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Changes in Japan's Seniority-Based Wage Structure
- A Comparative Study Between Industries -

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Abstract

Few of the empirical studies concerning Japan's seniority-based wage structure have fully analyzed it from a microeconomics viewpoint, i.e., by examining the differences between industries, companies, and so forth. But it is the companies themselves that determine their wage scales, after considering factors such as business performance, business prospects, and management policy. It should also be noted that Japanese firms attempt to keep their wages in line with the wages of other companies in the same industry.

In this paper the authors analyze Japanese wage structures by industry, using a data set on individuals collected for the *Basic Survey on Wage Structure.* Specifically, for the four survey years of 1979, 1984, 1989, and 1994, we calculated wage functions and coefficients by industry and occupation and analyzed chronological changes in the data. The results are summarized in the following.

In the manufacturing sector, changes in the seniority-based wage structure differed considerably by industry. In general, the relative importance of seniority for blue-collar workers tended to decline while it remained about even for white-collar workers.

Our analysis of white-collar workers in all industries, including nonmanufacturing industries, revealed that the seniority-based wage structure was declining in the banking and insurance industries. In other industries, however, it was basically being maintained up to 1994.

One reason for the varying pace of change in wage structures among industries is growth potential. Our empirical analysis shows that the higher an industry's prospective growth rate, the greater degree to which the pay scale tended to remain seniority-based.

Another reason could be the differences in average wage levels between industries. We found, for example, that the higher the average wage of an industry, the less seniority-based its wage structure tended to be.

This clearly shows that the Japanese seniority-based wage structure has undergone some changes in recent years and the changes were clearly affected by industry type and occupation.

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Introduction

Three of the principal characteristics of the Japanese employment system are lifetime employment, seniority by firm-specific length of service(i.e., job tenure), and firm-based labor unions. These are so important in the Japanese employment system that they are referred to as "the three sacred treasures." Seniority is reflected in both wages and promotions.

Wages based on seniority tend to increase with age and length of service. This tendency is not restricted to Japan, of course, but is found in many other countries as well, with substantial differences by country. The special features of the Japanese wage structure are: 1) white-collar wages increase more sharply together with length of service than they do in Western countries; and 2) blue-collar wages in Japan rise substantially with seniority, while in Europe and the U.S. the curve is almost flat.[1]

It should be noted that the "three sacred treasures" do not apply to all workers in Japan. In fact, it applies to less than 20 percent of the total workforce, principally affecting male, full-time employees of large companies. It should also be noted that many Japanese companies have regarded the seniority and lifetime (or long-term) employment systems as the ideal and have chosen to adopt these systems whenever possible. Japanese employees also consider the systems to be desirable. Consequently, it can be concluded that the seniority and lifetime employment systems are representative models of Japanese labor relations. They are matters of wide general interest in Japan and they exert a strong influence on labor relations.

In the contemporary Japanese labor market, marked by a maturing economy and a prolonged recession since the burst of the economic "bubble" in the late 1980s, changes are being introduced in the seniority and lifetime employment systems. In the backdrop of that situation, this paper clarifies how the traditional Japanese seniority-based wage structure is changing.

The literature has thus far paid little attention to the microeconomic aspects

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[1] See paper published by MITI Industrial Policy Bureau, 1993, p. 103

of Japan's seniority-based wage structure, such as by examining the differences by industry and by company. But it is companies that decide on their own wage structures, and their decisions reflect the future prospects of their business, industry trends, management strategy, and other factors. Japanese companies also tend to keep their wages in line with wages paid by other companies in the same industry. In our effort to clarify the current status of the Japanese wage structure, we also aim at identifying the factors behind any changes taking place. Using data on individuals from the Ministry of Labor's *Basic Survey on Wage Structure*, therefore, we analyzed by industry the influence of the seniority system and its chronological changes on the wage structure. As far as we are aware, no previous study has used this same method of analysis.

In Section 2 of this paper, we review the literature on seniority-based wage structures.[2] In Section 3, we analyze data by estimating wage functions and calculating variable coefficients. Our conclusions comprise Section 4.

2. Review of the literature

2.1 Theories

The reasoning behind seniority-based wage structures is broadly represented by four different theories.

(1) Support of living conditions theory

The first theory is the support of living conditions theory, which states that as workers grow older their wages rise to ensure that their cost of living is covered. Under this theory, a worker's wages increase even after his skills are no longer improving. The reason employers adopt such a wage structure are: i) to keep wages in line with the cost of living in accord with union demands (if this can be realized by

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[2] As surveys of wage profiles, see Ohashi (1990), Ono (1989), Ito & Teruyama (1995), Tachibanaki (1996), and Ohta and Tachibanaki (1998) referred to later. The descriptions of the above theories are based on these surveys.

transferring a part of value productivity between generations, employers will favorably consider the wishes of workers); ii) a seniority-based wage structure will save on total labor costs if there is a higher proportion of younger workers; and iii) pay differentials by age offer employees the prospects of a higher standard of living in the future and encourage them to remain with the company.

There are several studies which support this theory : Ono (1989), Ohashi (1983), and Ohta and Tachibanaki (1998). For example, Ohashi, despite his basic standpoint on human capital, which will be mentioned later, develops a theoretical model of the support of living conditions theory in order to prove the possibility that wage profiles reflect the cost of living of workers. Ohashi says that wages do not increase in line with marginal productivity because in-house skills are firm-specific. If management seeks to maximize profit, they will end up not paying younger workers enough to support their livelihood. Therefore, employers must also consider the consumption patterns of workers to determine wage profiles, which is why wages do not reflect marginal productivity and, instead, are closely related to consumer life cycle patterns. Ohta and Tachibanaki (1998) examined various theories and compared the importance between age effect and length-of-service effect.

(2) Human capital theory

A second, widely accepted theory is represented by a model based on the human capital theory, whose main factor is increased productivity. The main advocates of this theory include Becker (1964) and Mincer (1974). According to them, a wage increase is provided in response to additional productivity brought about by on-the-job training (OJT), formal training, and other factors. According to the theory Becker presents, human capital is divided into two categories -- general human capital, which demonstrates productivity in any company, and firm-specific human capital, usable only in a specific company. In the first half of a worker's career with a company, training costs for the accumulation of general human capital are paid for entirely by the worker. On the other hand, because firm-specific human capital is of no value to other companies, training costs are shared by the employer and the employee. In the second half of a worker's career, the benefits of training are distributed with cost-sharing. Viewed this way, wages paid in the early years of a worker's career tend to

exceed productivity while later in the worker's career productivity surpasses wages (sharing model)as it increases with training.

Koike's theory on career history (1981) is also classified as a human capital theory. According to Koike, a worker starts in a company with an easy job and is gradually promoted, working on closely related but increasingly difficult jobs. Through such OJT, the worker slowly acquires the skills needed in the company, and his wages increase over a period of time.

(3) Life-cycle incentives theory

A third theory is the life-cycle incentives theory. In this theory, a contract exists that pays workers more in the second half than in the first half of their employment, thus contributing to the prevention of shirking, because opportunity costs would be substantial if they lost their jobs due to such shirking. Lazear (1979 & 1981) is one proponent of this model that advocates paying less than productivity in the first half of a worker's career and more in the second half. In this theory, incidentally, Lazear justifies compulsory retirement at a certain age, arguing that employees at retirement age are being paid more than their productivity is worth.

(4) Insurance contract theory

According to this theory, employers gradually accumulate performance data concerning the productivity of employees throughout the employment period, and based on such data they revise wages. In this way of thinking, a worker who avoids risk is assured of receiving the current wage level, and is also assured that his pay will not be reduced below an amount equal to the insurance premiums. The longer a worker remains with a company, the shorter his remaining period of employment will become, requiring smaller insurance premiums and allowing the worker's wages to be increased. According to this model, because of insurance premium costs, wages never reach a par with productivity throughout a worker's employment (Harris and Holmstrom, 1982).

PART 2

2.2 Summary of related empirical studies

The foregoing are the main economic theories explaining the seniority-based wage structures. Next, we will discuss the main problems related to obtaining evidence to support these theories.

First, it is not always clear whether seniority should be defined as an age variable or a length of service variable. Under the support of living conditions theory, for example, the main variable will be age. For the human capital theory, on the other hand, the main variable will be length of service, i.e., the number of years an employee has been employed by a company, called job tenure frequently. The variable of total experience accumulated in the labor force is also used. What variable should be used as an indicator of seniority is thus controversial.[3] Presently, the only agreement is that studies specify which variable they use, whether age, length of service, or total experience accumulated in the labor force.

Second, even if it were possible to use a single variable -- say, length of service -- to represent seniority, it is not a simple matter to determine, based on the results of statistical analysis or quantitative economic research, which of the above theories is the most realistic. Theoretically, for example, the human capital theory (in particular, the firm-specific training theory) and the life-cycle incentives theory both conclude that the slope of the earnings profile is an increasing function of length of service. In most cases, the estimate of the wage function uses length of service or length of service squared as the explanatory variable, and adds other explanatory variables for regression analysis. When using this formula to estimate the wage function, it is impossible to determine with absolute certainty, based on an estimated length of service coefficient, whether the human capital theory or the life-cycle incentives theory has greater realistic validity, although it is possible to determine that wages are an increasing function of length of service. Lazear (1981) was the first to point this out.

Let us next survey the empirical studies related to Japanese wages.

Stoikov (1971) explains the pay structure of Japanese manufacturing industries using empirical analysis to clarify how labor skills and knowledge are

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[3] See Ohta and Tachibanaki(1998).

produced. Stoikov uses publicly available data from the Ministry of Labor's 1967 *Basic Survey on Wage Structure* for his study. He uses fixed monthly wage as the explained variable, and uses education, occupation, years in employment prior to taking current position and the square of that figure, and length of service and the square of length of service as other explanatory variables, and conducts regression analysis. Stoikov concludes from his results that external experience is very important, and is interchangeable to some extent with internal experience; also, education is strongly complementary to both internal and external experience, and the marginal productivity of education increases with the level of education. His results question the realistic validity of seniority-based wage structures.

Ono (1989) estimates wage functions by modeling the current situation by comparing human capital theory with the support of living conditions theory. In his study, he used the data set on individuals from the *Basic Survey Report on Wage Structure* for the three years of 1970, 1975, and 1980. The regression model in Case 1 uses hourly pay as the explained variable and company size, education, years of experience in the current occupation, years of external work experience and that figure squared, and length of service and length of service squared as the explanatory variables. In Case 2, the explanatory variables are company size, education, years of experience in the current occupation, age and age squared, and length of service and length of service squared. The analysis found that 60% of the difference between the starting salary paid to new male graduates and the salary of male employees with average attributes can be explained in terms of age, and the remaining 40% by human capital indices, such as education, length of service, years of experience in the current occupation, and so forth. Ono thus concludes that the support of living conditions theory has relatively higher validity than the human capital theory.

The recent study by Ohta and Tachibanaki (1998), however, show a slightly different result from Ono (1989), proposing that the relative importance of age or of length-of-service on the determination of wages is influenced by the sample of employees. They examined various samples, which are classified by occupation (white-collar versus blue-collar), employee's education, and size of firm, and obtained the result that in some samples length-of service dominated age, while in other

samples age dominates length-of-service. According to Ohta and Tachibanaki the former cases are majority, and thus suggest that length-of-service is more important than age. It is possible to describe that one of the purposes of this study is to examine it for different industries.

Clark and Ogawa (1992) conducted an analysis based on data from 1971, 1976, 1981, and 1986, arguing that the Japanese labor market experienced considerable change because of rapid aging of the workforce in the 1980s and economic reforms following the oil crises. They used publicly available data from the *Basic Report on Wage Structure*, instead the data set for individuals, and used the natural logarithm of the total of monthly salary payment and monthly bonus as the explained variable, and years in employment and that figure squared, length of service and length of service squared, the mixed form of total years in employment and length of service, and education as explanatory variables. After calculating estimates for different-sized companies (large, medium, and small), they argued that the effect of general experience and length of service on wage increases in Japan changed in the years between 1971 and 1986. They concluded that there has been a marked decline in the relative importance of length of service.

Hashimoto and Raisian (1992) attempted to verify the above theory of Clark and Ogawa. Like Clark and Ogawa, they used publicly available data from the *Basic Report on Wage Structure* (1985-1988) instead of a data set on individuals. The regression model uses the natural logarithm of wages as the explained variable, and for explanatory variables uses total years of employment and that figure squared, length of service and length of service squared, the mixed form of total years of employment and length of service, and education. They conducted analyses by company size (small, medium, large), and found a clear contrast between different company size in the rate of wage increase for male employees in Japanese nonagricultural sectors based on total years of experience in the labor force (general experience plus firm-specific experience). In large companies, the wage profile curve flattened in the first half of the 1980s but rose again in the second half. In medium-size companies, wage profiles flattened markedly. In small companies the flattening was not so severe, and, after 15 years or more of length of service, the curve rose more

steeply in 1988 than in 1980.

Tachibanaki (1996) examined wage structure for the past 30 years, by employing a large number of explanatory variables, and presented the change in the role of each explanatory variable in the determination of wage differentials. Genda (1998) conducted the similar study for recent data, and some related studies. Both authors obtained a gradual decreasing role of length-of-service (i.e., job tenure) in wage differentials, suggesting that the role of human capital (i.e., firm-specific human capital) or seniority based wage determination lost its importance marginally.

Ito and Teruyama (1995) analyzed the following two theories on the correlation between wages and business performance. According to the life-cycle incentives theory, the longer an employee's period of service with a company, the weaker that employee's career concerns become, and therefore the pay structure becomes more dependent on business performance. In this theory, the correlation between wages and business performance strengthens with length of service. In the insurance contract theory, employees are paid equal-level wages at the beginning of their service, when their abilities are unknown, and subsequently, as more performance data is accumulated concerning their productivity, the wage distribution widens, reflecting differences in ability. As a result, their wages no longer reflect the uncertainty of short-term business performance, and the correlation between wages and business performance weakens with longer service. The results of a questionnaire directed at the automobile, electrical, chemical, electric power, and department store industries (sample: 1,816 persons; survey in July 1993) found that companies demonstrating the features of both theories exist with regard to the wage/business performance correlation. These results suggest that there is no single effect of variables; rather, there are multiple effects, and the effect of each factor varies between companies. In other words, it is impossible to explain seniority-based wage structures from the perspective of incentive mechanisms alone, but other theories are not necessarily more cogent.

It can be concluded from a review of the literature that several theories and related empirical studies of the reasoning behind the seniority-based wage structure exist and that although each theory may be valid on certain points, no single theory

can explain the full picture. The results of the empirical studies and the validity of existing theories are discussed later in this paper.

3. Results of analyses

3.1 Estimate of wage functions

Wage functions were estimated using the method of least squares to observe chronological changes of wage profiles in Japan by industry.

Materials used were the data set of individuals from the *Basic Survey on Wage Structure* in the four years of 1979, 1984,1989, and 1994. The model for calculation is as follows:

$$\begin{aligned} Wage = {} & a_0 + (a_1 + a_2 0)\, T + (a_3 + a_4 0)\, T^2 \\ & + (a_5 + a_6 0)\, A + (a_7 + a_8 0)\, A^2 \\ & + (a_9 + a_{10} 0)\, TA \\ & + a_{11} 0 \\ & + a_{12} SC_1 + a_{13} SC_2 \\ & + a_{14} SH_1 + a_{15} SH_2 + a_{16} SH_3 \\ & + a_{17} R_1 + a_{18} R_2 + a_{19} R_3 + a_{20} R_4 \\ & + a_{21} P_1 + a_{22} P_2 \end{aligned}$$

Dependent variable: Real wages after conversion to hourly wage (convert total of contractural cash earnings and annual special cash earnings into an hourly wage, and calculate real wages using the 1990 final consumption expenditure of households in the domestic market deflator.[4]

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[4] Obtained from original data using the following formula:

Converted hourly rate of pay = Contractural cash earnings + Annual special cash earnings (including bonus and term-end allowance) divided by 12

Actual number of scheduled hours worked + Actual number of overtime

Explanatory variable

T : Length of service (Tenure)

A : Age

O : occupation dummy 0 = Production 1 = Non-production

SC1 : Company size dummy 0 = Other 1 = 1,000-4,999 persons

SC2 : Company size dummy 0 = Other 1 = 5,000 or more persons

SH1 : Schooling dummy 0 = Other 1 = High school graduate SH2 : Schooling dummy 0 = Other 1 = Technical college or junior college graduate

SH3 : Schooling dummy 0 = Other 1 = University graduate

R1 : Class of position dummy 0 = Other 1 = Foreman

R2 : Class of position dummy 0 = Other 1 = Chief

R3 : Class of position dummy 0 = Other 1 = Section manager

R4 : Class of position dummy 0 = Other 1 = Director

P1: Prefectural dummy 0 = Other 1 = Tokyo

P2: Prefectural dummy 0 = Other 1 = Prefectures where income per employee is ¥5 million or more*

* Saitama, Chiba, Kanagawa, Kyoto, Osaka, Hyogo, Okayama, and Kagawa prefectures

The reasons for introducing each of the explanatory variables are as follows. Age and length of service were introduced separately, because it was assumed that when considering the seniority system each effect could produce different, independent effects. Each variable has been made its square function, because many actual examples support its square functions. Their mixed form is included, however, because an interaction effect is possible. The occupation dummy focuses on the

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hours worked

differential between blue collar and white collar workers. As stated at the beginning, company size is based on the dual structure theory, which focuses on the differential between companies of different size in Japan. The schooling dummy conforms to the human capital theory of standard school education.

New variables that are not found in previous studies are the dummy variables that focus on job grades in the workplace, and the prefectural dummy. As noted by Tachibanaki (1996) and Genda (1998), the job position of workers in the Japanese workplace has a strong effect on wages, and there are also considerable differences in wages between regions. That is why two variables were introduced.

Estimates were calculated for: (1) all industries; (2) major groups by industry(i.e., one-digit level); and (3) medium groups by industry(i.e., two-digit level) in the manufacturing industries. Categories conform to the Ministry of Labor's *Basic Report on Wage Structure*. In the medium groups by industry, estimates were calculated for 25 industrial sectors -- food manufacturing; manufacture of textile mill products (except apparel and other finished products made from fabrics and similar materials); manufacture of lumber and wood products (except furniture); manufacture of furniture and fixtures; manufacture of pulp, paper, and paper products; publishing, printing, and allied industries; manufacture of chemicals and allied products; manufacture of general machinery; manufacture of electrical machinery, equipment, and supplies; manufacture of transportation equipment; manufacture of precision instruments and machinery; manufacture of ordnance, and miscellaneous manufacturing industries; banking and trusts; securities; commodities trading; insurance; railways; communication; electricity; gas; and information services, research, and advertising.

Partly because of the large number of samples[5] ,the estimated parameter values for each industry at the time of each survey were statistically significant at an equivalent of 1%.[6]

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[5] See Table 1 for sample numbers for each age class by industry.

[6] For medium groups by industry, however, the estimated value for some

PART 3

3.2 Effect on wage increases of increase in age (age effect) and increase in length of service (length-of-service effect)

By calculating the differential coefficient of age when the length-of-service figure is fixed, based on assumed wage function values obtained from estimates, we analyzed the net effect of age ("age effect") on wage increases by industry and occupation. The analysis by occupation covered production workers ("blue-collar workers") and supervisory, clerical, and technical workers ("white-collar workers"), consistent with classifications used in the *Basic Survey on Wage Structure*. Length of service was fixed at seven stages, between 7 and 30 years. Observed results of representative examples of blue- and white-collar workers employed for 10 years are shown in Figures 1-1, 1-2, 2-1, and 2-2.

(Figure 1-1) (Figure 1-2) (Figure 2-1) (Figure 2-2)

By calculating the differential coefficient of length of service when age is fixed, we also analyzed the net influence of added years of service on wage increases. Age was fixed at six stages between 30 and 55, each stage 5 years apart, and an effect similar to the age effect was found. Representative examples of results for 40-year-old blue- and white-collar workers are shown in Figures 3-1, 3-2, 4-1, and 4-2.

(Figure 3-1) (Figure 3-2) (Figure 4-1) (Figure 4-2)

Before proceeding, let us define gradual increase and decrease in age and

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parameters did not reach 1% significance. For details see Table 2.

length-of-service effects. Gradual increase or decrease of the age effect means that a worker's earnings gradually increase or decrease per additional year of age. In charts, this movement is shown by a rising (or falling) line. Gradual increase or decrease of the length-of-service effect means that the amount of wage increase per additional year of service increases or decreases gradually with longer service. In charts, this movement is shown by a rising (or falling) line.

Even if the age and length-of-service effects are positive, i.e., if charts show a rising wage curve, it is important to confirm whether the rising curve is increasing at a decreasing rate or perhaps flattening. A particular feature of Japan is that employment is generally understood to involve a long-term commitment, and companies must introduce changes to their wage structure gradually over a long period. It is thus important to observe changes in the shape of wage increases.

Besides analyses of the age and length-of-service effects by major groups by industry, analyses were also conducted by medium groups by industry in the manufacturing industries. Further, for the separate industry groups in the major groups by industry, coefficients of variation in wage payments were calculated for each age class, compared chronologically and between industries, and analyzed to determine if changes occurred in the way in which seniority-based wages were increased.

The next section describes the results of analysis for age and length-of-service effects in manufacturing industries, followed by the results of analysis for all industries, including nonmanufacturing industries such as finance and insurance. The first half of the section on the results of analysis for all industries gives the results for age and length-of-service effects; the second half gives results by calculating the variation coefficient of the wage payment.

3.3 Results of analyses of age and length-of-service effects in manufacturing industries

Manufacturing encompasses a diverse range of industries, and personnel policies vary among growing, mature, and declining industries. To conduct a detailed analysis of changes in wage structures in the manufacturing industry, the age and

length-of-service effects were analyzed by medium groups by industry. The analysis produced the following results.

Figures 2-1 and 4-1 show that age and length-of-service effects increased gradually for blue-collar workers in all industries in 1979 but afterward the effects began to vary by industry and no overall trend was evident in 1994. Figures 2-2 and 4-2 show that for white-collar workers, age and length-of-service effects continued to increase gradually, minor differences occurred between industries, and the seniority system was basically maintained. Details of the analysis are given below.

The results for blue-collar workers were as follows.

1) In 1979, age and length-of-service effects gradually increased in all industries except textiles, suggesting that the seniority-based wage structure was basically intact.

2) From 1984 onward, age and length-of-service effects varied considerably by industry: they gradually decreased in 1994 for the textile and chemical industries, remained constant in the iron and steel industry, and gradually increased in the electrical machinery and transportation machinery industries.

The results we observed indicate that both age and length-of-service effects are weakening for blue-collar workers, i.e., the validity of both the support of living conditions theory and human capital theory is being gradually eroded over time.

Results were as follows for white-collar workers.

1) With the exception of the iron and steel industry, the basic trend for age and length-of-service effects was a gradual increase in both survey years.

2) The degree of increase, however, varies by industry. In 1994, the electrical machinery industry had the largest rate of gradual increase of age and length-of-service effects, followed by the transportation machinery, textile, and chemical industries. The electrical machinery, transportation machinery, and textile industries showed a stronger rate of gradual increase in 1994 than in 1979.

These results show considerable variation between industries in the degree of influence of age and length-of-service effects, and that both effects declined overall over time for blue-collar workers. What are the influencing factors behind these results? To answer this question we first considered reasons for the decline in age

and length-of-service effects.

First, the question arises of the importance of skill. Regarding the length-of-service effect, it is possible to forecast that the effect of skill is declining in Japanese labor relations. In particular, the role of firm-specific skills is gradually being eroded. It is thus possible that companies are reducing the proportion of wages for firm-specific training and skill.

Our observation of the moderate decrease in the importance of skill is based on the advances of automation and computerization in the workplace. Many fact-finding surveys have found that workers are becoming polarized into skilled experts who have ability and skill, and non-skilled workers. The declining length-of-service effect indicated in our study of wages suggests the declining importance of skill.

Second is the reduced ability of companies to pay. This point will be discussed later in detail together with a discussion of the growth potential of companies.

Third is the problem of an aging workforce. A breakdown by age group clearly shows that the Japanese population is aging, and that aging is affecting companies. Under the seniority system, middle-aged and older employees are paid relatively high wages, and a rising proportion of older workers thus increases a company's labor costs. Because a key management strategy for companies in a slow-growth economy is the reduction of labor costs, the greater number of older workers inevitably leads to more companies revising their seniority-based wage structures. The aging of the workforce is therefore directly linked to the growth potential of companies, as is discussed later.

Fourth is the changes in the way Japanese wages are determined. There is general acceptance that because of slow corporate growth and changes in the industrial structure, technological structure, and so forth, a switch to merit- and profit-based pay is more likely to improve productivity than seniority-based wages. In other words, both labor and management are beginning to accept the fact that workers with enthusiasm, ability, and good performance records should be paid higher wages, and those with less of these attributes should be paid less. A wage structure based on merit obviously reduces the significance of seniority when determining wages. Since

differences arise between industries on the extent that merit- and performance-based pay is introduced, there are also considerable differences in the relative importance of seniority, which is one factor explaining the differences in wage payments between industries.

Next, the background to the differences in age and length-of-service effects between industries is discussed. As stated earlier, it was assumed that one factor explaining the differences in wage payments between industries was differences in the extent that merit- and performance-based pay is introduced. So what is the reason for differences in wage policy between industries? It was posited that the differences reflect a characteristic of each industry, e.g., growth potential. Can the differences between manufacturing industries be explained in terms of industries with little growth potential (textiles, chemicals, iron and steel) and those with considerable growth potential (electrical machinery and transportation machinery)?

Here it is necessary to examine the relationship between growth potential and seniority-based wages in manufacturing industries. Figures 5-1 and 5-2 show the relationship between growth potential and the length-of-service effect among blue-collar workers and white-collar workers. Similarly, Figures 6-1 and 6-2 show the relationship between growth potential and the age effect. These figures show that, for white-collar workers, age and length-of-service effects increase with growth potential in both survey years, i.e., the seniority-based tendency increases with growth potential. Although to a lesser extent in 1979 than in 1994, the same trend is observed for blue-collar workers, with industries with greater growth potential clearly demonstrating higher age and length-of-service effects.

(Figure 5-1) (Figure 5-2) (Figure 6-1) (Figure 6-2)

A detailed analysis of data on white-collar workers by industry shows that growth potential was low for the iron and steel industry in all survey years while age and length-of-service effects were close to zero or negative, which supports our hypothesis.

The growth potential of industries with high figures for age and length-of-

service effects, such as general machinery, transportation machinery, precision machinery, and electrical machinery, was relatively high in all survey years, which is consistent with our theory. In particular, the electrical machinery industry, which sustained high growth potential from 1979 to 1994, showed high figures for age and length-of-service effects up to 1994.

Next, we discuss the reasons why in the medium manufacturing industries we observed considerable differences between industries in age and length-of-service effects for blue-collar workers while basically observing a general trend of gradual increase in both effects for white-collar workers. A possible interpretation of these findings is that although the seniority-based wage distribution is generous when a company enjoys good business performance, when future growth prospects become dark, the wage system of blue-collar workers is revised first, and the middle aged and older workers who are paid the highest wages suffer the most severe cutbacks. Developing this theory still further, although it is believed that employees have considerable bargaining-power in large Japanese companies and management does its best to keep them satisfied with in terms of employment and wages, the reality is that blue-collar workers are less-advantaged and white-collar workers hold a stronger position as stakeholders. It is possible to say that differences in age and length-of-service effects reflect this reality.

3.4 Results of analyses in all industries, including nonmanufacturing

The following was observed regarding the age and length-of-service effects of white-collar workers in medium groups by industry, including nonmanufacturing.

1) In the construction industry, there was a generally gradual increase in both age and length-of-service effects, except in 1989.

2) In the financing and insurance industries, age and length-of-service effects were more or less constant in 1979, regardless of age, but gradually decreased from 1984. In 1989 and 1994, they significantly gradually decreased.

3) In the wholesale and retail industry, age and length-of-service effects gradually increased.

4) In the electricity, gas, heat supply, and water industries, the degree of

gradual increase is flattening, but in 1994 both effects sustained a mild but gradual increase.

When analyzed on the basis of the major manufacturing industries, while age and length-of-service effects of white-collar workers show a significant gradual decline over time in the financing and insurance industries, a gradual increase has remained up to 1994 in other industries.

Why is there a significant gradual decrease in age and length-of-service effects in industries such as finance and insurance, which are generally said to have higher wage levels than other industries?

Currently, the nominal wage levels of Japanese workers are high, and real wages are also far higher today than during the period of postwar poverty. In the postwar years, wages were aimed at covering living expenses, so it was common sense to pay middle-aged and older workers a relatively high wage, because they had the highest living expenses. This was also the raison d'être of the support of living conditions theory; the so-called Densan-type[7] wage structure was a typical example. As Japan underwent dramatic economic growth and living standards improved, it became less important to emphasize the support of living conditions. Companies responded to this change by reducing the age effect. The analysis below was conducted to confirm this theory.

Figures 7 and 8 show the relationship between average white-collar wages in each industry and the degree to which seniority affects wages. Average wages in each industry of the medium groups by industry are plotted on the X axis; the length-of-service effect when age is fixed at 40 is plotted on the Y axis in Figure 7, and the age effect when the period of service is fixed at 10 years is plotted on the Y axis in Figure 8. The intersection between the X and Y axes is where average wages equal the average for all industries, and age and length-of-service effects are zero.

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[7] A wage structure implemented by the Japan Federation of Electrical Industry Labor Unions (Densan), which emphasizes support of living conditions and has strong egalitarian features (Ono, 1989).

(Figure 7) (Figure 8)

It is noteworthy that in industries with high average wages, such as banking, trusts, and insurance, the steepness of the age and length-of-service effects show large negative values. Similarly, in industries such as electrical machinery, transportation machinery, iron and steel, and chemicals in the manufacturing industry, industries that pay above average wages, both effects are weaker when wages are higher, suggesting that the importance of seniority is on the decline when determining wages. For example, the chemical industry in 1979 had the highest average wage in the manufacturing industry, yet the length-of-service and age effects in the chemical industry are the highest. The values of both effects change dramatically between 1979 and 1984, and both have remained close to zero since 1984. This suggests that the higher the wages paid by an industry, the smaller the role that seniority plays in determining pay.

It can thus be observed that in both manufacturing and nonmanufacturing industries, industries with higher wages tend to have lower age and length-of-service effects. In other words, industries with relatively high wages already satisfy the needs of workers for support of living conditions, and wages in excess of support of living conditions are not paid according to seniority but increase in line with business performance and ability, with the intent of providing workers with incentives.

This concludes the analysis results by major groups by industry obtained from stochastic estimates of wage functions. Next we introduce a comparison between industries and occupations of coefficients of wage payments by age class to observe by major groups by industry how seniority-based, horizontal wage structures in Japan change over time.

The major groups by industry studied were construction, manufacturing, wholesale, retail, and financing and insurance. The contractural cash earnings and annual special cash earnings were used to calculate the coefficient of variation . Data for analysis is on supervisory, clerical, and technical workers (university graduates) and production workers (high school graduates) in the manufacturing and construction

industries, and university graduate employees of the wholesale, retail, financing, and insurance industries. All companies studied had a workforce of 1,000 or more. This selection was made because the objective was to observe typical white- and blue-collar workers in major companies.

Trends in the coefficient of variation for each age class are shown in Table 1. The variation coefficient for each age class for major groups by manufacturing industry is more or less constant for both white- and blue-collar workers in manufacturing industries. The coefficient of variation is also fairly constant for white-collar workers in the construction industry. Similarly, little variation occurs in the coefficient in wholesale and retail industries.

In contrast, the coefficient of variation changes considerably in the financing and insurance industries, where the coefficient for age classes other than 45-49 declines in 1989-1994 -- a period which includes the bursting of the economic "bubble" -- but rises for the 45-49 age class. This is likely to be due to the effect of employees who left the company and were sent to subsidiary firms. It is possible that, as a result of these employees, starting with those with the highest wages (excluding a few director candidates), a polarization emerged in the evaluation ratings of workers between those who leave and those who do not. Nevertheless, since all employees leave before retirement, except for employees who are appointed as directors, the coefficient of variation falls again in the 50-plus age class.

The difference between blue- and white-collar workers is evident in the manufacturing industry. It may be argued that it is basically impossible to compare white- and blue-collar workers. Our subjects, however, were major companies employing 1,000 or more; these companies have stable labor relations with blue-collar workers as well as white-collar workers, and it would seem possible to compare the two.

Comparisons within the manufacturing industry show that the coefficient of variation is generally higher for blue- than for white-collar workers. It is possible to interpret this as indicating a larger performance difference in employee assessment among blue-collar workers than among white-collar workers, and merit-based pay is more strongly established among blue-collar workers. In the 30-34 age class, however,

the difference is greater among white-collar workers. One possible explanation of the exceptional pattern of the 30-34 age class is that this period sees a widening gap between white-collar workers who are promoted and those who are not, as noted by Kobayashi (1995).

Looking at the wage differences of white-collar workers between industries, the distribution is significantly greater in the financing and insurance industries compared to other industries. The reason is that, first, although these two industries are generally highly regulated and protected legally and by the government, there is considerable competition between financial institutions and between employees, and the wage structure is already merit-based. Second, employees of financial institutions are divided into grades, as described earlier, which widens the wage distribution.

PART 4

4. Summary

Companies make the final decision on the wage system they will use, and different factors influence their decisions. The factors include future business prospects, industry trends, and management policy. An additional factor in Japan is said to be the tendency for companies to set wages in line with other companies in the same industry. Past studies of Japanese wage structures have rarely analyzed data by industry. We therefore used the data set on individuals from the Ministry of Labor's *Basic Survey on Wage Structure* to analyze, by industry and by occupation, chronological changes in the seniority-based wage structure, which characterizes Japanese wage structures. We also reviewed the background of these changes.

The analysis we employed was as follows: first, wage functions were estimated. Based on estimated age and length of service coefficients, the net effect on wage increases of increase in age (age effect) and increase in length of service (length-of-service effect)were studied. Even if the age and length-of-service effects are positive, i.e., if charts show a rising wage curve, it is important to confirm whether the rising curve is increasing at a decreasing rate or perhaps flattening. In Japan, employment is

generally considered as a long-term commitment, and companies must introduce wage system changes gradually over a long time. It is therefore essential to observe changes in the shape of wage increases.

For major groups by industry, coefficients of variation in wage payments were calculated for each age class and compared chronologically and between industries to determine whether there were any changes in the way seniority-based wages increased.

Below is a summary of the results and interpretations of the analysis described in Section 3.

4.1 Summarized results of analyses on manufacturing industries

Our analysis gave the following results. For blue-collar workers, both age and length-of-service effects increased gradually in many industries in 1979, and the wage structure was basically a seniority-based one. In 1984, however, considerable differences between industries in both effects emerged, and no general trend could be observed. Looking at both effects among all blue-collar workers in manufacturing industries, the trend is generally downward over time.

For white-collar workers, although there is considerable variance of chronological change between industries, age and length-of-service effects basically gradually increased in 1994.

The above results make it clear that the degree of influence of age and length-of-service effects varied considerably between industries. For blue-collar workers, age and length-of-service effects generally are chronologically downward.

How should these results be interpreted? The decline in age and length-of-service effects could be attributed to the following: 1) Skill has become less important with the advance of automation and computerization; 2) declining ability of companies to pay wages in low-growth industries; 3) need to reduce labor costs for older employees; and 4) introducing merit- and performance-based factors to change the way wages are determined. Analysis results found that growing differences existed in the two effects between industries, because the effects reflect the growth potential of each industry. Analysis results also show that companies with better growth potential

maintain seniority-based wage structures. Another finding is that the seniority-based wage structure is beginning to change for blue-collar workers but is still being maintained for white-collar workers. Our interpretation of this is that companies revise the wage system of blue-collar workers first when future business prospects are limited. This seems to reflect the reality that white-collar workers are in a stronger position than blue-collar workers as management stakeholders.

4.2 Summarized results for all industries

An analysis of major industry sectors, including nonmanufacturing industries, yielded the results below for white-collar workers. Age and length-of-service effects tend to show a gradual increase in manufacturing, wholesale, and retail sectors. The rate of gradual increase is flattening in the electric power, gas, water, and heating utilities sectors, but a modest gradual increase of the two effects was maintained in 1994. Similarly, both effects show a gradual increase in 1994 in the construction sector. Basically, a seniority-based wage structure has been maintained for white-collar workers in all industries except finance and insurance. In contrast, age and length-of-service effects significantly and gradually decreased over time.

The following hypothesis was formed from the observation that a significant gradual decrease in age and length-of-service effects occurs in industries, such as finance and insurance, with high wage levels. Wages of Japanese workers attained quite a high level after the period of high economic growth, living standards improved, and it became less important for companies to emphasize the support of living conditions factor. This trend was particularly conspicuous in sectors with high wage levels. An analysis testing this hypothesis found that the higher an industry's average wage, the lower the age and length-of-service effects. This suggests that industries paying pay high wages already more than satisfy the needs of workers for support of living conditions, and the portion of wages that exceeds the support of living conditions is designed to provide an incentive to workers as merit- and performance-based pay.

Coefficients of Variation for each age class in each sector and occupation of the major industry sectors were calculated, compared chronologically and between

industries, and changes in the seniority-based horizontal wage system were observed.

Results showed the following features: First, a comparison of coefficients of variation in the same age class in the financing and insurance industries shows a significant increase in the 1989 and 1994 figures compared with 1979 figures, and a comparison with other industries also shows a significant increase after 1989. It is notable that, in the financing and insurance industries, the coefficient declines in 1989-1994, during which the "bubble economy" collapsed, for all except the 45-49 age class, which shows an increase.

The effect of workers on sepation to subsidiary firms was considered as a reason for the increase for the 45-49 age class. As a result of these older workers (other than the handful who become directors) being sent, starting with the most highly paid, a polarization appeared to be occurring between workers highly evaluated and paid well and those poorly evaluated and not paid as well. All older workers other than directors are eventually sent to subsidiary firms, which accounts for the decline in the variance coefficient in the 50 plus age class. Reasons for the significant increase in the coefficient of variation in the financing and insurance industries -- industries well known for how regulations protect them -- are as follows: 1) stiff competition exists between financial institutions and between employees in this sector, and they already have a merit-based wage system in place; and 2) as stated previously, institutions and employees are divided into dual sectors, which increases the distribution further.

Differences between blue- and white-collar workers were obvious in the manufacturing sector. Generally, blue-collar workers have a higher coefficient of variation than white-collar workers. Taking into account this finding and results based on the observation of age and length-of-service effects, it can be concluded that merit-based pay is more clearly established among blue-collar workers.

4.3 Conclusions

The purpose of this study is to identify recent changes in the seniority-based wage structure, which is considered as a main feature of the Japanese wage structure. Individual companies are responsible for determining the wage systems of their

workers, and changes in wage policies of companies are reflected in changes in the overall Japanese wage system. We adopted an analysis by industry so that our analysis of the wage structure of Japanese workers would take into account the wage policies of companies.

Results of our study clearly demonstrated that the Japanese seniority-based wage structure has changed in recent years, and the change varies significantly between industries and occupations. It was found that differences between industries had a similar correlation to relative relationships between each industry's growth potential and average wage. This study has clarified one aspect of the essence of Japan's wage structure, and suggests the direction which future research into the Japanese wage structure may take.

Considering that industry categories are groups of companies in the same business, it is important to conduct analyses of wage structures by company, including regular evaluations and career paths. Japan is currently experiencing a long period of economic recession, which has encouraged companies to restructure themselves to improve their financial condition and reduce fixed costs. Personnel policy and wage structures have also become targets for restructuring. Research should therefore pay close attention to how wage policy is positioned in a company's management strategy when analyzing the wage system of individual companies.

(Table 1) Number of samples used in stochastic estimate of wage functions

(Major group by industry)	1979	1984	1989	1994
Mining	15, 098	15, 495	12, 411	5, 064
Construction	51, 062	41, 967	41, 285	41, 611
Manufacturing	455, 976	353, 270	343, 017	269, 744
Electricity, gas, heat supply, and water	41, 521	29, 805	27, 811	46, 102
Transport and communication	188, 178	159, 741	136, 205	118, 585
Wholesale and retail trade	96, 145	76, 613	69, 949	71, 090
Financing and insurance	64, 420	46, 488	41, 666	83, 039
Real estate	13, 567	9, 372	10, 091	7, 365
Services	114, 554	105, 085	104, 378	154, 565

Manufacturing and medium industry groups	1979	1984	1989	1994
Food manufacturing	31, 361	24, 872	22, 243	17, 458
Manufacture of textile mill products, except apparel and other finished products made from fabrics and similar materials	15, 200	10, 488	10, 481	6, 085
Manufacture of lumber and wood products, except furniture	14, 808	11, 066	11, 107	7, 608
Manufacture of furniture and fixtures	12, 803	10, 366	10, 029	6, 758
Manufacture of pulp, paper, and paper products	20, 496	14, 663	13, 808	10, 195
Publishing, printing, and allied industries	26, 258	18, 377	18, 181	15, 452
Manufacture of chemicals and allied products	36, 306	27, 145	24, 280	20, 570
Manufacture of rubber products	13, 268	10, 671	10, 442	8, 875
Manufacture of ceramic, stone, and clay products	29, 036	20, 159	19, 577	13, 549
Iron and steel	27, 821	23, 190	20, 392	14, 677
Manufacture of nonferrous metals and products	19, 250	15, 736	13, 799	10, 984
Manufacture of fabricated metals and products	29, 525	21, 148	21, 041	13, 045
Manufacture of general machinery	41, 760	31, 728	29, 457	22, 303
Manufacture of electrical machinery, equipment, and supplies	37, 993	33, 110	35, 172	36, 472
Manufacture of transportation equipment	45, 966	36, 018	35, 855	30, 422
Manufacture of precision instruments and machinery	16, 306	12, 590	12, 396	10, 060
Manufacture of ordnance, Miscellaneous manufacturing industries	18, 119	17, 092	9, 118	6, 231
Bank and trusts	18, 851	14, 558	14, 481	27, 913
Securities and goods transactions	9, 779	6, 049	5, 646	15, 984
Insurance	11, 824	7, 687	6, 208	11, 123
Railways industry	71, 436	46, 144	33, 117	18, 261
Communication	36, 050	40, 988	32, 621	31, 249
Electricity	18, 149	12, 585	12, 388	22, 481
Gas	6, 392	5, 924	5, 328	6, 902
Information, investigation and advertising	9, 559	12, 218	12, 413	18, 783

(Table 2) Parameters not attaining 1% significance

(Major group by industry)						
Mining	OT	OT^2			OTA	
Construction						
Manufacturing	TA					
Electricity, gas, heat supply, and water						
Transport and communication						
Wholesale and retail trade						
Financing and insurance						
Real estate						
Services						

Manufacturing and medium industry groups						
Food manufacturing	OT	OT^2	TA		OTA	R2
Manufacture of textile mill products, except apparel and other finished products made from fabrics and similar materials		OT^2				
Manufacture of lumber and wood products, except furniture	OT	OT^2	TA		OTA	
Manufacture of furniture and fixtures	OT	OT^2	TA		OTA	
Manufacture of pulp, paper, and paper products		OT^2	TA			
Publishing, printing, and allied industries	OT					R2
Manufacture of chemicals and allied products	OT		TA			
Manufacture of rubber products	OT	OT^2	TA	OA^2	OTA	R2
Manufacture of ceramic, stone, and clay products	OT	OT^2		OA^2	OTA	T^2
Iron and steel		OT^2				
Manufacture of nonferrous metals and products	OT	OT^2		OA^2	OTA	
Manufacture of fabricated metals and products	OT	OT^2			OTA	
Manufacture of general machinery		OT^2				
Manufacture of electrical machinery, equipment, and supplies	OT	OT^2			OTA	
Manufacture of transportation equipment	OT	OT^2			OTA	
Manufacture of precision instruments and machinery		OT^2	TA			
Manufacture of ordnance, Miscellaneous manufacturing industries	OT		TA			
Bank and trusts						
Securities and goods transactions						
Insurance						
Railways industry						
Communication						SC2
Electricity						
Gas			TA			
Information, investigation and advertising						

OT:occupation (profession)×length-of-service (job tenure) dummy variable

OT^2:occupation (profession)×square of length-of-service (job tenure)

OA^2:occupation (profession)×square of age

TA:length-of-service (job tenure) dummy variable×age

OTA:occupation (profession)×length-of-service (job tenure) dummy variable×age

R2:section head dummy variable

T^2 : square of length-of-service (job tenure)

SC2 : firm-size dummy (more than 5,000 employees)

Note: This table shows that the coefficient is not statistically significant at 1% level in more than three samples among total four years' samples.

(Table 3) Trends in coefficient of variation in wages

[Manufacturing] Contractual cash earnings paid by companies with 1,000 or more employees to university graduates in supervisory, clerical, and technical fields

year / age	1979	1984	1989	1994
20~24	18.14	18.60	20.30	17.83
25~29	20.12	20.46	20.58	19.89
30~34	20.14	21.73	21.46	21.68
35~39	18.84	19.96	19.59	20.99
40~44	18.25	18.86	19.42	19.88
45~49	20.17	18.64	19.98	20.30
50~54	20.52	21.20	20.43	20.59

[Manufacturing] Contractual cash earnings paid by companies with 1,000 or more employees to high-school-graduate production workers

year / age	1979	1984	1989	1994
20~24	20.18	21.08	20.99	18.67
25~29	20.07	20.73	20.48	19.19
30~34	19.78	20.03	20.41	19.51
35~39	19.50	20.24	20.33	20.50
40~44	20.23	19.96	20.82	20.89
45~49	20.97	20.18	20.32	21.03
50~54	22.07	21.87	21.38	22.00

[Construction] Contractual cash earnings paid by companies with 1,000 or more employees to university graduates in supervisory, clerical, and technical fields

year / age	1979	1984	1989	1994
20~24	20.65	20.02	18.56	19.24
25~29	22.41	23.14	21.39	22.63
30~34	21.40	23.22	23.13	24.28
35~39	19.20	21.46	21.99	21.49
40~44	17.20	19.34	18.88	20.69
45~49	18.73	17.67	18.31	18.08
50~54	21.61	19.82	16.77	19.05

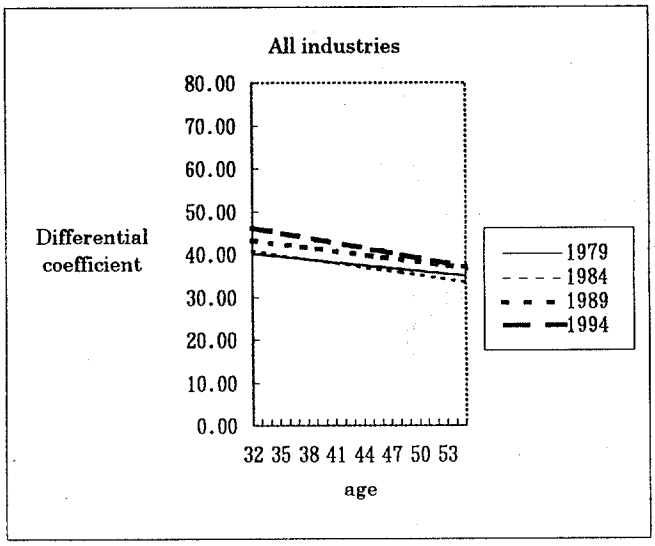
[Wholesale and retail trade] Contractual cash earnings paid by companies with 1,000 or more employees to university graduates

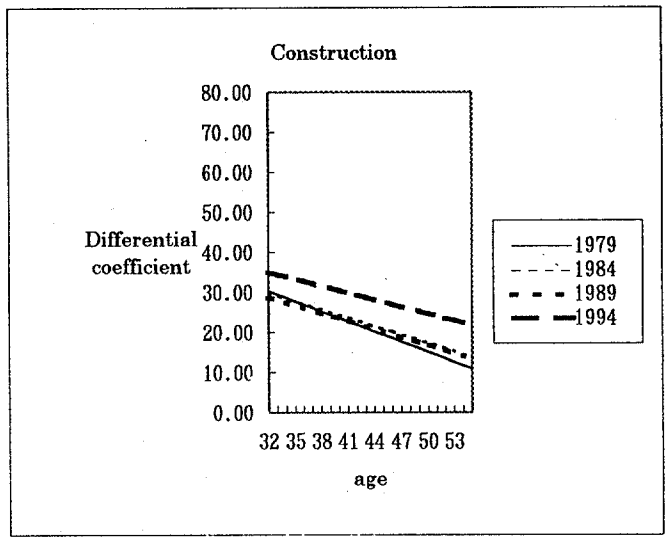
year / age	1979	1984	1989	1994
20~24	17.43	20.58	18.86	15.12
25~29	21.29	22.83	18.75	16.40
30~34	20.41	23.58	21.08	20.86
35~39	21.03	21.79	20.34	19.70
40~44	20.55	20.00	18.90	19.53
45~49	24.31	19.12	19.39	20.25
50~54	22.54	25.36	22.31	20.08

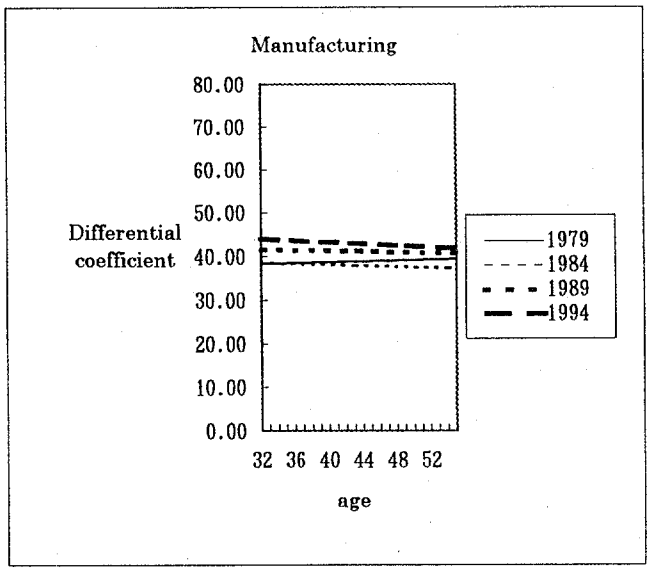
[Financing and insurance] Contractual cash earnings paid by companies with 1,000 or more employees to university graduates

year / age	1979	1984	1989	1994
20~24	20.95	20.60	20.11	18.33
25~29	24.94	26.29	31.93	30.01
30~34	24.86	25.79	32.67	27.18
35~39	21.21	23.43	38.51	30.43
40~44	19.10	20.55	33.57	27.07
45~49	21.12	20.94	31.37	33.47
50~54	23.92	23.30	34.83	28.71

(Figure 1-1) Age effect for blue-collar workers with 10 years of service
(all industries, and major groups by industry)







(Figure 1-2) Age effect for white-collar workers with 10 years of service
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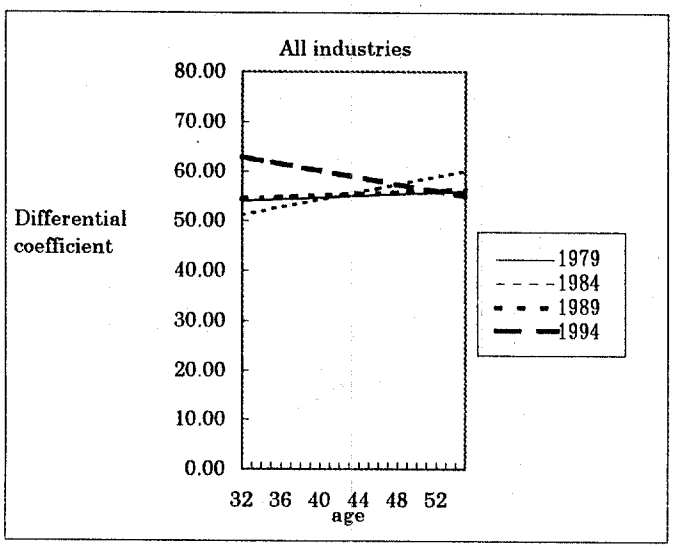
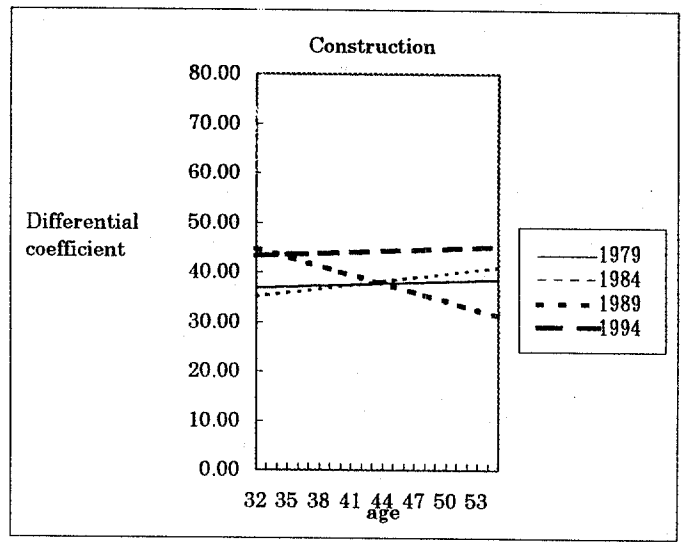
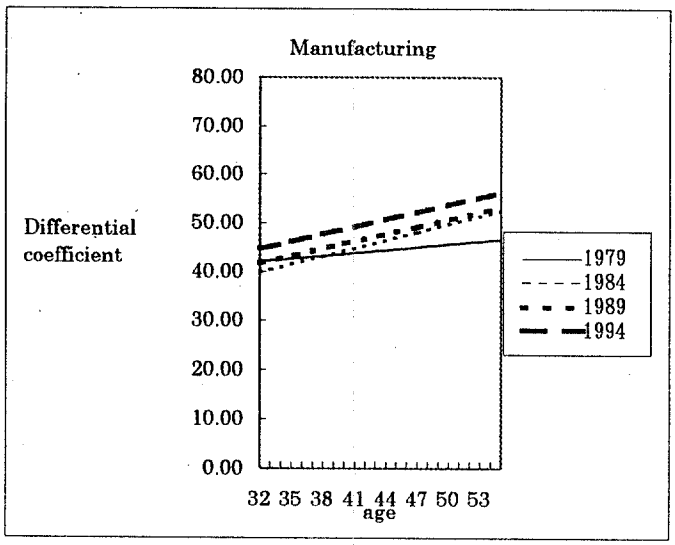
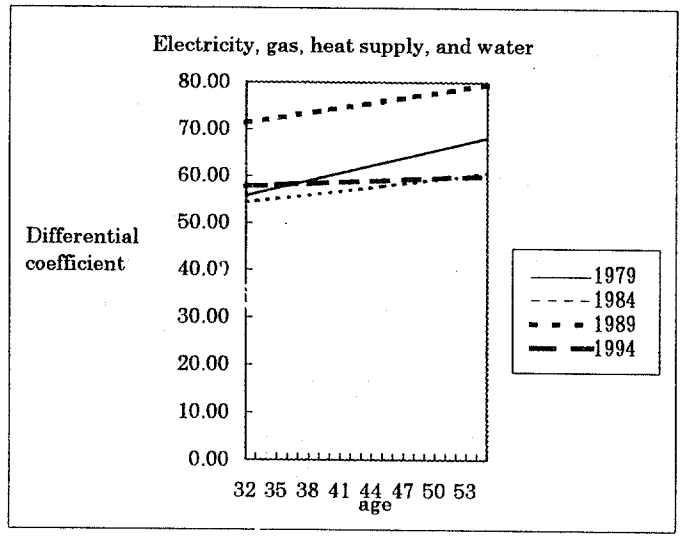
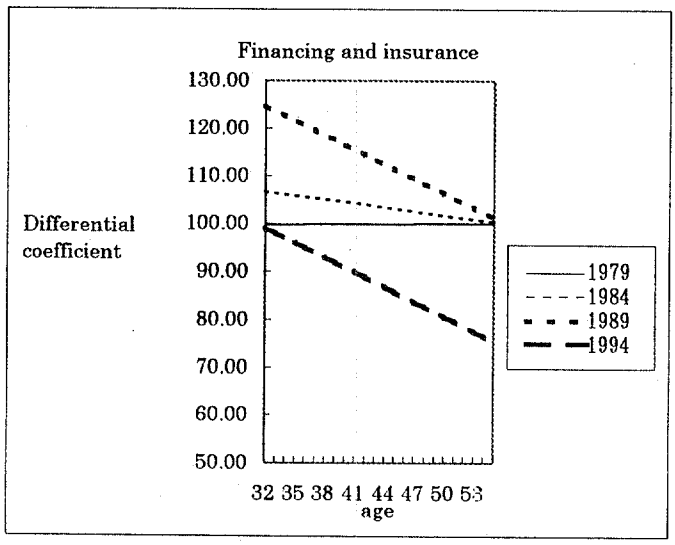
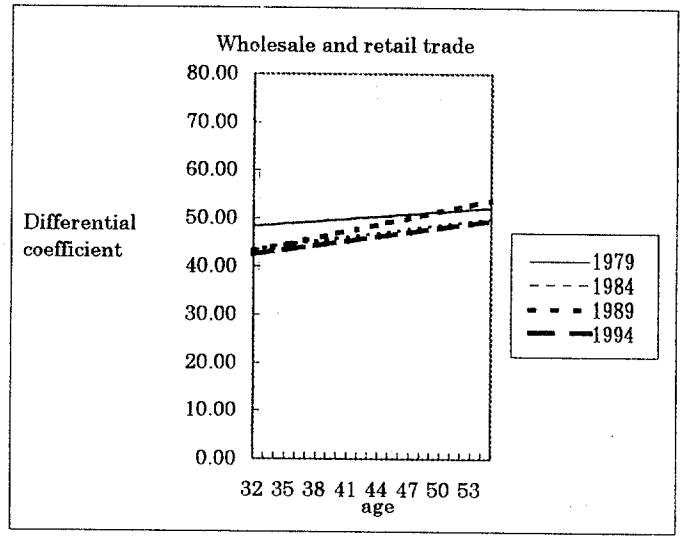




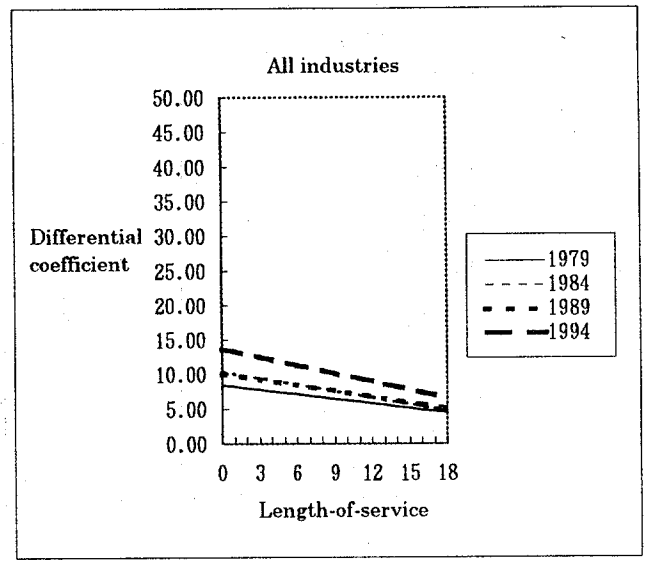


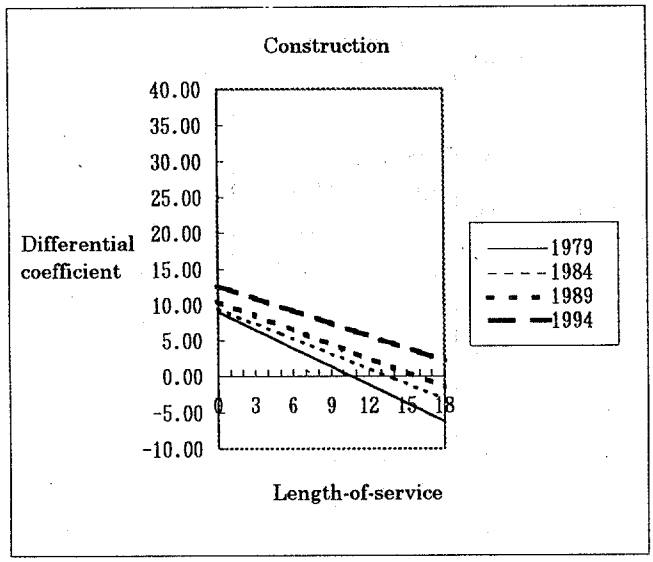


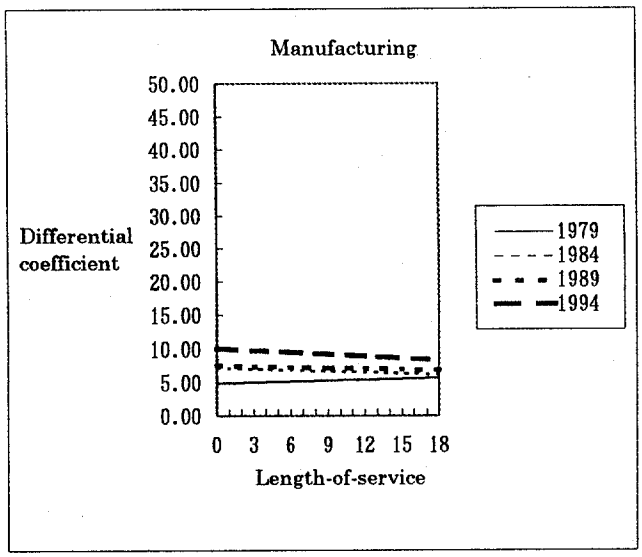




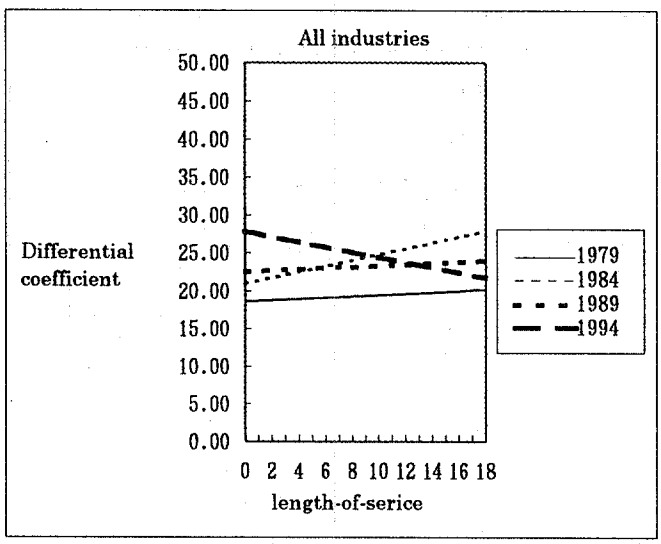
(Figure 2-1) Length-of-service effect on workers aged 40
(all industries, and major group by industry, blue-collar)

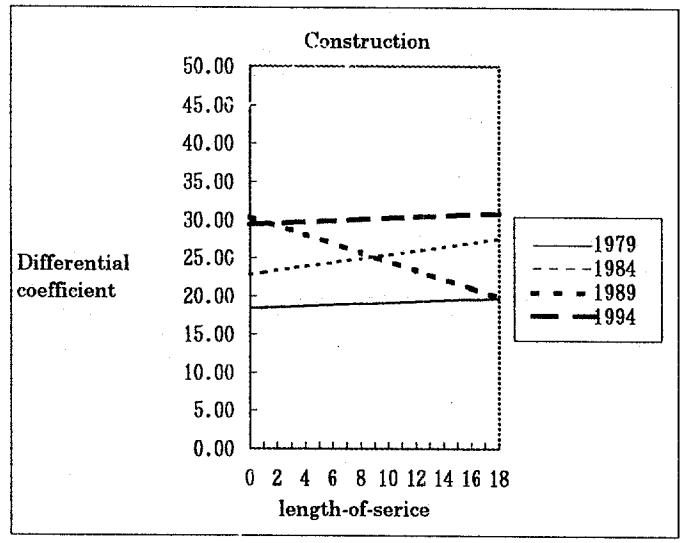


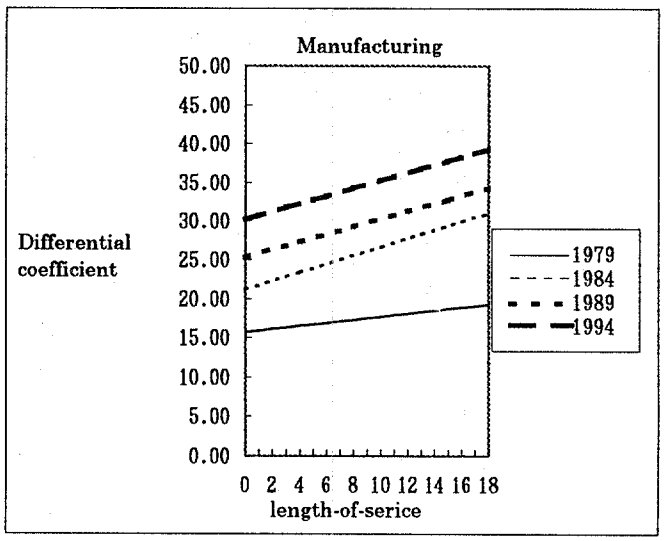


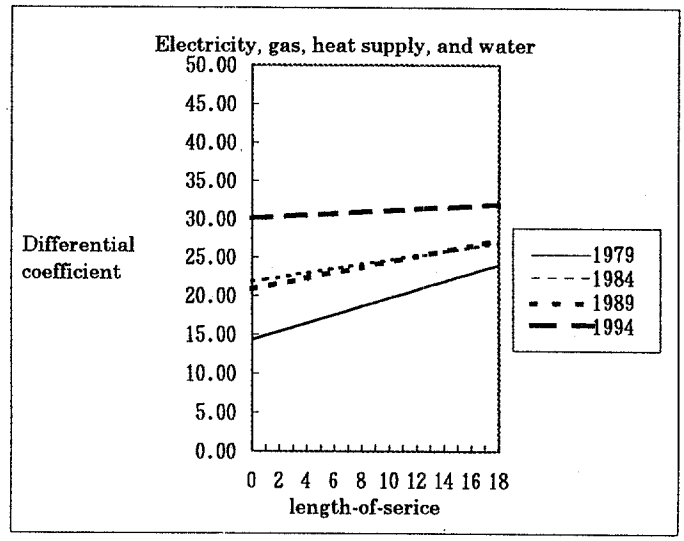


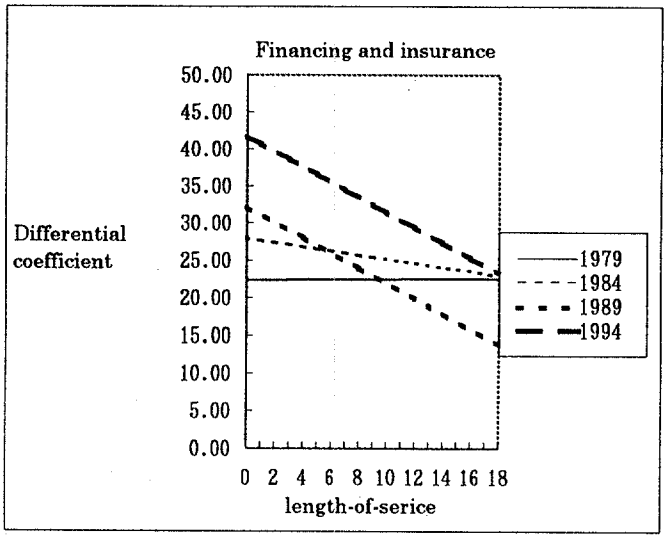
(Figure 2-2) Length-of-service effect on workers aged 40
(all industries, and major groups by industry, white-collar)

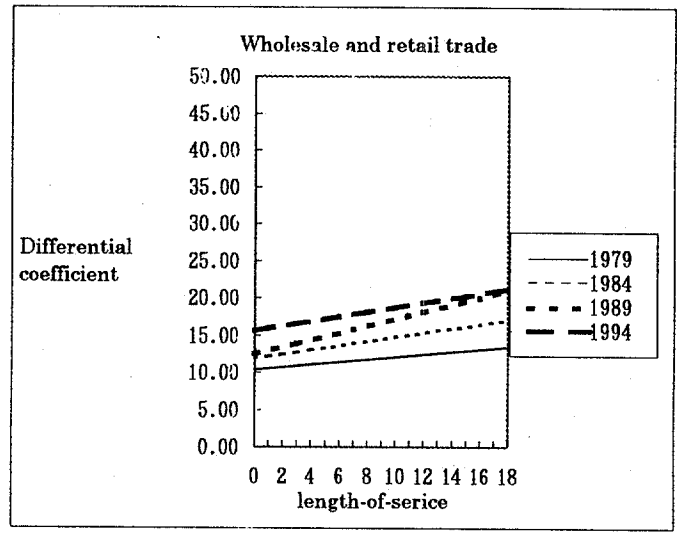




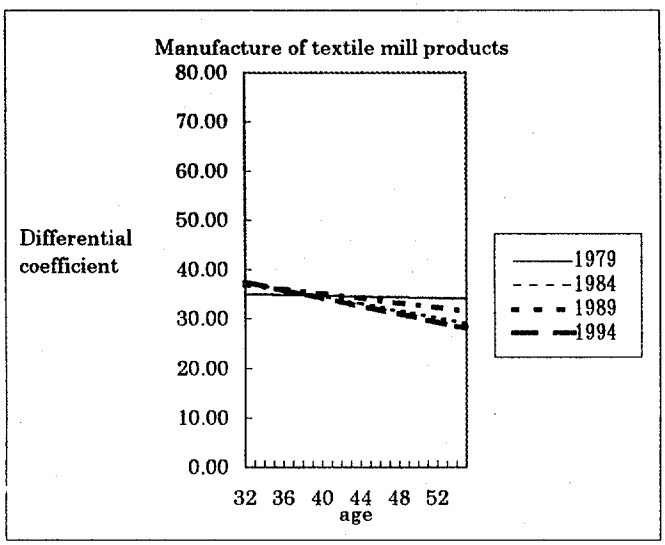


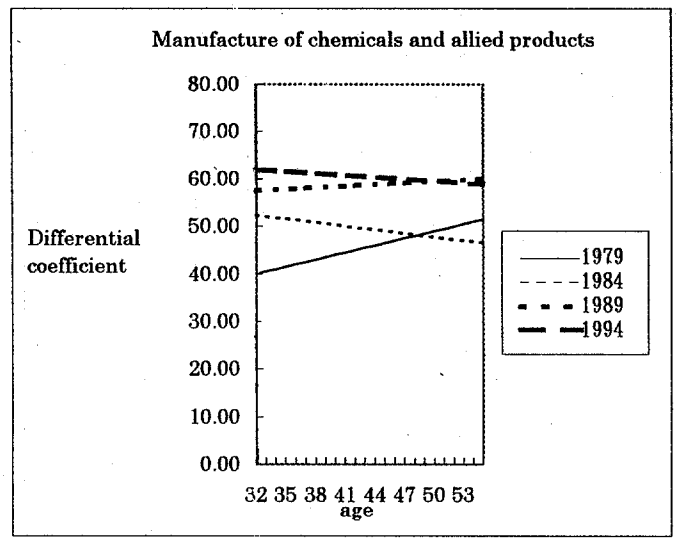


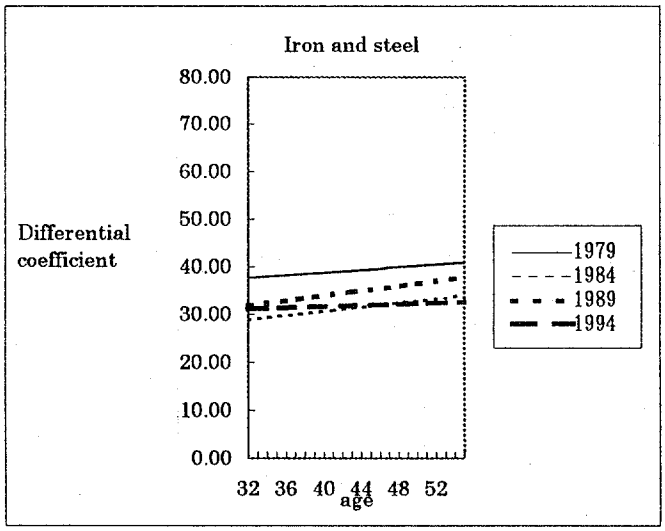


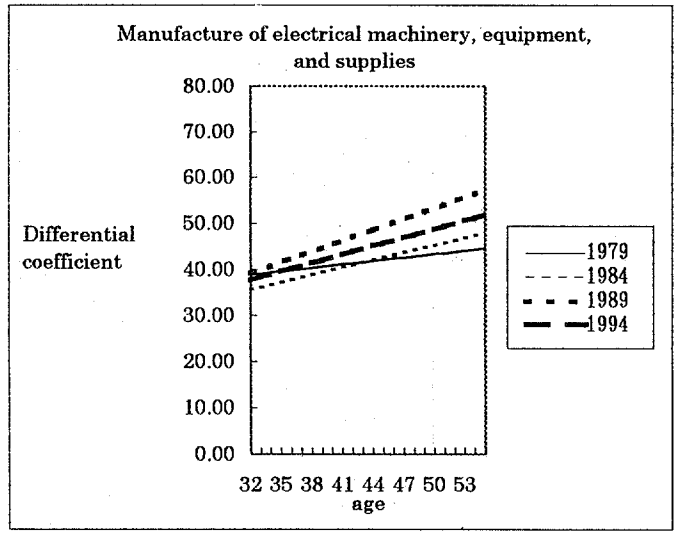


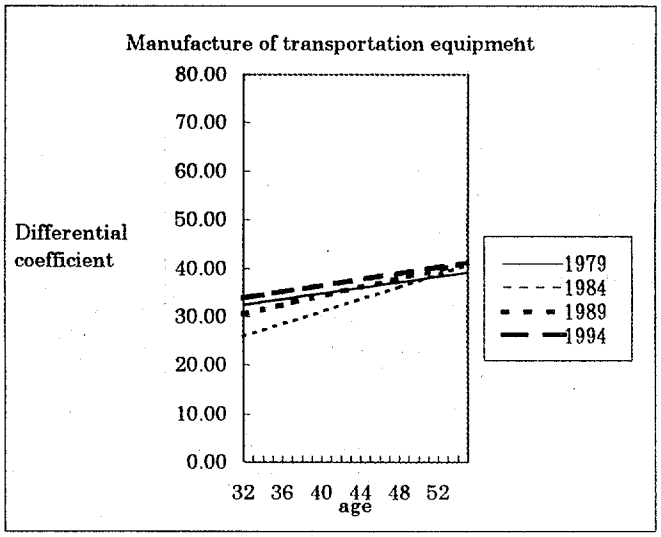
(Figure 3-1) Age effect for blue-collar workers with 10 years of service
(manufacturing and medium industry groups, blue-collar)



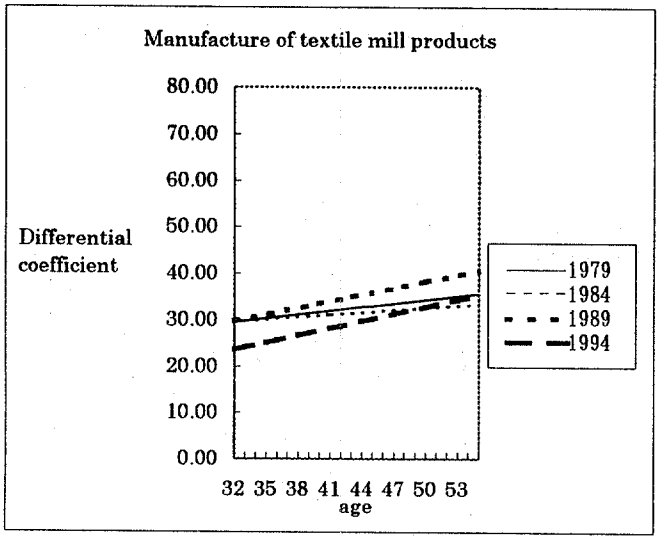


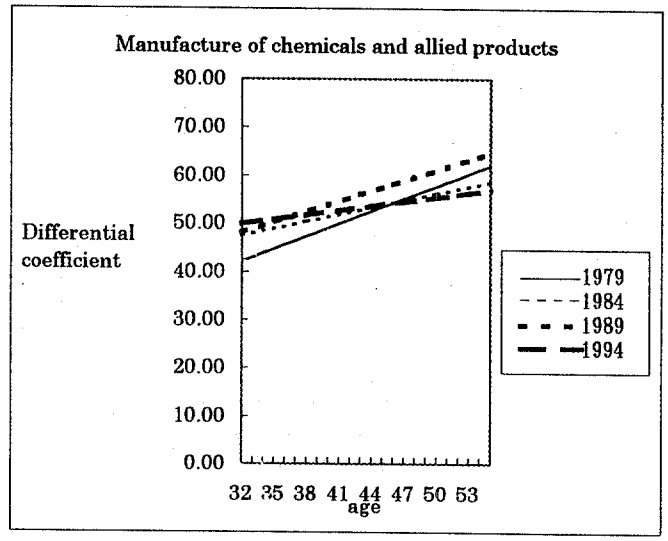


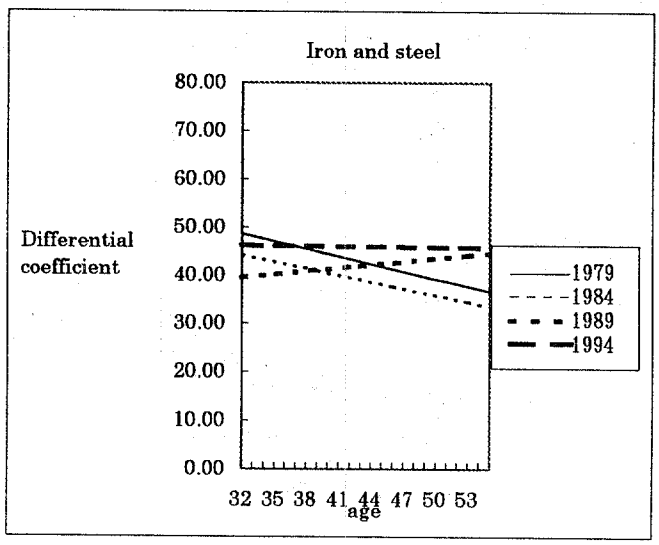


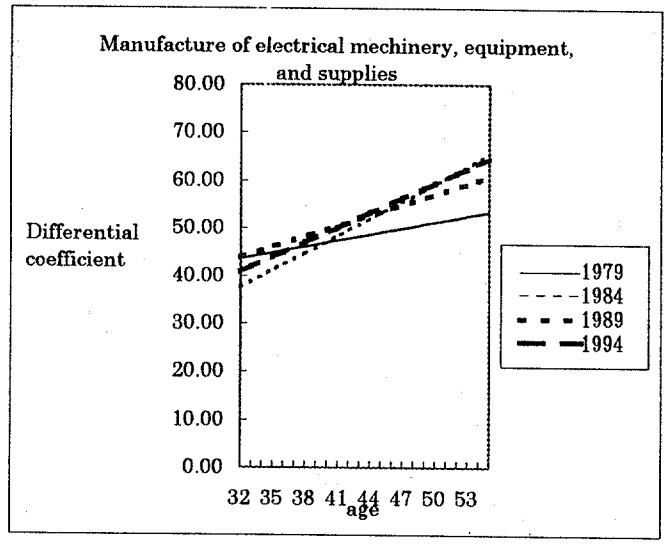


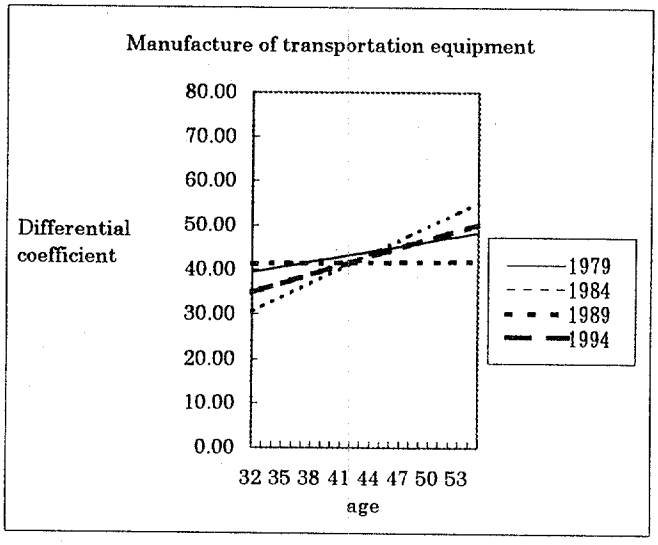
(Figure 3-2) Age effect for blue-collar workers with 10 years of service
(manufacturing and medium industry groups, white-collar)



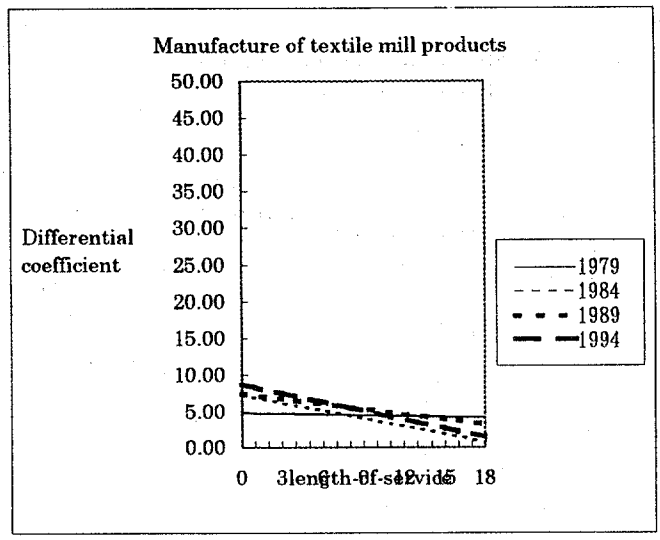


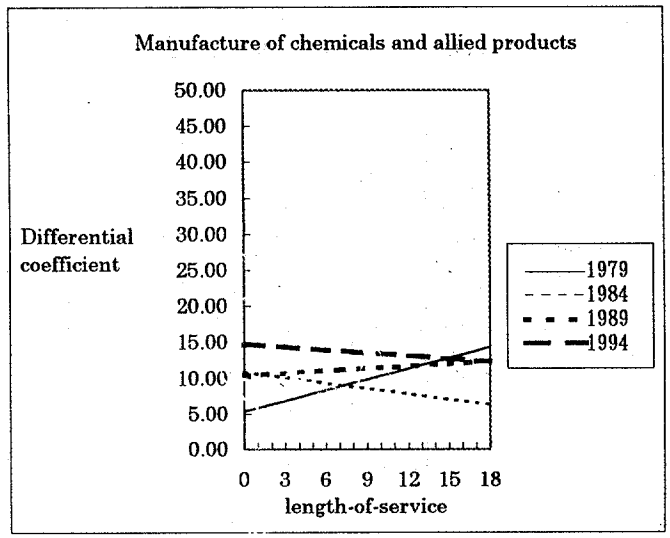


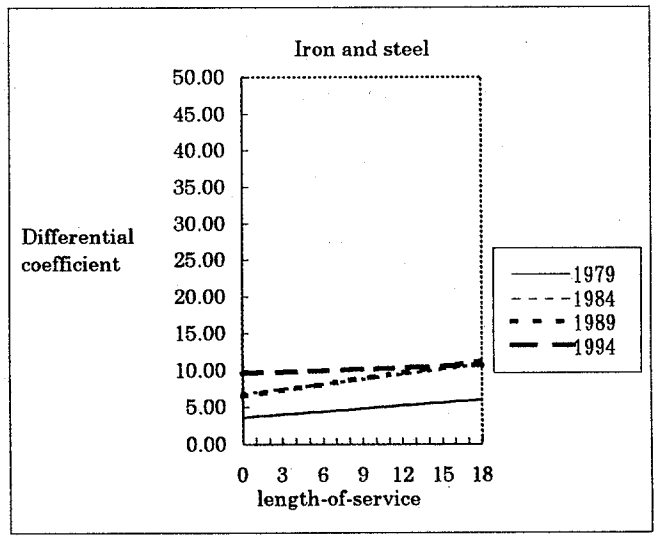


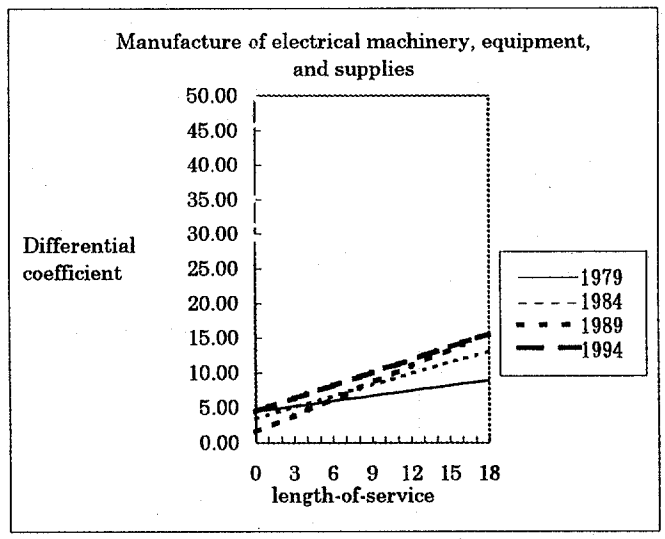


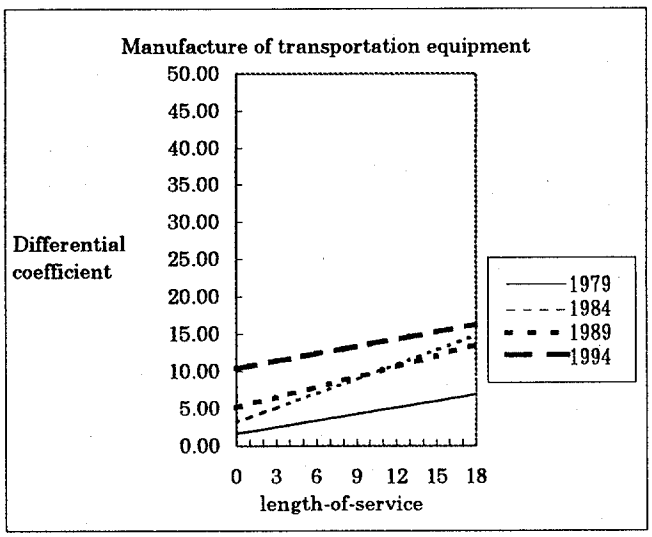
(Figure 4-1) Length-of service effect on workers age 40
(manufacturing and medium industry group, blue-collar)



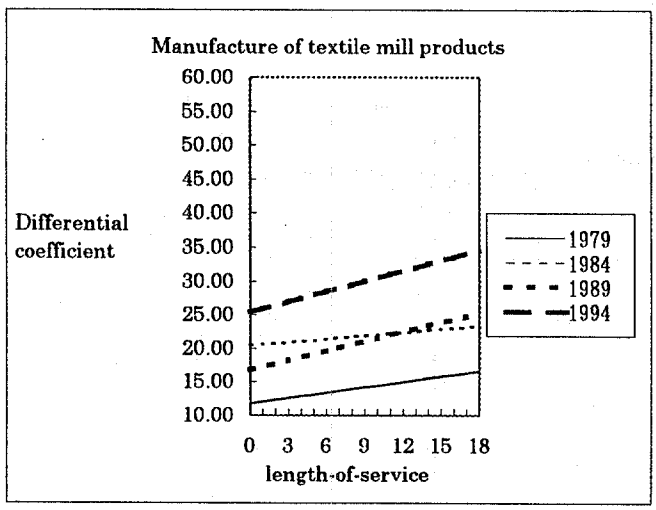


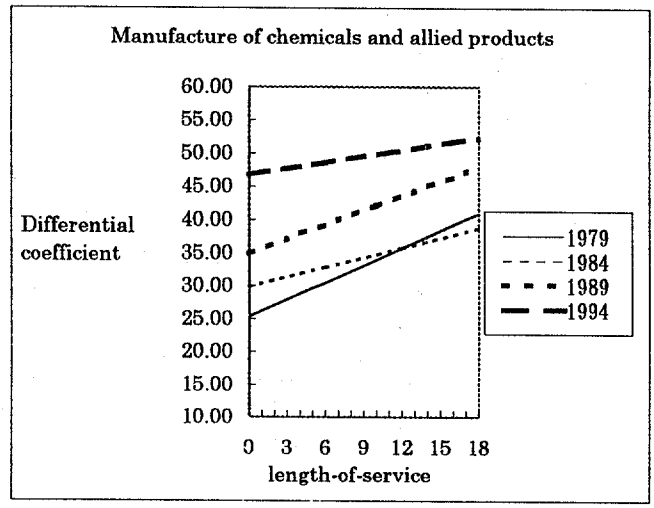


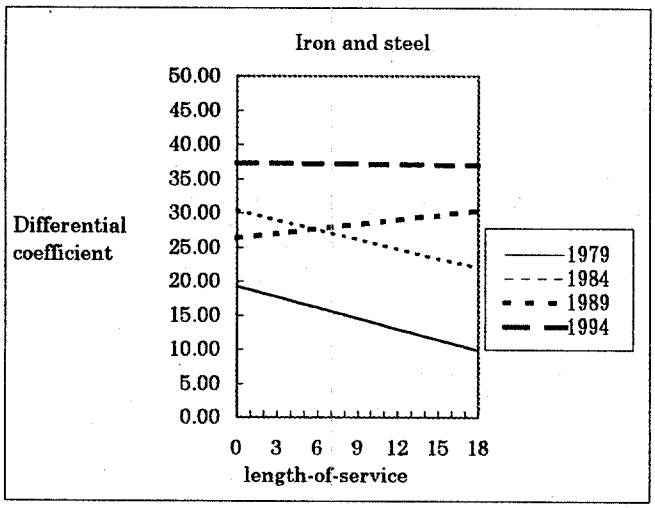


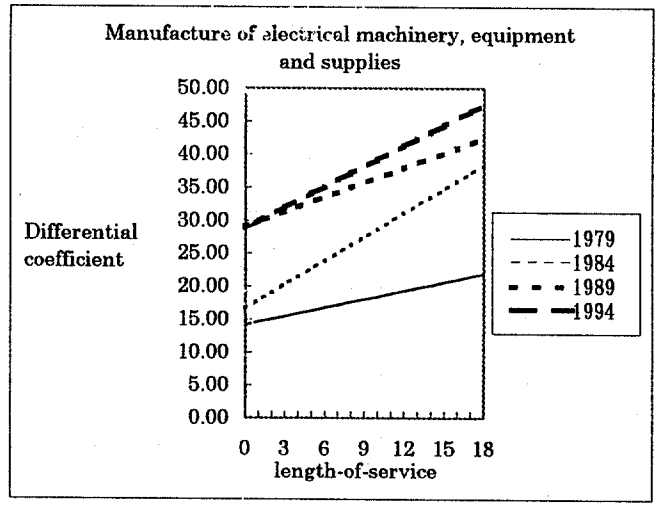


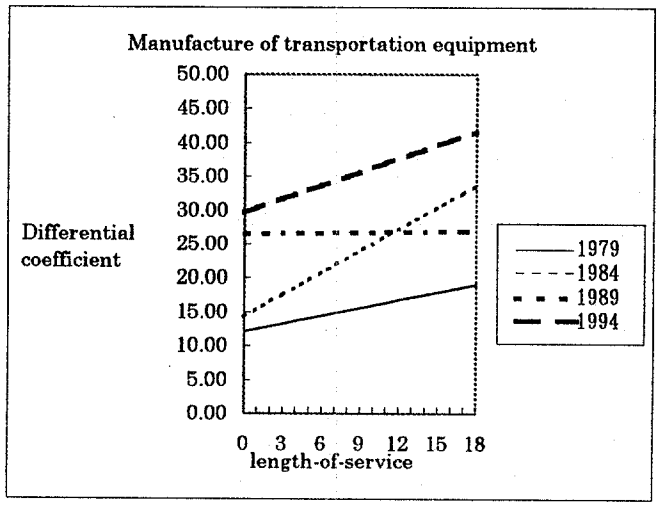
(Figure 4-2) Length-of service effect on workers age 40
(manufacturing and medium industry group, white-collar)



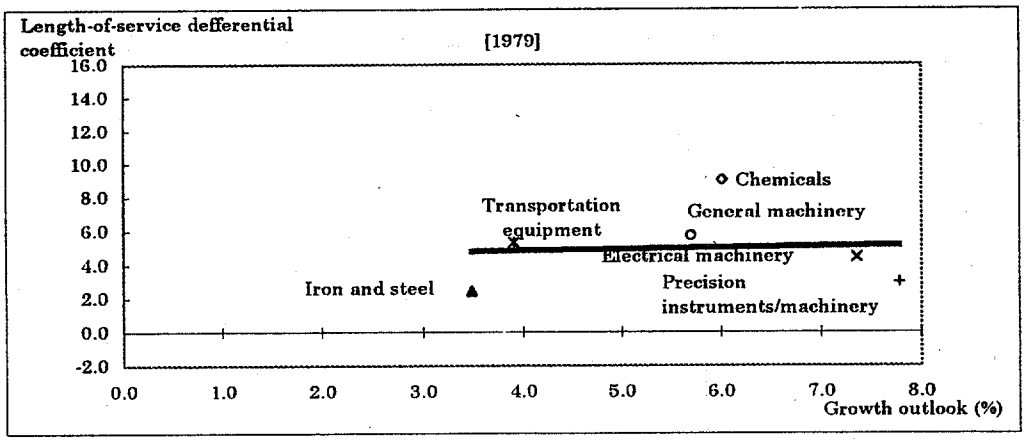


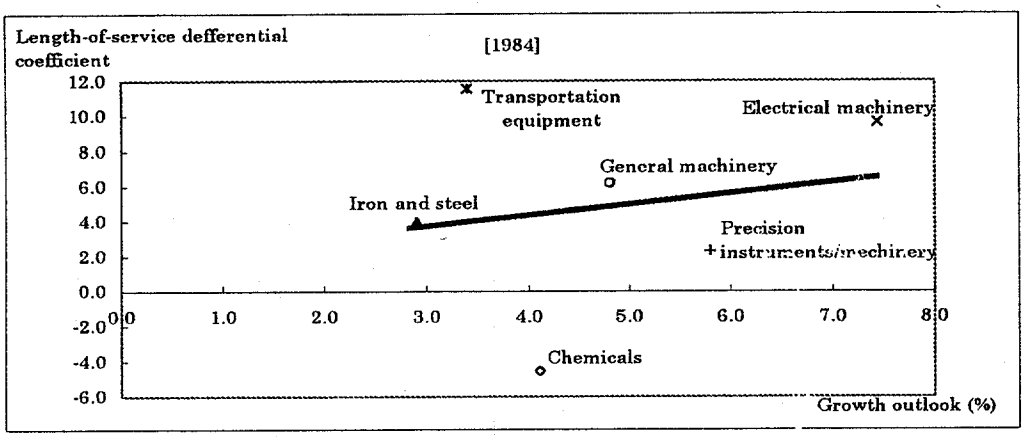


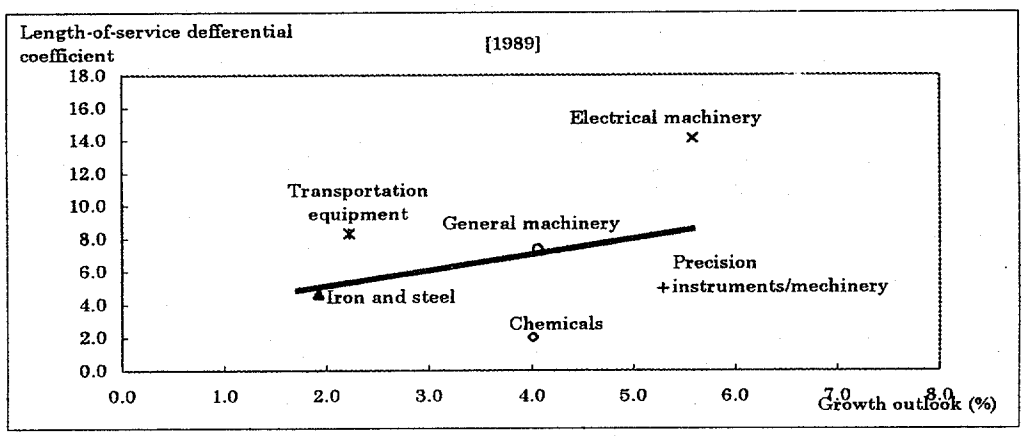


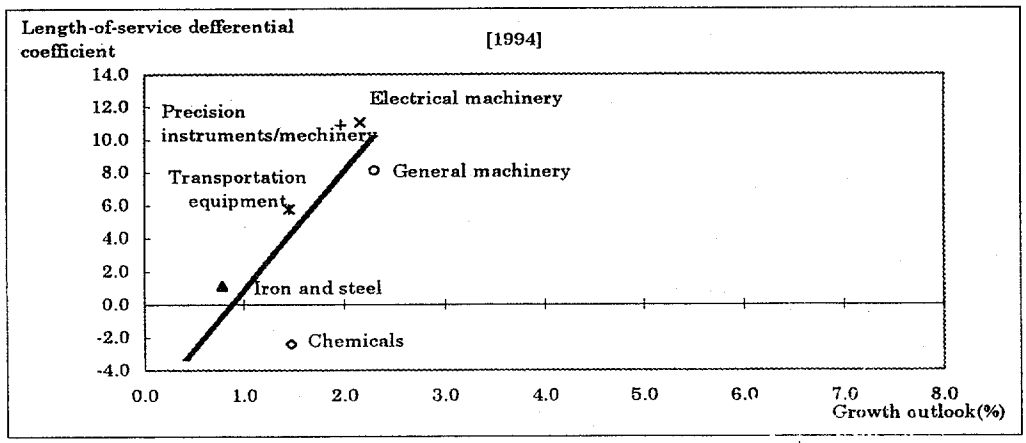


(Figure 5-1) Company growth outlook and degree to which seniority is considered in wages
(Observation on length-of-service effect blue-collar workers)



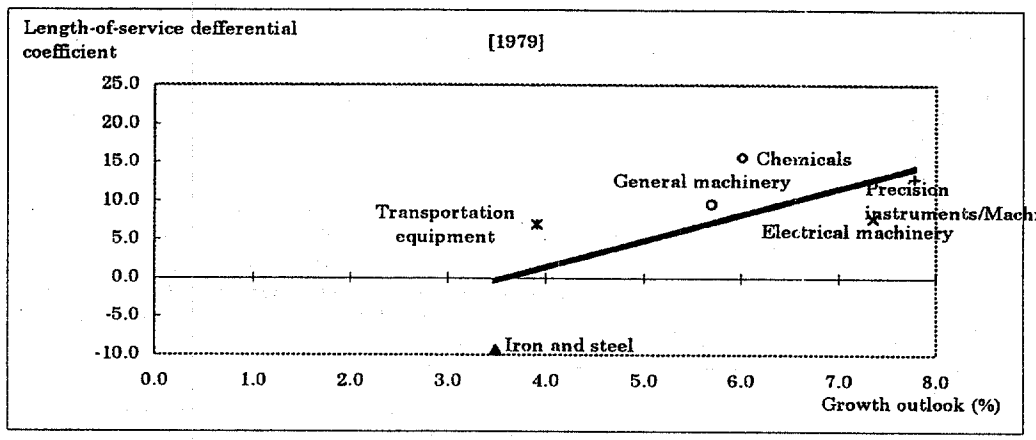


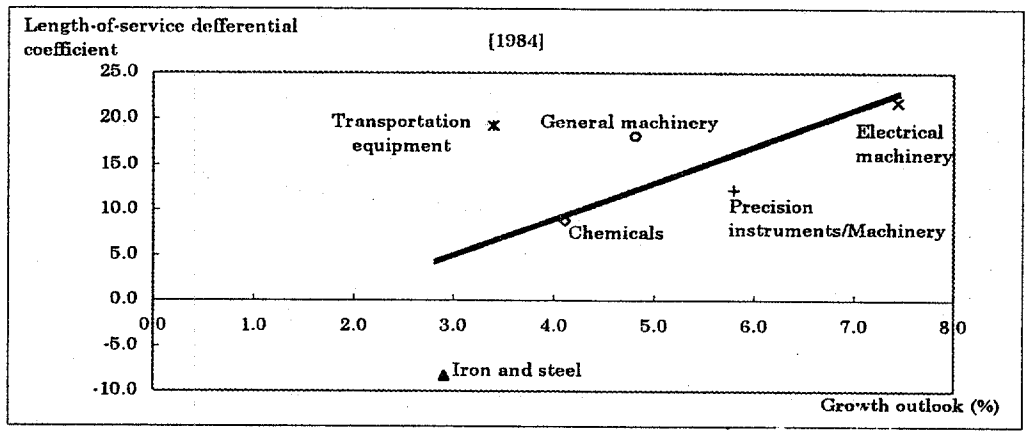


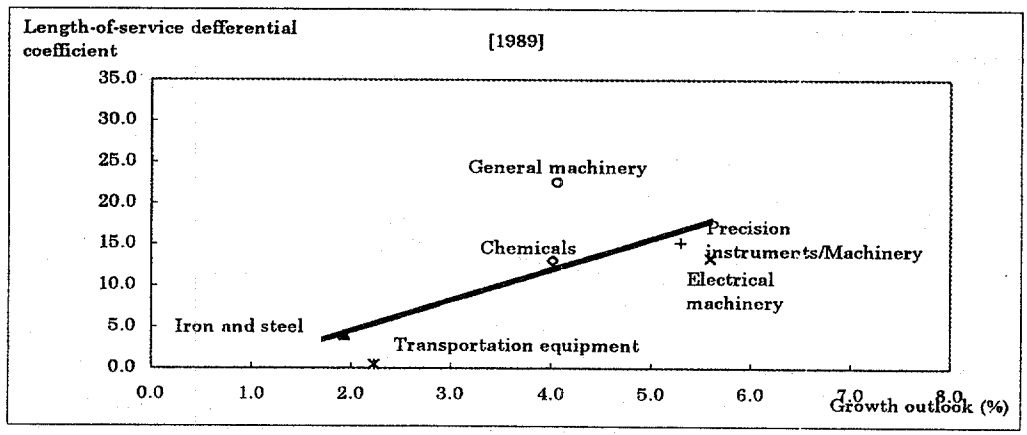


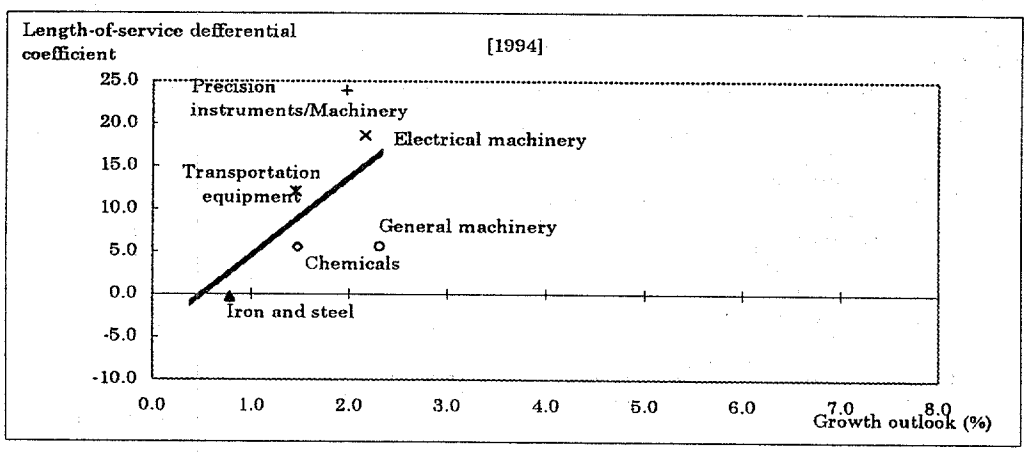
Source: Kigyo Kodo ni Kansuru Ankeito Chosa (Questionnaire survey of company behavior), Economic Planning Agency, Research Bureau

(Figure 5-2) Company growth outlook and degree to which seniority is considered in wages
(Observation on length-of-service effect white-collar workers)



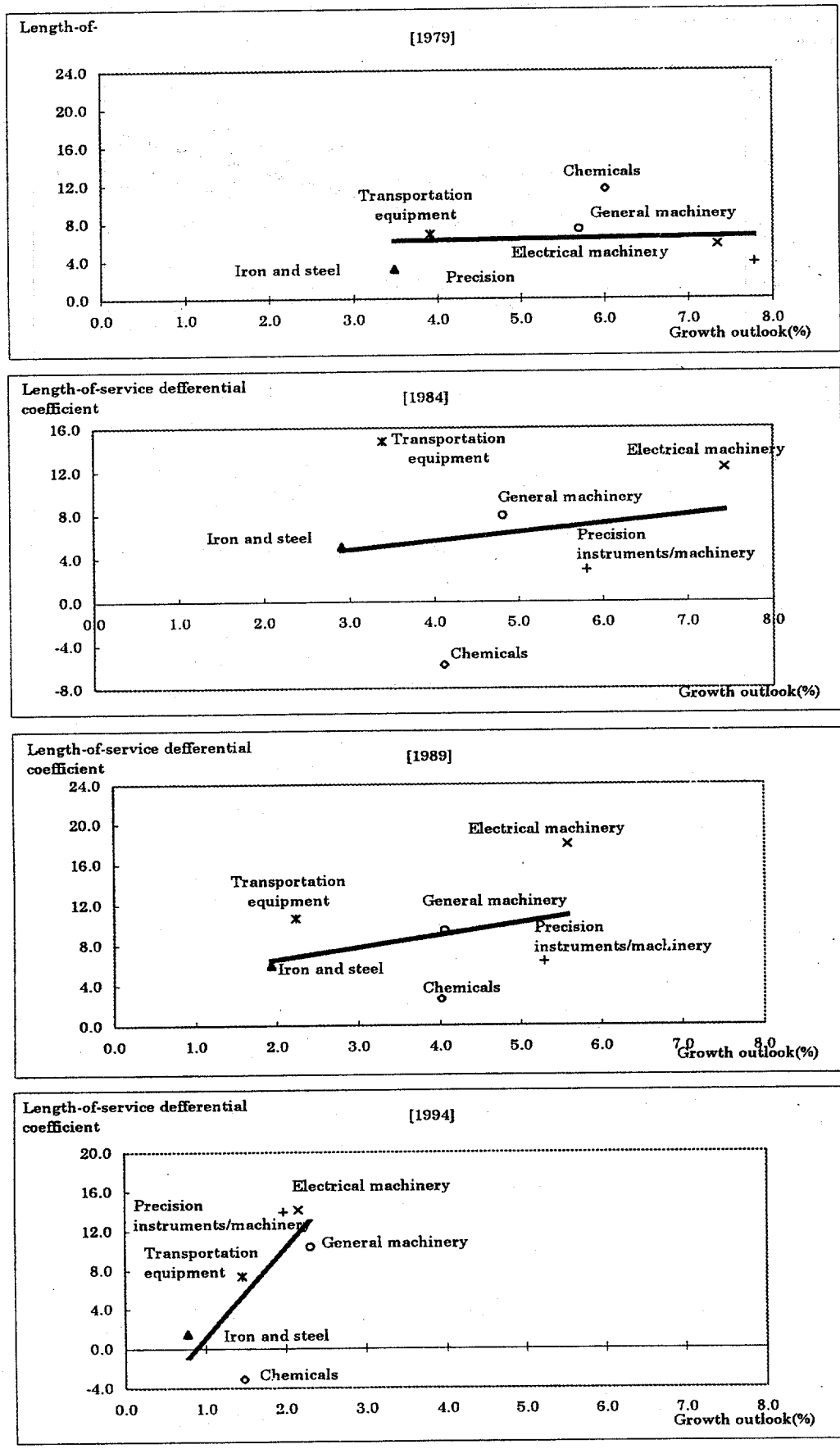






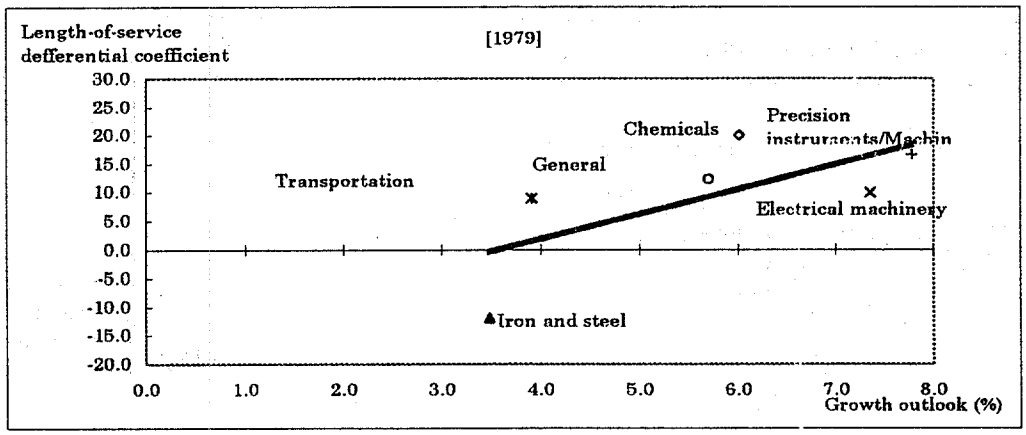
Source: Kigyo Kodo ni Kansuru Ankeito Chosa (Questionnaire survey of company behavior), Economic Planning Agency, Research Bureau

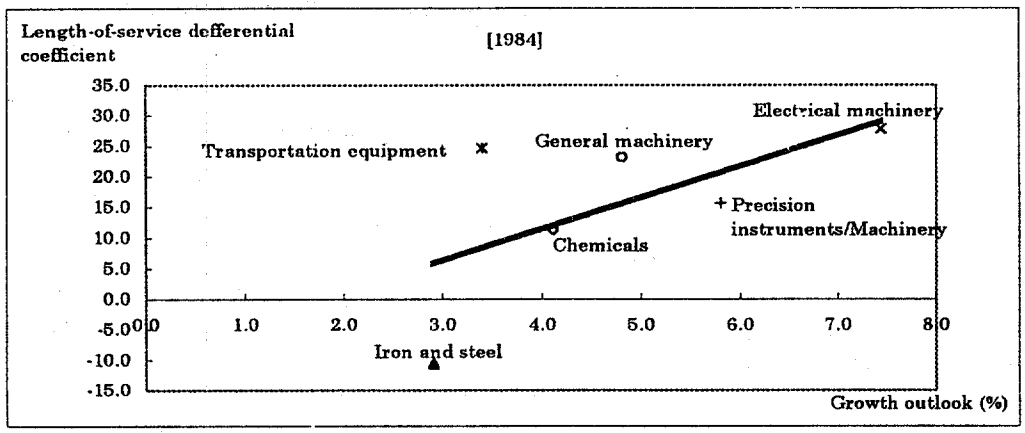
(Figure 6-1) Company growth outlook and degree to which seniority is considered in wages
(Observation on age effect blue-collar workers)

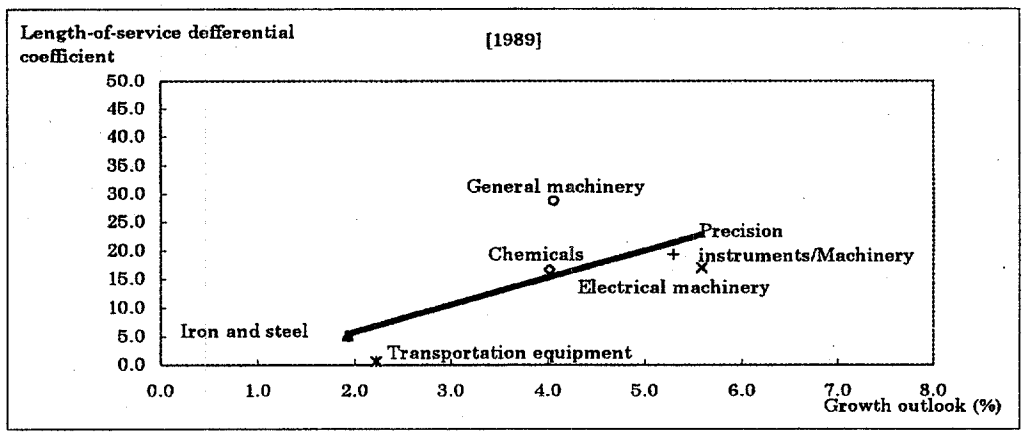


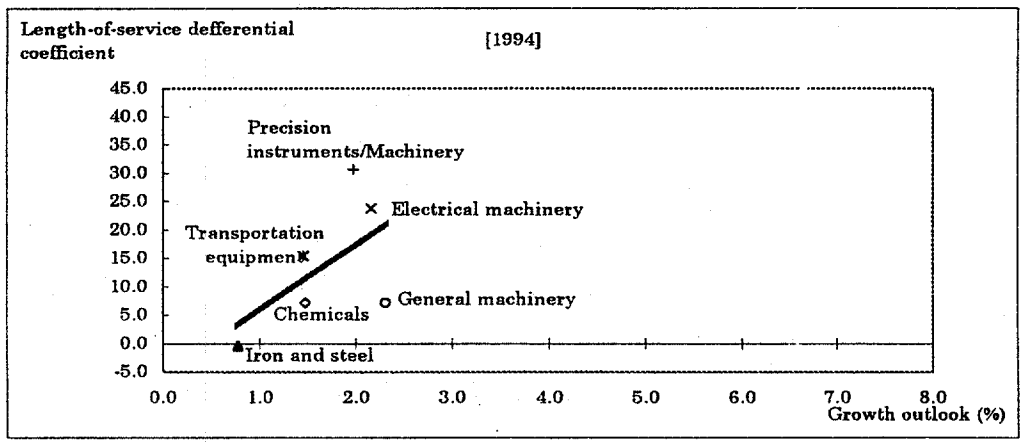
Source: Kigyo Kodo ni Kansuru Ankeito Chosa (Questionnaire survey of company behavior), Economic Planning Agency, Research Bureau

(Figure 6-2) Company growth outlook and degree to which seniority is considered in wages
(Observation on age effect white-collar workers)



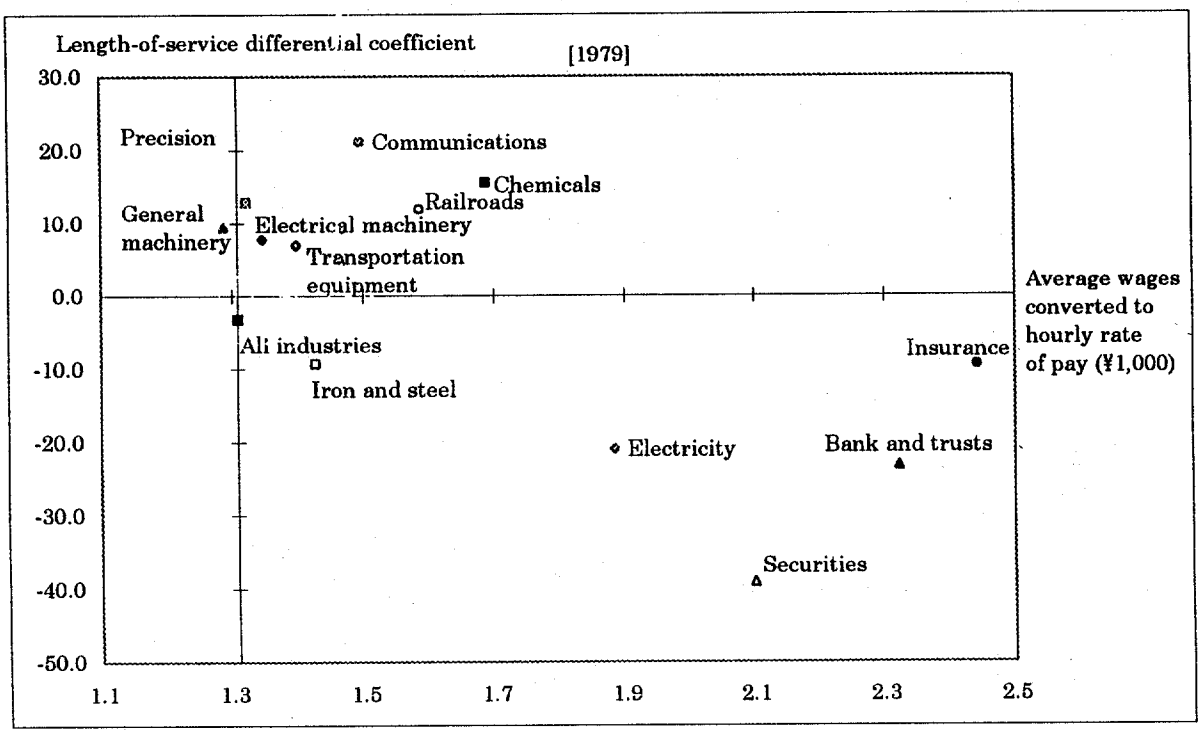


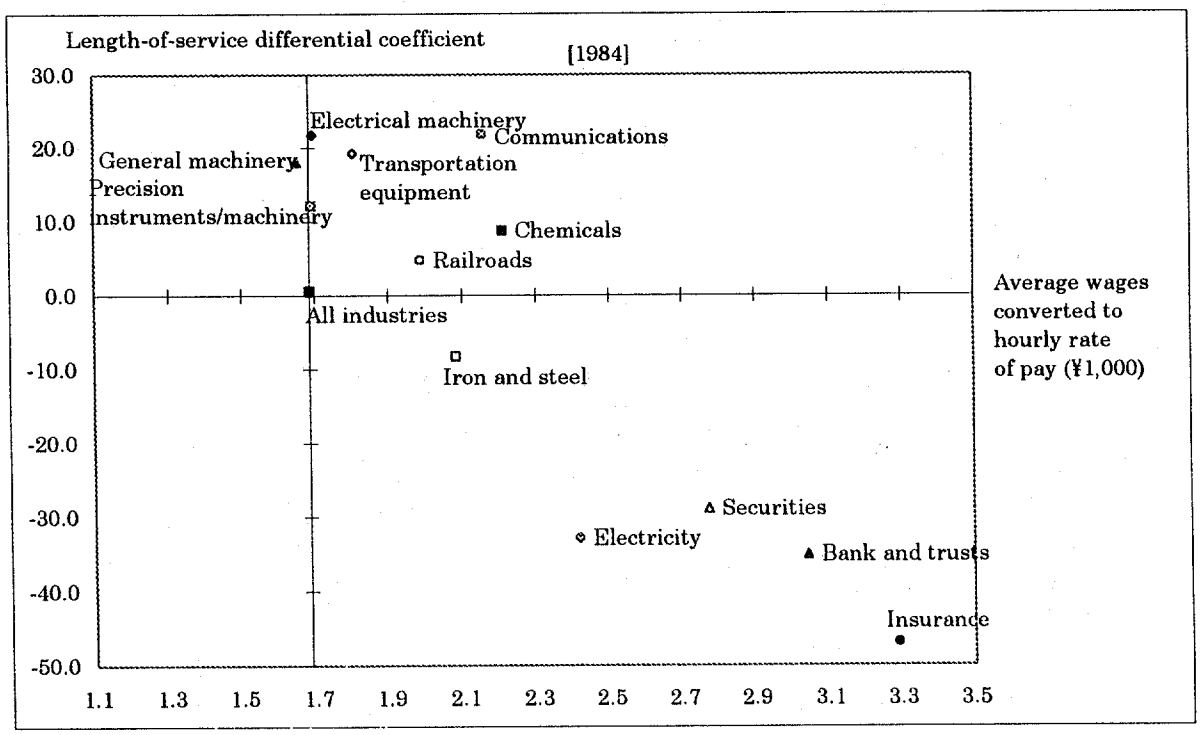


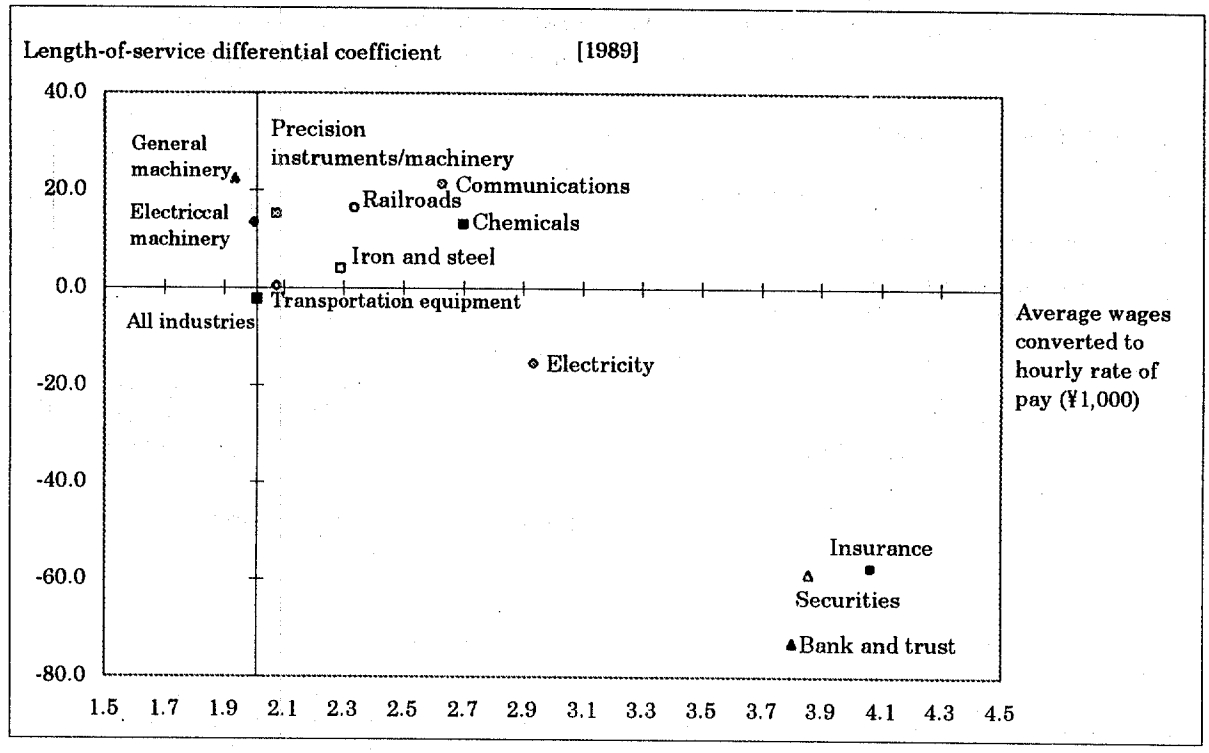


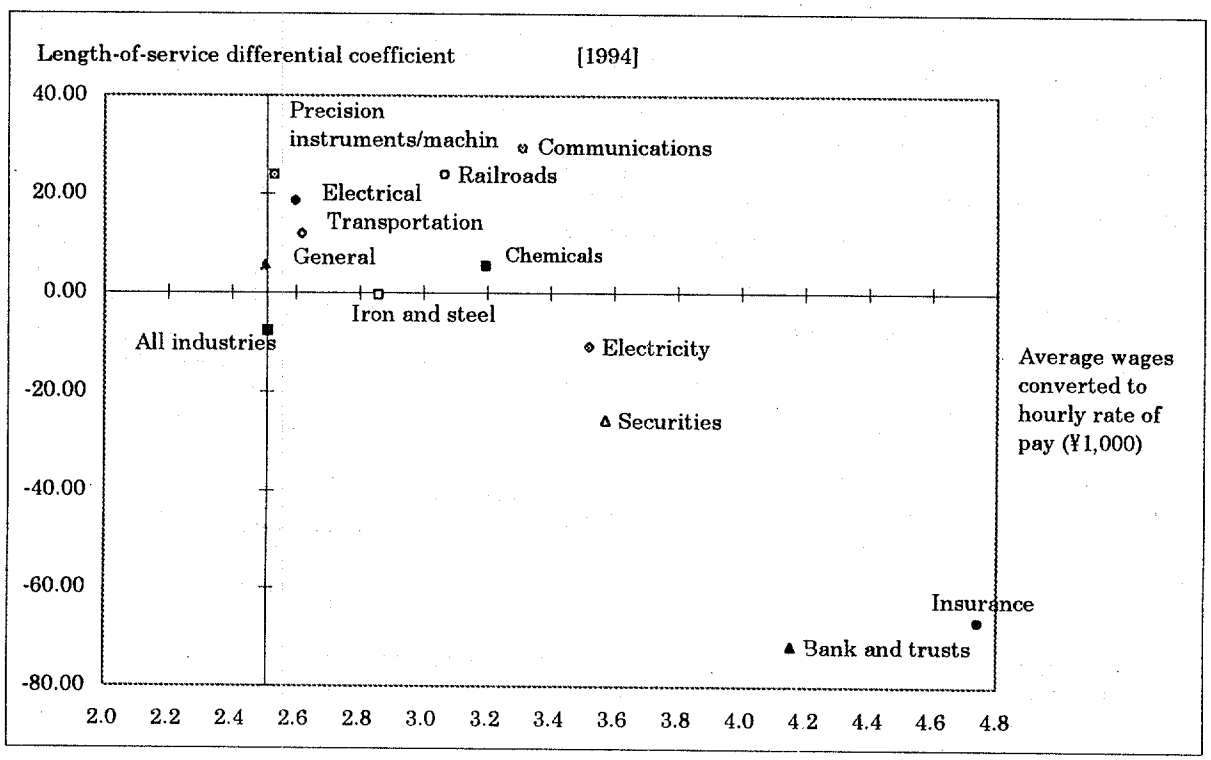
Source: Kigyo Kodo ni Kansuru Ankeito Chosa (Questionnaire survey of company behavior), Economic Planning Agency, Research Bureau

(Figure 7) Average wages and degree to which seniority is considered in wages
(observation on length-of-service effect, white-collar)

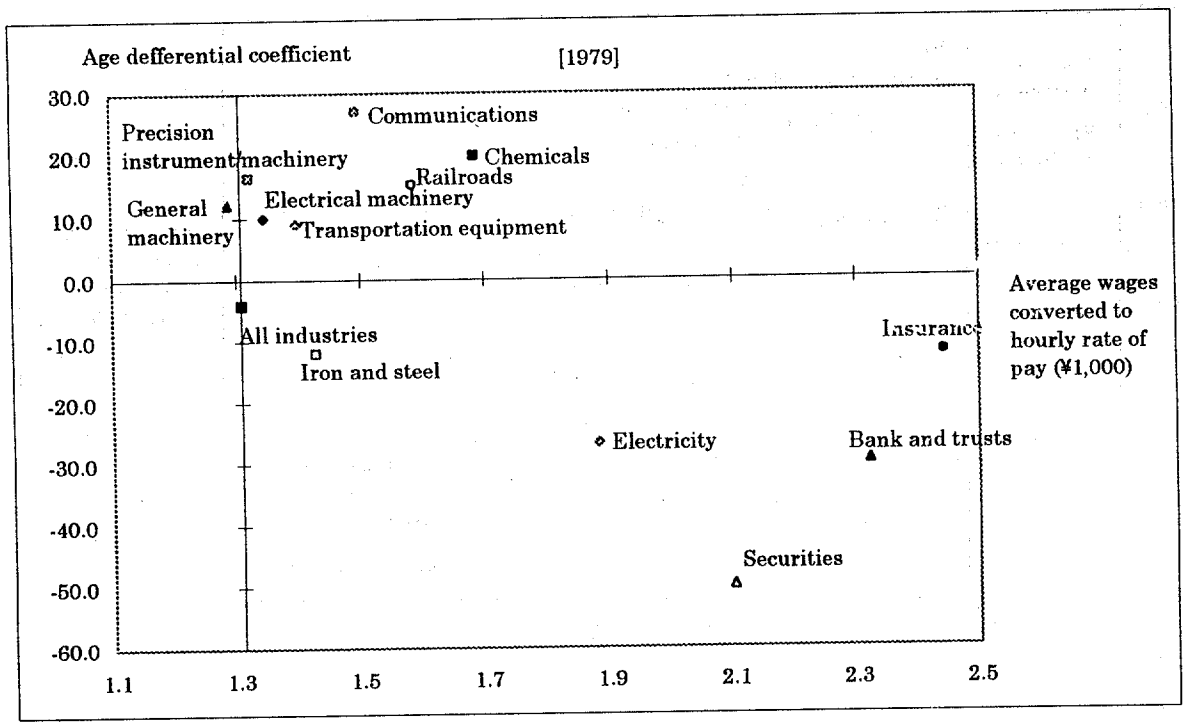


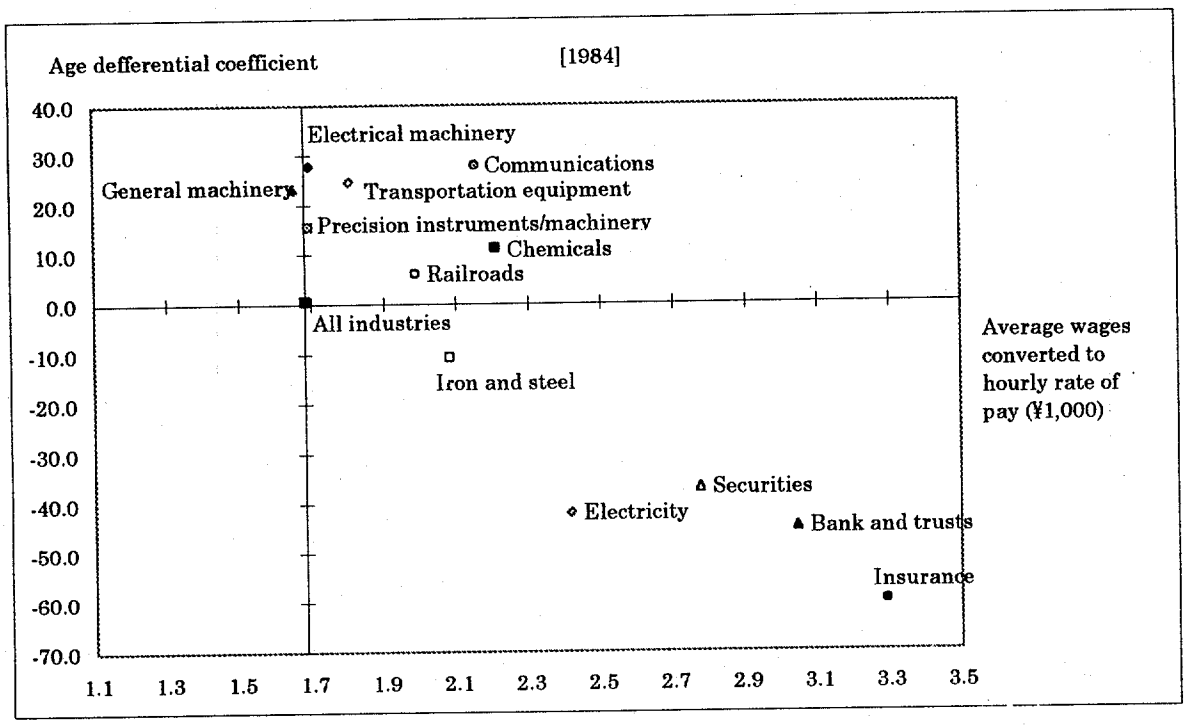


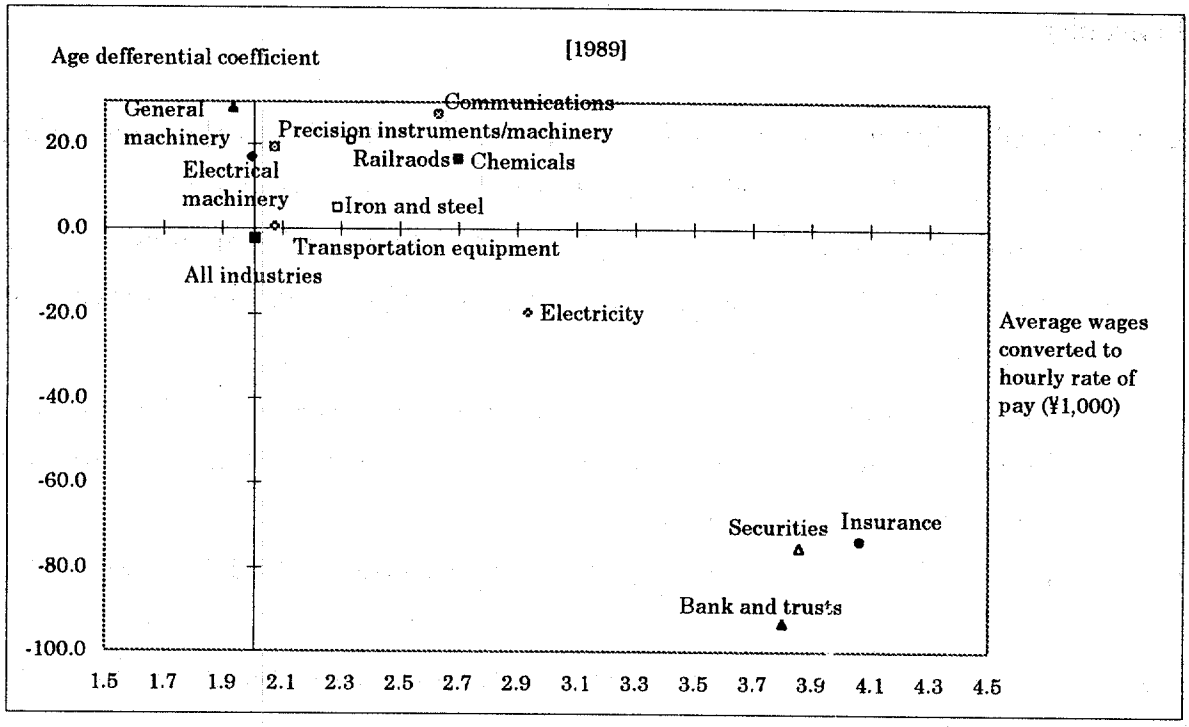

Length-of-service differential coefficient
[1989]
40.0
20.0
0.0
-20.0
-40.0
-60.0
-80.0
General machinery
Precision instruments/machinery
Communications
Railroads
Electriccal machinery
Chemicals
Iron and steel
Transportation equipment
All industries
Electricity
Insurance
Securities
Bank and trust
1.5 1.7 1.9 2.1 2.3 2.5 2.7 2.9 3.1 3.3 3.5 3.7 3.9 4.1 4.3 4.5
Average wages converted to hourly rate of pay (¥1,000)

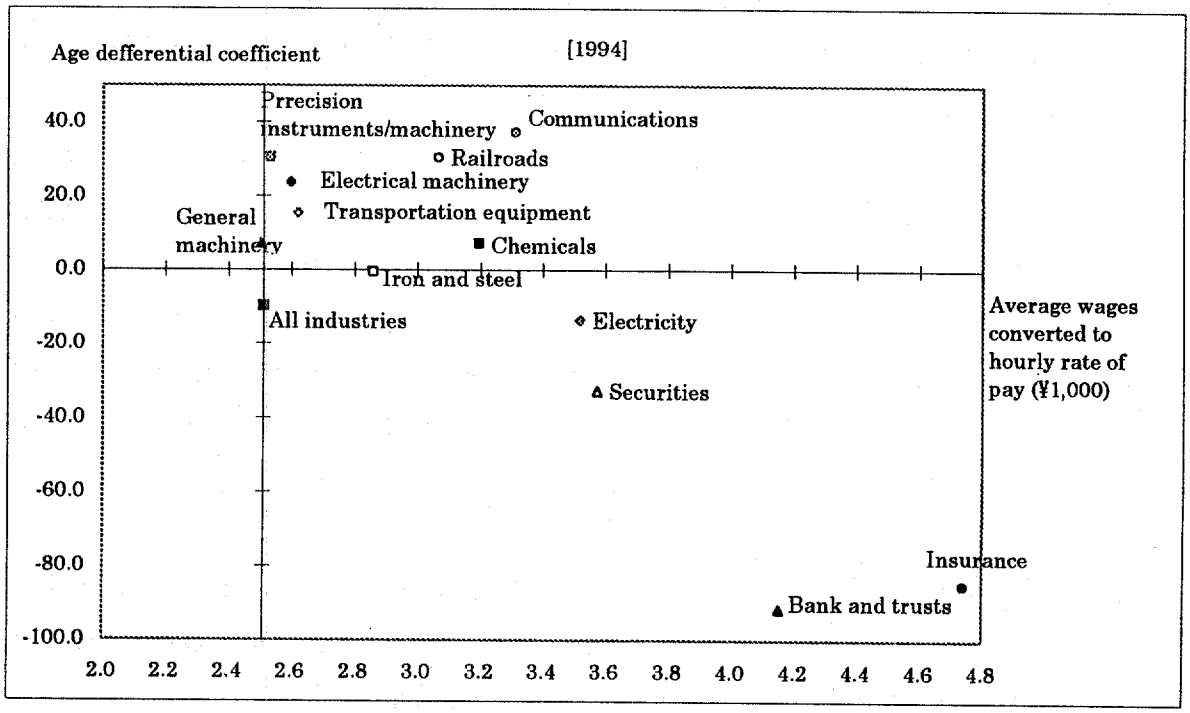

Length-of-service differential coefficient
[1994]
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
Precision instruments/machin
Communications
Railroads
Electrical
Transportation
General
Chemicals
Iron and steel
All industries
Electricity
Securities
Insurance
Bank and trusts
2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8
Average wages converted to hourly rate of pay (¥1,000)

(Figure 8) Average wages and degree to which seniority is considered in wages
(Observation on age effect white-collar)






Age defferential coefficient
[1989]
General machinery
Communications
Precision instruments/machinery
Railraods
Chemicals
Electrical machinery
Iron and steel
Transportation equipment
All industries
Electricity
Securities
Insurance
Bank and trusts
20.0
0.0
-20.0
-40.0
-60.0
-80.0
-100.0
1.5 1.7 1.9 2.1 2.3 2.5 2.7 2.9 3.1 3.3 3.5 3.7 3.9 4.1 4.3 4.5
Average wages converted to hourly rate of pay (¥1,000)


Age defferential coefficient
[1994]
Precision instruments/machinery
Communications
Railroads
Electrical machinery
Transportation equipment
General machinery
Chemicals
Iron and steel
All industries
Electricity
Securities
Insurance
Bank and trusts
40.0
20.0
0.0
-20.0
-40.0
-60.0
-80.0
-100.0
2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8
Average wages converted to hourly rate of pay (¥1,000)

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