the case by industry. It should be noted, therefore, that, in terms of averages, it projects a certain

[12] "Total" in Figs. 2-8 and 2-9 is the difference in weighted average ROA of the common firms from the previous year and the movement differs, though only slightly, from the analyses of Chapter I. (Fig. 1-4) based on individual industry data in the Statistics of Corporations.

sense of presence and contributes to a boost in the ROA (in contrast to the total average of –0.28% points, "within" is –0.33% points and "between" is +0.05% points). The presence of the "between" effect is especially strong in times when ROA decline is most severe such as during the strong yen recession (FY 1985-86) and after the collapse of the bubble economy (FY 92-93), which can be seen as a fact with an abundance of suggestions[13].

As stated previously, it is also important to investigate the situations of gross "within" effect, namely to sum up the positive contribution of firms with improving ROA and negative contribution of firms with deteriorating ROA separately, from the standpoint of gauging the magnitude of the creation and loss of profit opportunities in the analysis of individual company data (Fig. 2-9). First, when looking at the twenty-year average, –0.33% points of the net "within" effect is decomposed into –0.78% points for the gross negative effect (contribution of firms with deteriorating ROA) and +0.45% points for the gross positive effect (contribution of firms with improving ROA). This considerable magnitude of the gross positive effect gives rise to somewhat of a change in the impression of total collapse when seen by industry. However, in the average for the 1980s (1981-89), the gross positive effect was +0.56% points while, in the average for the 1990s (1990-99), it dropped to +0.36% points (+0.46% if FY 1991-93 after the collapse of the bubble economy are excluded). Thus, it is not possible after all to deny the steady weakening of the creation of profit opportunities as a major trend. In addition, movements for each fiscal year indicate that, when the gross negative effect grew larger (smaller) in size, the gross positive effect became smaller (larger), exerting a constant overall influence in the same direction. Rather than creative destruction characterized by an expansion of both positive and negative, there seems to be a strong possibility that fluctuations in cyclical demand are the primary cause[14].

Fig. 2-8 Firm-based "Within-Between" Decomposition of Changes in Weighted Average ROA of the Common Firms from the Previous Year



Notes: 1. Refer to the notes of Fig. 2-1.
2. The change in weighted average ROA of the common firms from the previous year (total) is decomposed into the contribution of the change in ROA for each firm from the previous year ("within" effect), contribution of change in total assets weight for each firm from the previous year ("between" effect) and the cross term of both ("cross"). In the charts, the "between" effect is shown aggregated with the cross term.

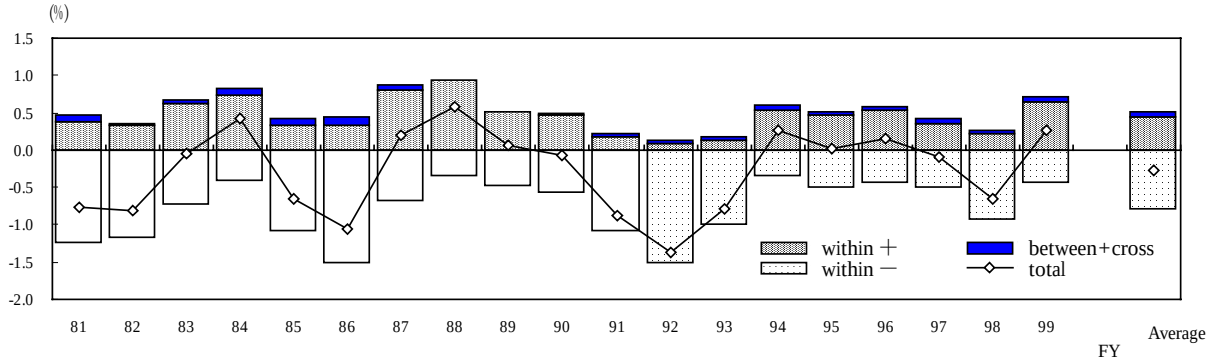
Based on the analysis of this section, it has been quantitatively supported that within-industry disparities are more important than industry characteristics in inter-company disparities

[13] Caballero and Hammour (1996) theoretically analyzed the efficiency of the process of creative destruction concentrated in periods of recession when opportunity cost of resource reallocation is small and the possibility that such efficiency could be hindered by a decentralized economy.

[14] In spite of that, it should probably be borne in mind that there always were firm groups in existence that generate a positive "within" effect even in recessions.

and that expansions in inter-company disparities are generated as dynamism weakens. Accordingly, in the next chapter, we will focus on the existence of the excess profit rate as an important key when considering the way to improve such situations and elucidate its character while analyzing the link to investment strategies.

Fig. 2-9 Firm-based "Within-Between" Decomposition of Changes in Weighted Average ROA of the Common Firms from the Previous Year (Gross Effect)



Notes: 1. Refer to the notes of Fig. 2-1.

2. The difference in weighted average ROA of the common firms from the previous year (total) is decomposed into the contribution of the difference in ROA for each firm from the previous year ("within" effect), contribution of difference in total assets weight for each firm from the previous year ("between" effect) and the cross term of both ("cross"). In the charts, the "within" effect is divided into gross positive and gross negative effect and the "between" effect is shown aggregated with the cross term.

III. The Nature and Background of Inter-Company ROA Disparities

1. Persistence of ROA Disparities

Based on the analyses of the previous chapter, it is probably easy to see that realizing an improvement in the ROA of Japanese corporate sector overall or of specific industries is simply a matter of revitalizing dynamism that would continuously produce firms that create markets on their own and earn excess profit (improvement of the "within" effect) and shifting assets overall to firms that have high efficiency (positive "between" effect). Such arguments, however, only have practical validity when the specific nature of that excess profit rate is clarified to a certain extent.

Thus, in this chapter, we will first of all analyze the time-series character of the ROA disparities that exist between firms to determine whether they are merely transitory or are persistent. Though such analytical methods are well known in the field of traditional industrial organization economics, their main concern rested on the persistence of the excess profit rate as a proxy variable of the degree of market competitiveness. In contrast, our goal in focusing on the persistence of ROA disparities is to explore the intuition that, in light of the importance of intra-industry disparities in inter-company ROA disparities, highly profitable firms perhaps have characteristics in common in terms of management, regardless of what kind of industry they belong to.

The framework for analysis is as given below[1]. First of all, excess profit rate Π_{it} of Firm i in Industry j at point in time t is defined as $ROA_{it} - \overline{ROA_j}$. Next, suppose the time-series pattern of excess profit rate Π_{it} is following the first order autoregressive process (AR(1)) indicated below in common with each firm (partial adjustment model).

$$\Pi_{it} \equiv \alpha_i + \beta_i \cdot \Pi_{i,t-1} + u_{it} \quad \cdots\cdots (6)$$

In formula (6), α and β are parameters that assume different values depending on the firm and u is an individual company (idiosyncratic) mutually non-correlated disturbance term with zero mean (white noise). If β_i is within the range of $-1 < \beta_i < 1$, long-term excess profit rate of Firm i, $\Pi LR_i \equiv \lim_{t \to \infty} \Pi_{it}$, will converge to $\alpha_i / (1 - \beta_i)$. Thus, once we obtain estimated values of α_i and β_i from the transitions in ROA of the 1,447 common firms over the twenty-year period since FY 1980, as was also used in Chapter II, it becomes possible to calculate the long-term excess profit rate extracted from historical data (implied ΠLR_i). If a significant positive correlation is then recognized between the implied ΠLR_i and excess profit rate Π_{i0} at some initial point 0, it could be considered there is persistence in ROA disparities.

The results of the estimation are indicated below. The estimated value of β fell within the range of $0 \leqq \beta_i < 1$ (average 0.59), which, from a theoretical standpoint, can be considered the most natural outcome since it implies monotonous convergence to the implied ΠLR_i.[2] The frequency distribution of the estimated value of β and value t is a indicated in Fig. 3-1. The estimated value is significant at the 5% level in 80% of the firms. Meanwhile, it was not possible to significantly discard the hypothesis that excess profit rates do not exist (equivalent to the industry average profit rate) in 83% of the firms in which the estimated value of α is significant at

[1] The framework below is based primarily on Odagiri and Yamawaki (1986, 1990).

[2] Though there is convergence to the implied ΠLR_i in the case of $-1 < \beta_i < 0$, moving toward convergence while fluctuating above and below the implied ΠLR_i is somewhat unnatural as a movement of the firm profit rate.

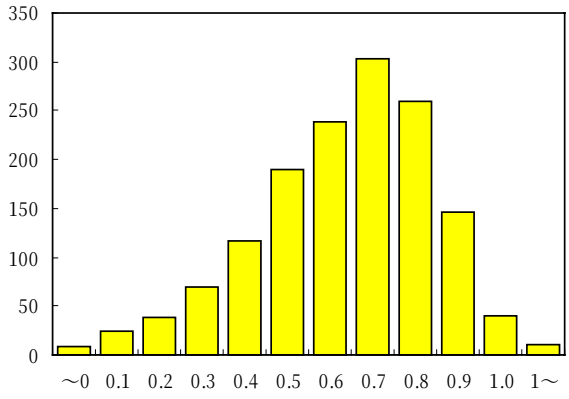
the 5% level and in 74% of the firms even at the 10% level (Fig. 3-2). This instability of the estimation results is actually the same as in Odagiri and Yamawaki (1990) and other earlier research, suggesting some possible limitations of this type of analysis. Nevertheless, in this study, as in the earlier research, if the long-term excess profit rate obtained from these estimated values has a clearly-defined relationship to the profit rate at the initial point in time, it is thought to indicate the existence of an economic factor that cannot be disregarded.

Accordingly, other than the ten firms in which the estimated value of β is 1 or more and the implied ΠLRi explodes, when the implied ΠLRi is regressed to Π_{i0} (here, initial point 0 is the average of FY 1995-99), the following result is obtained (the figures in parentheses to the right of the estimated values are standard error).

$$\text{implied } \Pi\text{LR}_i = 0.0202(0.0835) + 0.9265(0.0272)\ \Pi_{i0} \qquad R^2=0.4470$$

Fig. 3-1 Results of the Examination of Persistence of ROA Disparities (1)

1. Frequency distribution of the estimated value of β



2. Frequency distribution of t-value of the estimated value of β

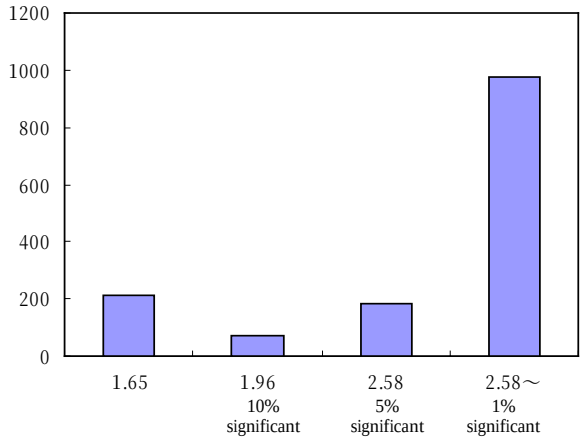
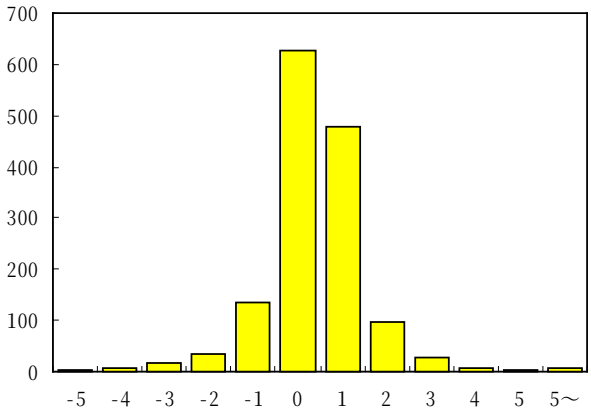
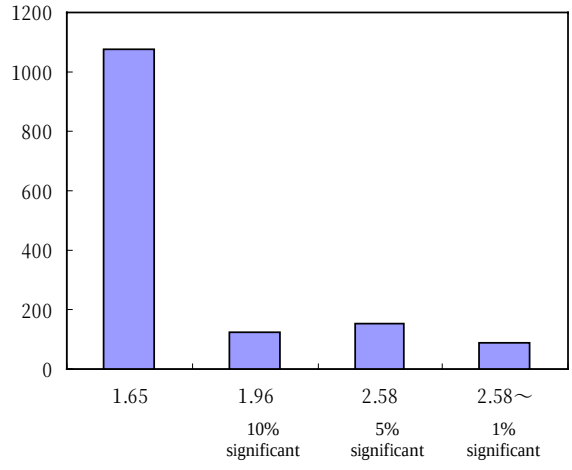


Fig. 3-2 Results of the Examination of Persistence of ROA Disparities (2)

1. Frequency distribution of the estimated value of α



2. Frequency distribution of t-value of the estimated value of α



The coefficient of determination is at a decent level as a cross-sectional estimation with all industries pooled, and the estimated value of the coefficient of Π_{i0} suggest that the excess profit rate observed on average in FY 1995-99 (corresponding to the profitability of each firm in recent years) is maintained even in the long term at a ratio of about 90-95%[3]. In other words, a high level of persistence is recognized in ROA disparities.

Next, we will look at the relationship between the long-term excess profit rate and the excess profit rate at the initial point (FY 1995-99 average) in eleven major industries (refer to Table 3-1). The industry with the lowest Π_{i0} coefficient is iron & steel at 0.56 and the highest is pharmaceuticals at 1.04. There are four industries that are above the coefficient when all industries are pooled and seven that are below. Even when viewed by industry, a high level of persistence is recognized in ROA disparities and this can be seen as results that indicate the importance of disparities between firms within the same industry as also confirmed in the previous chapter. In addition, compared to the results of analysis using the skyline charts of Chapter I again for manufacturing industries, there is an apparent tendency for the Π_{i0} coefficient of relatively robust industries such as foods, chemicals and pharmaceuticals to be relatively large and of stagnating industries such as iron & steel and general equipment to be small. In other words, this suggests the possibility that a positive correlation, weak though it may be, exists between industry ROA performance and the Π_{i0} coefficient, namely the level of persistence of ROA disparities.

Though it is possible to make various theoretical interpretations of the persistence in ROA disparities itself[4], the positive correlation observed between industry average ROA and the Π_{i0} coefficient suggests that the existence of firms that maintain an excess profit rate supports the vitality of the industry overall. Accordingly, to wrap up the analysis of this study, we will empirically clarify what kind of difference in investment strategies produce persistent ROA disparities using the results of the Corporate Investment Attitude Survey released by the Development Bank of Japan in October 1999.

[3] With one standard error above and below the estimated value.

[4] As stated previously, in research by Odagiri and Yamawaki (1986, 1990) and others in traditional industrial organization theory, persistence of ROA disparities is interpreted to be a measure of the imperfectness of market competition. However, there probably is not a large number of cases in which long-term monopolies, oligopolies, cartels, etc., have exerted a dominant influence on profit rate disparities since the 1980s, the subject analysis term in this study (incidentally, the term of the analyses of Odagiri and Yamawaki (1990) was FY 1964-82).

Table 3-1 Estimation Results for Relationship Between Long-Term Excess Profit Rate (Implied ΠLR$_i$) and Excess Profit Rate Π_{i0} at the Initial Point (FY 1995-99 Average)

Estimated equation: implied $\Pi\text{LR}_i = \gamma + \delta\Pi_{i0}$

Industry	Number of observations	Estimated value of δ	R^2
Foods	91	0.92	0.70
Chemicals (excl. pharmaceuticals)	102	0.81	0.70
Pharmaceuticals	32	1.04	0.83
Iron & steel	53	0.56	0.54
General equipment	154	0.73	0.59
Electrical equipment	131	0.82	0.67
Automobiles (& automotive parts)	73	0.95	0.64
Construction	120	0.69	0.61
Specialized trading firms	72	0.73	0.69
Retail	48	1.03	0.93
Transportation	95	0.85	0.67

Notes: 1. Refer to the main text for the definitions, data preparation methods, etc.
2. Two outliers in chemicals (excl. pharmaceuticals) were excluded from the estimation.

2. ROA Disparities and Investment Strategies

In the analysis in this section, we make use of the results of the Corporate Investment Attitude Survey ("original survey"), a special survey of the Surveys of Planned Capital Spending (large firms) by the Development Bank of Japan in 1999, as a variable relating to the investment strategies of individual firms. It was conducted as an extremely wide-ranging survey for this type targeting 3,302 firms with ¥1.0 billion or more in capital, excluding financial, insurance and some other industries, and responses were obtained from 2,113 firms, 64% of the target firms[5]. Thus, when combined with listed company data based on the common firms through the previous section, it is possible to use a sample consisting of 692 firms (427 manufacturing, 265 non-manufacturing firms). Although investment strategies reflect only one aspect of the corporate management, they appear to be quite suitable material for the analysis here since they are associated with the most strategic decision-making process and the results are directly linked to ROA.

Used below are ten items picked up from various questions of the original survey "II. Investment decision-making criteria and their changes" and "IV. Points at issue in causes of Japanese corporate investment acceleration in the 1980s." Specifically, they are items (1) - (10) listed in Table 3-2. All of the questions involved a single choice of two alternatives and individual responses were obtained of the one that applies (applied) to either of two points in time, namely, the "present" (August 1999, when the survey was conducted) and during the 1980s.

The basic viewpoint in setting up the questions was the extraction of the intensity of behavioral characteristics thought to have a strong relationship to so-called "Japanese-style"[6]

[5] Refer to the Development Bank of Japan (1999) for survey details and tabulated results.

[6] Research relating to "Japanese-style management" and the "Japanese-style corporate system" includes a vast array of contentions centered on corporate governance and no consensus even exists regarding the basis for a strict definition of "Japanese-style." For the definition of "Japanese-style management" elaborating on the intent of the results of the Corporate Investment Attitude Survey, refer to Nakamura (2000), pp. 8-11, who surveyed research in this field and presented a series of hypotheses thought to have suitable popularity as the "Japanese corporate image."

management. It is possible to position choice 1 as a "Japanese" characteristic (an impression of being inherently Japanese) and 0 as the opposite. Since data characteristics are best expressed in the results of the cross tabulation with ROA in FY 1998 (targeting about 1,000 firms for which ROA could be calculated in FY 1998) conducted by Nakamura (2000), those charts are reproduced in Fig. 3-3. Among notable characteristics, it can be pointed out first of all that overall changes in behavior were apparent that leaned toward the restraint of corporate investment with a declining rate of selection of "bottom-up," "addition of qualitative factors," "pursuit of long-term profit," "concern for balance between divisions" and "following/emulating other firms" and an increasing rate of selection of "priority on certainty"[7]. Secondly, it can also be pointed out as an important fact relevant to this study that such changes in behavior were especially conspicuous in that group of firms with low ROA while, conversely, the group of firms with high ROA did not considerably change the corporate investment behavior that could be referred to as "Japanese-style" characterized by "pursuit of long-term profit" and "orientation toward maintaining/expanding sales share"[8].

Table 3-2 Question Items in the Corporate Investment Attitude Survey (related items only)

(1) Decision-making style regarding important investment projects
Top-down = 0, bottom-up = 1

(2) Basic criteria for judgment in prioritizing investment projects
Based in principle on quantitative evaluation of investment profitability = 0, also considerable addition of qualitative factors = 1

(3) Quantitative evaluation criteria of investment profitability - time horizon
Priority on those with high growth rate = 1, priority on those with early improvement in returns = 0

(4) Quantitative evaluation criteria of investment profitability - attitude toward risk
Priority on those with high profits = 0, priority on those with high certainty = 1

(5) Judgment criteria other than quantitative evaluation of investment profitability
If (2) is 0 = 0
If (2) is 1 with concern for balance between divisions = 1, if (2) is 1 and concentrate resources in priority divisions = 0

(6) Judgment criteria other than quantitative evaluation of investment profitability
If (2) is 0 = 0
If (2) is 1 and invest following/emulating other firms = 1, if (2) is 1 and follow own firm's investment criteria = 0

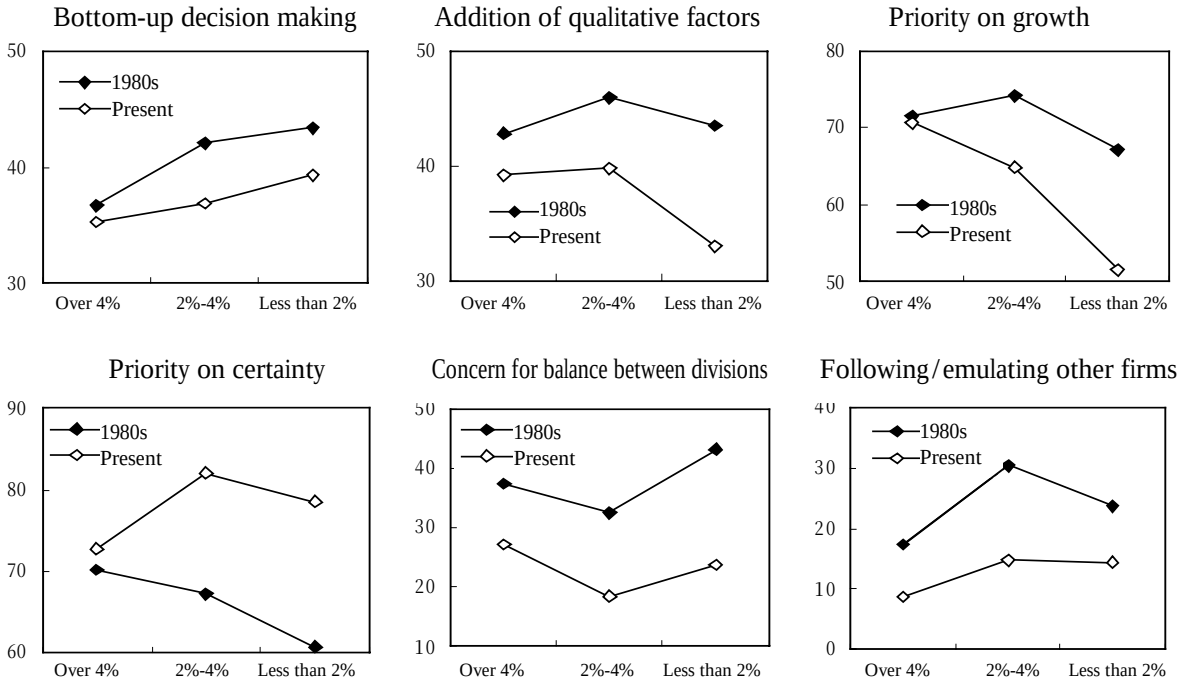
(7) - (10) Causes of Japanese corporate investment acceleration in the 1980s (no = 0, yes = 1)
(7) existence of a main bank, (8) existence of stable shareholders, (9) long-term business relationships with business partners and clients, (10) orientation toward maintaining/expanding sales or market share

[7] It is not clear of course whether or not these changes in behavior actually tend to "restrain" capital investments; however, such interpretation is made in this study based on the series of hypotheses relating to the capital investment behavior of Japanese firms presented on pp. 8-11 of Nakamura (2000). This assumption, however, does not have any essential effect on the discussion that follows.

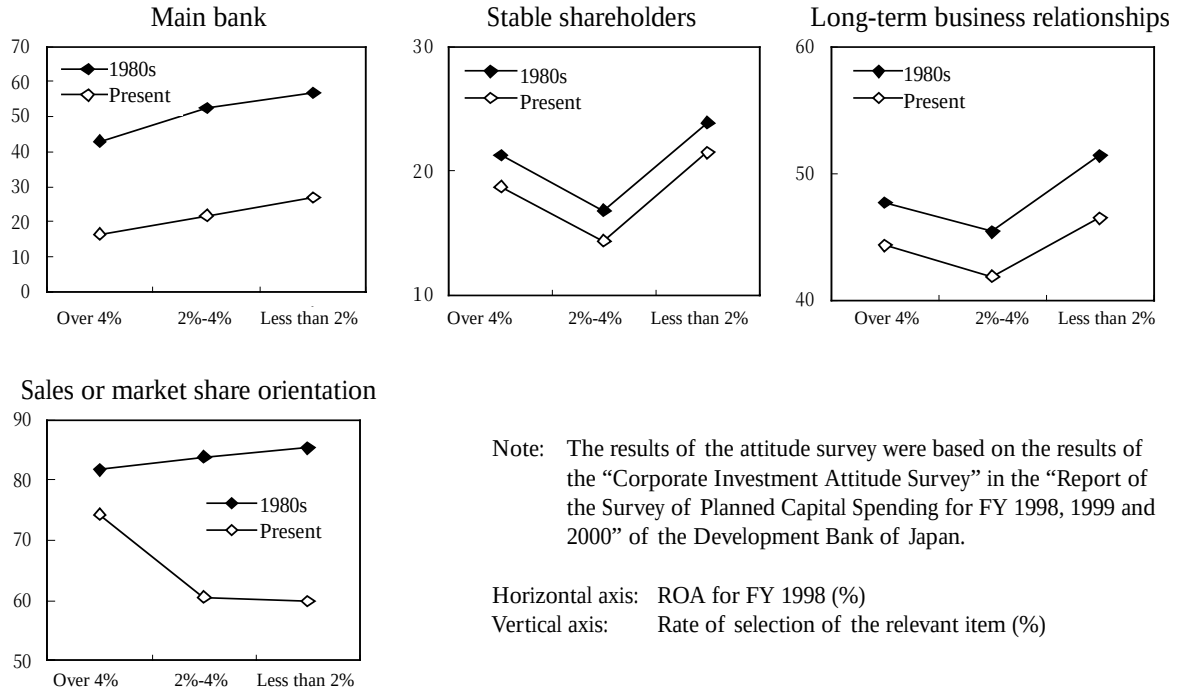
[8] For details, refer to Nakamura (2000), pp. 15-17.

Fig. 3-3 Cross Tabulation Results of the Attitude Survey and Financial Data (ROA in FY 1998)

a) Investment decision-making criteria and their changes



b) Points at issue in causes of Japanese corporate investment acceleration in the 1980s



Note: The results of the attitude survey were based on the results of the "Corporate Investment Attitude Survey" in the "Report of the Survey of Planned Capital Spending for FY 1998, 1999 and 2000" of the Development Bank of Japan.

Horizontal axis: ROA for FY 1998 (%)
Vertical axis: Rate of selection of the relevant item (%)

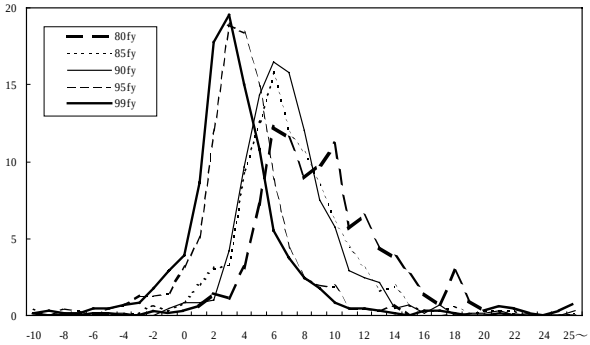
What this suggests is not the uniform evolutionary change in investment style commonly referred to as the switch "from Japanese-style to global standards" but rather the diversification of choices within the elements of Japanese-style investment behavior and the disparities in asset efficiency.

In this section, we will examine a hypothesis to explain disparities in ROA (excess profit rate of each firm) in each decade by the difference in investment strategies adopted during the 1980s, which is expected to be true from the above point of view. The analytical procedure is as given below. First of all, since an interpretation of the results of the estimation is far too complex when behavioral characteristics encompassing all ten items in the original survey are used intact as explanatory variables, we will summarize them into several factors using principal components analysis[9]. In the analysis, we use data in which the response results as for investment strategies adopted during the 1980s are converted to dummy variables. Next, we observe the correlation between each principal component and the ten items in the original survey and profile the principal components. Finally, we regress the average excess profit rate of each firm to the principal component score (characteristics of investment strategies extracted from the attitude survey) of the relevant firm for each of the five-year periods of the early 1980s (1980-84), late 1980s – early 1990s (1988-92) and late 1990s (1995-99) and verify the hypothesis given above. To confirm that the problem of sample bias does not exist, the ROA distribution for every five years of the 692 firms that were subjected to the analysis of this section and a comparison of the ROA distribution in FY 1999 with the 1,447 common firms are shown in Fig. 3-4. Apparently, we observe no divergence that would obstruct the analysis in any of them.

Fig. 3-4 Statistical Characteristics of the ROA of the 692 Firms that Responded to the Attitude Survey

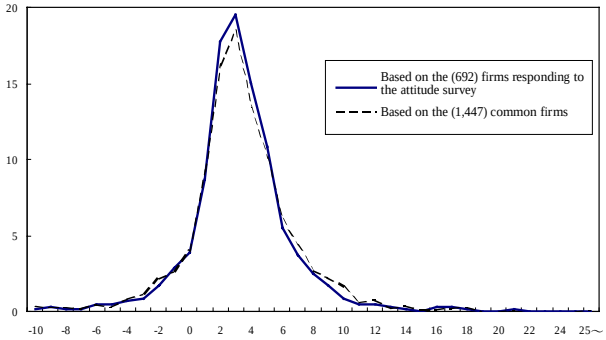
1. ROA frequency distribution of firms responding to the attitude survey for every 5 years

(horizontal axis: ROA (%), vertical axis: relative frequency (%))



2. Comparison of the ROA frequency distribution in FY 1999 of firms responding to the attitude survey and the common firms

(horizontal axis: ROA (%), vertical axis: relative frequency (%))



Notes: 1. Refer to the notes of Fig. 2-1.
2. Refer to the main text for the firms responding to the attitude survey.

[9] Principal components analysis is an analytical procedure for minimizing the loss of information while summarizing and reducing the number of dimensions of the data by linearly combining multidimensional data taking correlations between variables into account.

The results of analysis using the above method are as given below. First of all, the number of principal components utilized was set at 4 taking into account eigen values and cumulative contribution rate[10] as well as the ease of interpretation (Table 3-3). Next, viewing the correlation of the four principal components and the ten items in the original survey (Fig. 3-5), principal components no. 1 and 2 embody the shared characteristic of a strong correlation with characteristics other than the quantitative evaluation criteria of investment profitability (i.e., priority on balance between sectors and an orientation toward uniformity with other firms), namely, the characteristic of discretionary investment behavior. In addition, principal component no. 1 has a strong element of corporate investment promotion by Japanese-style corporate governance, such as the existence of a main bank and stable shareholders, while principal component no. 2 is weak in that respect (strong aspect of firms following their own judgment). Next, it is evident by observing the correlation with characteristics other than the quantitative evaluation criteria of investment profitability that principal components no. 3 and 4 embody the characteristic of non-discretionary investment behavior that places greater importance on quantitative evaluation than principal components no. 1 and 2. In addition, principal component no. 3 has a strong correlation with such items as bottom-up investment decision-making, capital investment promotion effect of sales or market share orientation and priority on certainty and it projects the image of a large stable firm with "up the ladder" style white-collar management. Principal component no. 4 is notable in the characteristics of top-down decision-making as well as strong growth and profit rate orientations and it projects the image of a profit-seeking firm under the leadership of owner-manager type of management. The investment strategies adopted by each of the firms during the 1980s are characterized by the size of the point scores of these four principal components.

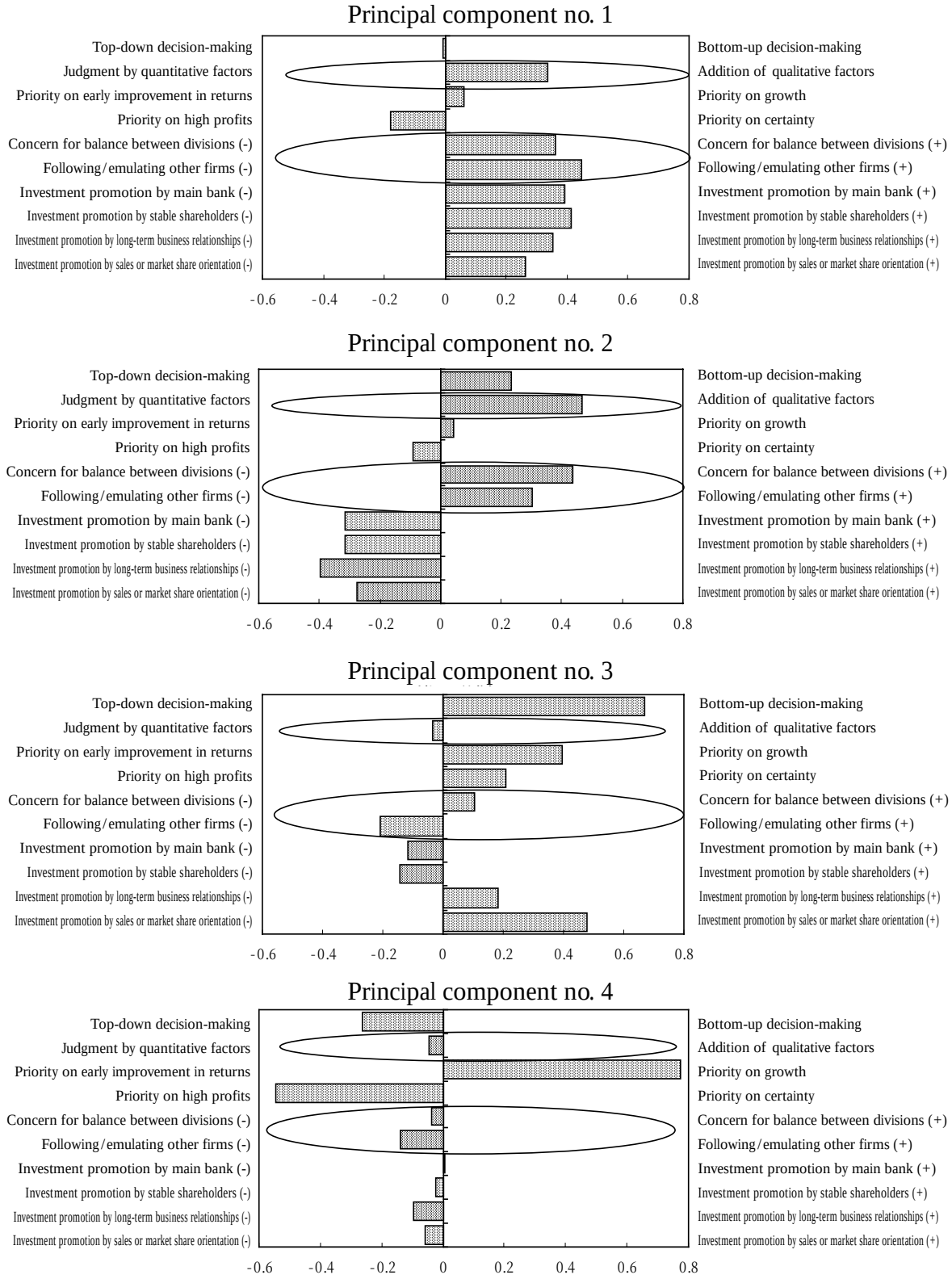
Table 3-3 Statistics of the Principal Components Utilized

	Eigen value	Cumulative contribution rate
Principal component no. 1	1.88	0.19
Principal component no. 2	1.54	0.34
Principal component no. 3	1.05	0.45
Principal component no. 4	1.02	0.55

Table 3-4 indicates the results of the cross-sectional estimation in which the average excess profit rate of each firm is regressed to the scores of the four principal components. It is evident based on the results that the relationships indicated below exist between ROA disparities and investment strategies. First, focusing on the correspondence of the estimated values of the coefficients, principal components no. 1 and 2 are constantly negative, while principal components no. 3 and 4 are constantly positive. In other words, that means that, even in the early 1980s or the early 1990s when the Japanese economy remained robust, investment behavior that was discretionary in terms of asset efficiency was always surpassed by non-discretionary investment behavior.

[10] Eigen values indicate the volume of data (size of dispersion) explained by the relevant principal component and the cumulative contribution rate indicates the extent of the data in the original data set that is covered when utilization is terminated as far as the relevant principal component.

Fig. 3-5 Summarization of Characteristics of Investment Behavior During the 1980s by Principal Components Analysis



Note: The values on the horizontal axis indicate the degree of correlation of the principal component of the factors on the right-hand vertical axis.

Table 3-4 Estimation Results of the Correlation between Excess Profit Rate and Investment Behavior (Principal Component no. 1 ~ 4)

** = significant at 1%, * = significant at 5%

Dependent variable: Average excess profit rate FY 1980-84

	Principal component no. 1	Principal component no. 2	Principal component no. 3	Principal component no. 4
Estimated value of coefficient	▲0.490**	▲0.114	0.511**	1.060**
t value	2.69	0.50	2.96	3.92

Dependent variable: Average excess profit rate FY 1988-92

	Principal component no. 1	Principal component no. 2	Principal component no. 3	Principal component no. 4
Estimated value of coefficient	▲0.476**	▲0.221	0.143	0.137
t value	3.22	1.21	1.02	0.63

Dependent variable: Average excess profit rate FY 1995-99

	Principal component no. 1	Principal component no. 2	Principal component no. 3	Principal component no. 4
Estimated value of coefficient	▲0.379**	▲0.120	0.263*	0.354
t value	2.92	0.75	2.14	1.84

Especially, the estimated value of the coefficient of principal component no. 1, which embodies discretionary investment behavior supported by Japanese-style corporate governance such as the main bank or stable shareholders, is significantly negative. Discretionary corporate investment behavior supported by the main bank is generally considered to lag behind the times as the result of changes in the environment in the 1990s when it was no longer possible to neglect global competition; it is evident based on the analysis of this section, however, that such tendency had already emerged at least by the 1980s.

Next, turning attention to characteristics by period, it can be pointed out that the relationship between excess profit rate and investment strategies becomes generally less distinct (significant) around 1990, that is, the time of the bubble economy, than at other periods. The profit rate essentially should have the functions of conveying the market evaluation of the outcome of investment strategies and promoting efficiency through the reallocation of resources and the revision of corporate investment strategies; the possibility has been pointed out, however, that the surge in asset prices, the prosperity of equity finance and other distortions caused by the expansion of financial activities that are far apart from the real economy may have weakened the signal function of profit rate.

It was possible to confirm the following points based on the analysis:

1. Though not all, a certain portion of inter-company disparities in ROA is explained by differences in investment strategies.
2. The diverging point of investment behavior that is critical in determining ROA disparities is whether qualitative factors are added (discretionary) or not, namely the absolute priority on quantitative evaluation (non-discretionary) and non-discretionary surpasses discretionary. In this sense, the so-called “Japanese-style” management has not been effective since at least the 1980s.

3. In determining ROA disparities, it is not possible to tell which is the most outstanding of the characteristics of whether bottom-up or top-down, low-risk orientation (priority on certainty) or high-return orientation (priority on profit rate) or whether or not there is a sales or market share orientation. It is thought rather that multiple optimal solutions exist based on business characteristics, conditions of competition, corporate governance and various other factors and, in this respect, there were not any particular problems with "Japanese-style" investment decisions[11].

[11] Based on the results of the cross tabulation of Nakamura (2000) reproduced in Fig. 3-3, this point is consistent with the fact that firms with favorable business performance have not necessarily changed their behavior in regard to bottom-up decision-making, pursuit of long-term profit, priority on certainty and an orientation toward maintaining and expanding sales or market share. In contrast, points with a strong relationship to discretionary investment behavior, such as considerable addition of qualitative factors, concern for balance between sectors and following/emulating other firms are moving toward decline without regard to management performance.

Concluding Remarks -In pursuit of improvement in Japanese corporate ROA-

We would like to give consideration finally to the direction for realizing improvement in the ROA of Japanese corporations while referring back to the analyses thus far.

The results of the analysis of the microstructure of the persistent ROA decline indicate that movement toward the creation of profit opportunities has stagnated not only at the industry level but also at the firm level and that it is dominated by a major trend of overall deterioration. Even taking into consideration the fact that the subjects of the analyses were listed companies at a mature stage as corporations, these are results that give us a renewed awareness of the harsh situation Japanese corporations have been facing.

However, the true value of microstructure analyses, rather than confirming the harsh situation of Japanese firms, is utilizing them for the purpose of finding the first step toward a breakthrough. What became clear as a result of the analyses in Chapter II of inter-company disparities in ROA is that, rather than disparities based on industry characteristics, it is far more important to attribute them to disparities between firms within the same industry, i.e., firm-specific factors such as investment strategies. It was also found that industries in which ROA decline was relatively small maintained a broad right-hand tail (high ROA side) in the distribution of ROA by firm. These facts when viewed from a different perspective indicate that, regardless of the industry, there is potential for the continuous emergence of firms that acquire an excess profit rate (creation of profit opportunities) and raise their ROA through competition or innovation relating to corporate management. When expressing this process within the framework of "within-between" analysis, a virtuous cycle becomes apparent in which the positive contribution of the gross positive "within" effect (creation of profit opportunities) first expands and the gross negative "within" effect of firms that are affected by that (loss of profit opportunities) is absorbed in the course of time by the positive contribution of the "between" effect due to the reallocation of resources (ceaseless shift of resources toward relatively dominant firms). Unfortunately, the current situation of listed companies in Japan is characterized by expanding inter-company disparities due to the accelerating broadening of the left-hand tail of the distribution (loss of profit opportunities) within the context of a small gross positive "within" effect with the level overall declining and, with the exception of a slightly positive "between" effect, gives the appearance of a state of extreme opposites.

There is the argument that the forced exit of firms with poor performance should be promoted in order to find a way to break with these circumstances. However, given the scarcity of firms that are in a position to create profit opportunities and serve as absorbers for the assets and employment of the firms that exit, that would require careful consideration. Though it is important of course to provide further for an environment (legal, taxation, flexibility of financial and labor markets) that would allow a smooth exit from the market through M&As or the sale of firms and assets, in light of the current situation in which the persistence of the excess profit rate has a positive correlation with industry ROA, stagnation in the creation of profit opportunities is seen to be a more fundamental issue. Aside from how the move toward acquisitions and capital participation by foreign firms, which has been picking up speed in recent years, can be evaluated in terms of accepting the task of maintaining and creating jobs in the domestic market, there is no doubt that it is necessary to demand outstanding management whether domestic or foreign.

Meantime, the purpose of the analysis of Chapter III is to conduct the fact finding that is required for the purpose of promoting sound competition leading to the creation of profit opportunities and for Japanese corporations not to lose sight of the path to proceed, focusing on differences in investment strategies that have given rise to ROA disparities. Though signifying nothing more than relative worth in the midst of overall decline, solid persistence was recognized

in ROA disparities and that was largely attributable to firm-specific factors. What becomes clear as the background of ROA disparities is the fact that, whether or not absolute priority is placed on quantitative evaluations in corporate investment behavior is virtually the only factor that has continued to decide the outcome. The truth of the matter is that there has been no definite tendency indicating which of the other factors are responsible for ROA disparities and that means that there is a strong possibility that multiple optimal solutions exist based on firm characteristics, conditions of competition, corporate governance and various other factors. Even though "Japanese-style" management has been responsible for the decline in efficiency, in the sense of adding qualitative factors, the stereotypical idea that conventional investment judgments and employee relations must all be discarded as so-called "global standards" are adopted is also a misleading view and what is truly necessary now is a cool-headed and steady attitude to address problems.

It has become evident recently that the penetration of corporate investment behavior based on quantitative evaluation and the move toward restructuring operations and assets[1] have been steadily accelerating among Japanese corporations. It is anticipated that such changes in behavior will lead to an improvement in aggregated ROA through ROA improvement of individual firms (enhancement of the "within" effect)[2] and dynamism in resource allocation that expands the asset share of firms that are the most highly efficient ("between" effect).

Junichi Nakamura (e-mail: junakam@dbj.go.jp)

[1] Restructuring of assets referred to here does not of course mean the retirement of assets that have already become obsolete or the unsubstantial shift of assets to the off-balance sheet such as those described in Chapter 1. It means finding buyers that are more capable of managing the assets in question with greater efficiency than your own firm and enhancing your own ROA, while shifting assets in a way that enhances asset efficiency for the economy as a whole.

[2] From the perspective of creative destruction, there is also the approach, as indicated by Caballero and Hammour (1996), for example, that the incompleteness of contracts between labor and management over the firm-specific investment causes inefficiency and stagnation in innovation due to disparities between creation and destruction. We hope to deal with this issue in future empirical analyses taking theoretical developments of recent years such as this into account.

Appendix – Correspondence between the industry classification used in the study beginning in Chapter II and the industry classification of the Development Bank of Japan (mid- and sub-categories)

Development Bank of Japan classification (mid- and sub- categories)		Corresponding industry classification in the study
Code	Industry	
000100	Foods	1
000300	Textiles	3
000700	Paper & pulp	7
000900	Publishing & printing	9
001100	Chemicals *1	11
001160	Pharmaceuticals	12
001300	Oil refining	13
001500	Rubber products	15
001700	Ceramic, stone & clay products	17
001900	Iron & steel	19
002100	Nonferrous metals	21
002300	Metal products	23
002500	General equipment	25
002700	Electrical equipment	27
002910	Automobiles & automotive parts	29
002900	Transport equipment *2	30
003100	Precision equipment	31
009110	Plastic products	32
000500	Lumber & wood products	91
009120	Leather products	91
009130	Furniture & fittings	91
009140	Other petroleum products	91
009150	Coal products	91
009160	Weaponry	91
009190	Other manufacturing industries	91
010100	Agriculture	101
010500	Fisheries, marine & aquaculture	101
020100	Mining	101
030100	Civil engineering and construction	301
030300	Dredging	301
039100	Other (construction)	301
040110	General trading firms & commodity sales	401
040100	Wholesale *3	402
040310	Department stores	403
040320	Supermarkets	403
040390	Other retail	403
040330	Restaurant operators	404
060100	Real estate	601
070100	Rail roads	701
070300	Roadway passenger transport	701
070500	Roadway cargo transport	701
070700	Shipping	701
070900	Airlines	701
071100	Warehousing	701
071300	Other transportation-related	701
071500	Communication	715
090510	Private sector broadcasting	715
080110	9 electrical power	801
080310	Gas supply	801
090100	Hotels	901
090300	Amusement services	903
050190	Money lending, etc.	991
090700	Automobile-related services	991
090990	Other rental & leasing	991
091100	Medical treatment	991
091312	Research institutes	991
091500	Information services	991
092100	Leasing	991
099100	Other services	991

Industry classification used in the study	
Code	Industry
1	Foods
3	Textiles
7	Paper & pulp
9	Publishing & printing
11	Chemicals (excluding pharmaceuticals)
12	Pharmaceuticals
13	Oil refining
15	Rubber products
17	Ceramic, stone & clay
19	Iron & steel
21	Nonferrous metals
23	Metal products
25	General equipment
27	Electrical equipment
29	Automobiles (& automotive parts)
30	Other transport equipment
31	Precision equipment
32	Plastic products
91	Other manufacturing industries
101	Agriculture, forestry, fisheries & mining
301	Construction
401	General trading firms
402	Specialized trading firms
403	Retail
404	Restrant
601	Real estate
701	Transportation
715	Communication & broadcasting
801	Electricity & gas supply
901	Hotels
903	Amusement services
991	Other services

Notes: 1. Excluding pharmaceuticals (001160)
2. Excluding automobiles & automotive parts (002910)
3. Excluding general trading firms & commodity wholesales (040110)

References

(In Japanese)

Development Bank of Japan, 1999. "1998・1999・2000 nendo Setsubi Toshi Keikaku Chosa Hokoku (Survey on Planned Capital Spending for Fiscal Years 1998, 1999 and 2000)," *Chosa* **2** (October).

Kurosawa, Y. and Wakasugi, T. 1982. "Business Risk to Shihon Kosei (Business risk and capital composition)," *Keizai Keiei Kenkyu* **3-1**, Research Institute of Capital Formation, Japan Development Bank.

Maeda, E. and Yoshida, K. 1999. "Shihon Koritsu wo Meguru Mondai ni Tsuite (Problems relating to capital efficiency)," *Chosa Geppo* (October), pp. 27-53, Bank of Japan.

(In English)

Caballero, R. J., and M. L. Hammour, 1996. "On the Timing and Efficiency of Creative Destruction," *Quarterly Journal of Economics*, **111**(3), pp. 805-852.

Haltiwanger, J. C., 1997. "Measuring and Analyzing Aggregate Fluctuations: The Importance of Building from Microeconomic Evidence," *Federal Reserve Bank of Saint Louis Review* May/June.

Haltiwanger, J. C., 2000. "Aggregate Growth: What Have We Learned from Microeconomic Evidence?," *OECD Economics Department Working Papers*, **267**.

Nakamura, J., 2001. "Empirical Reassessment of Japanese Corporate Investment Behavior: Features and Changes since the 1980s, based on Micro-level Panel Data," *DBJ Research Report* **12** (March).

Odagiri, H., and H. Yamawaki, 1986. "A Study of Company Profit-rate Time Series: Japan and the United States," *International Journal of Industrial Organization*, **4**: 1986, pp. 1-23.

Odagiri, H., and H. Yamawaki, 1990. "The Persistence of Profits in Japan," in D.C. Mueller eds. *"The Dynamics of Company Profits an International Comparison,"* Cambridge University Press, Chapter 8.

Tanaka, K., 2000. "Job Creation and Job Destruction in Japan, 1978 – 1998: An Empirical Analysis Based on Enterprise Data," *DBJ Research Report* **10** (September).

List of Back Numbers (Including JDB Research Report)

No. 23 Microstructure of persistent ROA decline in the Japanese corporate sector: Inter-company disparities and investment strategies (this issue)

No. 22 Recent Trends in the Japanese Economy: The Japanese Economy under Deflation and Prospects of Evolution, February 2002

No. 21 Survey on Planned Capital Spending for Fiscal Years 2000, 2001 and 2002, December 2001

No. 20 Current Situation and Challenges for Cable Television in the Broadband Era, October 2001

No. 19 Recent Trends in the Japanese Economy: The Japanese Economy under Deflation, August 2001

No. 18 Introduction of a Home Appliance Recycling System: Effects & Prospects: Progress towards Utilisation of Recycling Infrastructure, June 2001

No. 17 Survey on Planned Capital Spending for Fiscal Years 2000 and 2001, June 2001

No. 16 Revitalization of Middle-aged and Elderly Workers in Japan's Labor Markets: Requiring the Expansion of the Vocational Training Functions, March 2001

No. 15 Risk-Averting Portfolio Trends of Japanese Households, March 2001

No. 14 Consumption Demand Trends and the Structure of Supply: Focus on Retail Industry Supply Behavior, March 2001

No. 13 Recent Trends in the Japanese Economy: Weakness of Current Economic Recovery and Its Background, March 2001

No. 12 Empirical Reassessment of Japanese Corporate Investment Behavior: Features and Changes since the 1980s, based on Micro-level Panel Data, March 2001

No. 11 Survey on Planned Capital Spending for Fiscal Years 1999, 2000 and 2001, October 2000

No. 10 Job Creation and Job Destruction in Japan, 1978-1998: An Empirical Analysis Based on Enterprise Data, September 2000

No. 9 Recent Trends in the Japanese Economy: Information Technology and the Economy, September 2000

No. 8 Trend of International Reorganization Affecting the Japanese Automobile and Auto Parts Industries, June 2000

No. 7 Survey on Planned Capital Spending for Fiscal Years 1999 and 2000, June 2000

No. 6 Current Status and Future Perspective of the Japanese Remediation Industry: Technology and Market for Underground Remediation, May 2000

No. 5 Recent Trends in the Japanese Economy: The 1990s in Retrospect, March 2000

No. 4 Destabilized Consumption and the Post-bubble Consumer Environment, February 2000

No. 3 The Slump in Plant and Equipment Investment in the 1990s: Focusing on Lowered Expectations, the Debt Burden and Other Structural Factors, January 2000

No. 2 Survey on Planned Capital Spending for Fiscal Years 1998, 1999 and 2000, November 1999

No. 1 Corporate Strategies in Japan's Semiconductor Industry: Implications of Development in Other Asian Countries, November 1999

JDB Research Report

No. 96 Recent Trends in the Japanese Economy: Focused on Fixed Investment and Capital Stock, August 1999

No. 95 Efforts to Protect the Natural Environment in the United States and Germany: Environmental Mitigation and Biotope Conservation, July 1999

No. 94 Survey on Planned Capital Spending for Fiscal Years 1998 and 1999, June 1999

No. 93 Towards the realization of 'environmental partnership': A survey of Japan's environmental NPO sector through comparison with Germany, June 1999

No. 92 The Impact of Demographic Changes on Consumption and Savings, March 1999

No. 91 Recent Research and Development Trends in Japanese Enterprises: Technology Fusion, March 1999

No. 90 Recent Trends in the Japanese Economy: Prolonged Balance Sheet Adjustment, January 1999

No. 89 Impact of Asset Price Fluctuations on Household and Corporate Behavior: A Comparison between Japan and the U.S., December 1998

No. 88 Survey on Planned Capital Spending for Fiscal Years 1997, 1998, and 1999, December 1998

No. 87 Foreign Exchange Rate Fluctuations and Changes in the Input-Output Structure, November 1998

No. 86 Structural Changes in Unemployment of Japan: An Approach from Labor Flow, November 1998

No. 85 Recent Trends in the Japanese Economy: Characteristics of the Current Recession, August 1998

No. 84 R&D Stock and Trade Structure in Japan, August 1998

No. 83 Survey on Planned Capital Spending for Fiscal Years 1997 and 1998, August 1998

No. 82 The Significance, Potential, and Problems of DNA Analysis Research: Establishing Public Acceptance is Essential, May 1998

No. 81 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1996, 1997 and 1998 Conducted in August 1997, March 1998

No. 80 Recent Trends in the Japanese Economy: Growth Base of the Japanese Economy, January 1998

No. 79 Information Appliances: The Strength of Japanese Companies and Tasks for the Future, January 1998

No. 78 Challenges and Outlook for the Japanese Machinery Industries: Impact of ISO14000 Series and Environmental Cost, January 1998

No. 77 Current Conditions and Issues of Computerization in the Health Care Industry: For the Construction of a Health Care Information Network, January 1998

No. 76 Household Consumption and Saving in Japan, December 1997

No. 75 The Direction of Japanese Distribution System Reforms: Strengthening the Infrastructure to Support Diverse Consumer Choices, November 1997

No. 74 Foreign Direct Investments by Japanese Manufacturing Industries and Their Effects on International Trade, October 1997

No. 73 The Impact of the Changing Trade Structure on the Japanese Economy: With Special Focus on the Effects on Productivity and Employment, October 1997

No. 72 An Analysis of Foreign Direct Investment and Foreign Affiliates in Japan, August 1997

No. 71 Recent Trends in the Japanese Economy: Stock Replacement and New Demand as Aspects of Economic Recovery, August 1997

No. 70 Corporate Fundraising: An International Comparison, June 1997

No. 69 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1996 and 1997 Conducted in February 1997, May 1997

No. 68 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1996 and 1997 Conducted in August 1996, August 1997

No. 67 An International Comparison of Corporate Investment Behavior: Empirical Analysis Using Firm Data from Japan, France and the US, April 1997

No. 66 Housing in the National Capital: Analysis of the Market for Housing using Micro Data, March 1997

No. 65 The Environment for Locating Business Operations in Major East Asian Cities, January 1997

No. 64 Direction of Reconstruction of Business Strategy in the Chemical Industry, January 1997

No. 63 Reflection on Discussions Concerning Regulation of the Electric Power Industry: Deregulation of the Electric Power Industry in Japan and Implication of Experiences in the United States, December 1996

No. 62 Current Status and Future Perspective of the Japanese Semiconductor Industry, November 1996

No. 61 A Breakthrough for the Japanese Software Industry?: Responsiveness to Users' Needs is the key, October 1996

No. 60 Recent Trends in the Japanese Economy Focusing on the Characteristics and Sustainability of the Current Economic Recovery, September 1996

No. 59 Analysis of the Primary Causes and Economic Effects of Information: Related investment in the United States and Trends in Japan, August 1996

No. 58 Selected Summaries of Research Reports: Published in FY1995, June 1996

No. 57 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1995 and 1996 Conducted in February 1996, May 1996

No. 56 Recent Trends in the Japanese Economy, May 1996

No. 55 Issues Concerning the Competitiveness of the Japanese Steel Industry, February 1996

No. 54 Changes in the Financial Environment and the Real Economy, January 1996

No. 53 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1994, 1995 and 1996 Conducted in August 1995, October 1995

No. 52 Current Economic Trends: Focusing on the Appreciation of the Yen and its Effects, October 1995

No. 51 Problems Concerning the International Competitiveness of the Petrochemical Industry, October 1995

No. 50 An Economic Approach to International Competitiveness, October 1995

No. 49 Selected Summaries of Research Reports Published in FY1994, July 1995

No. 48 Strategies for Improving the Efficiency of the Japanese Physical Distribution System: Part 2, July 1995

No. 47 Issues on International Competitive Strength of the Auto Industry, June 1995

No. 46 Problems Concerning the International Competitiveness of the Electronics and Electric Machinery Industry, June 1995

No. 45 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1994 and 1995 Conducted in March 1995, June 1995

No. 44 Strategies for Improving the Efficiency of the Japanese Physical Distribution System, March 1995

No. 43 Capital Spending Recovery Scenario Cycle and Structure, August 1994

No. 42 Progress of International Joint Development between Industrialized Countries on the Private Level, May 1994

No. 41 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1993, 1994 and 1995 Conducted in August 1994 , November 1994

No. 40 Selected Summaries of Research Reports Published in FY1993, June 1994

No. 39 Recent Trends in Japan's Foreign Accounts, April 1994

No. 38 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1993 and 1994 Conducted in March 1994, April 1994

No. 37 Economic Zones and East Asia Prospect for Economic Activity Oriented Market Integration, December 1993

No. 36 Japanese Corporate Responses to Global Environmental Issues, December 1993

No. 35 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1992, 1993 and 1994 Conducted in August 1993, September 1993

No. 34 Structure of Profit to Capital in the Manufacturing Industry, September 1993

No. 33 Comparison of the Japanese and The U.S. Labor Markets, October 1992

No. 32 The Relative Competitiveness of U.S., German, and Japanese Manufacturing, March 1993

No. 31 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1992 and 1993 Conducted in March 1993, April 1993

No. 30 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1991, 1992 and 1993 Conducted in August 1992, December 1992

No. 29 Flow of Funds in the 80s and Future Corporate Finance in Japan, November 1992

No. 28 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1991 and 1992 Conducted in February 1992, April 1992

No. 27 An Analysis of Foreign Direct Investment in Japan, March 1992

No. 26 Projection of Japan's Trade Surplus in 1995: Analysis of Japan's Trade Structure in the 80s, February 1992

No. 25 Intra-Industry Trade and Dynamic Development of The World Economy, November 1991

No. 24 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1990, 1991 and 1992 Conducted in August 1991, September 1991

No. 23 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1990 and 1991 Conducted in February 1991, March 1991

No. 22 Trends of the Petrochemical Industry and its Marketplace in East Asia, March 1991

No. 21 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1989, 1990 and 1991 Conducted in August 1990, September 1990

No. 20 Deepening Economic Linkages in The Pacific Basin Region: Trade, Foreign Direct Investment and Technology, September 1990

No. 19 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1989 and 1990 Conducted in February 1990, March 1990

No. 18 Petrochemicals In Japan, The US, and Korea an Assessment of Economic Efficiency, February 1990

No. 17 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1988, 1989 and 1990 Conducted in August 1989, October 1989

No. 16 Impact of the EC Unification on Japan’s Automobile and Electronics Industries, August 1989

No. 15 Industrial and Trade Structures and the International Competitiveness of Asia’s Newly Industrializing Economies, August 1989

No. 14 The Japan Development Bank Reports on Capital Investment Spending: Survey for Fiscal Years 1988 and 1989 Conducted in February 1989, March 1989

No. 13 The Japan Development Bank Reports on Capital Spending: Survey for Fiscal Years 1987, 1988 and 1989 Conducted in August 1988, September 1988

No. 12 Growing Foreign Investors' Activities and the Future of Internationalization, September 1988

No. 11 Futures Tasks and Prospects for the Japanese Machine-Tool Industry, July 1988

No. 10 International Division of Labor in the Machine Industries Among Japan, Asia's NICs and ASEAN Countries, June 1988

No. 9 Trends of the Petrochemical Industry and its Marketplace in East Asia around Japan, May 1988

No. 8 The International Competitiveness of Japan and U.S. in High Technology Industries, April 1988

No. 7 The Japan Development Bank Reports on Private Fixed Investment in Japan, March 1988

No. 6 Economic Projections of the Japan's Economy to the Year 2000, February 1988

No. 5 The Japan Development Bank Reports on Private Fixed Investment in Japan, September 1987

No. 4 Current Trends in the Japanese Auto Parts Industry in Overseas Production, July 1987

No. 3 Current Moves for Foreign Direct Investment into Japan, May 1987

No. 2 Overseas Direct Investments by Japanese Corporations, May 1987

No. 1 Current U.S. Consumption Trends, May 1987