

Increasing Wage Inequality in Japan since the End of the 1990s: An Institutional Explanation

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Using the factor decomposition of micro data, in this paper we examine the validity of the SBTC (skill-biased technological change) and the outsourcing hypotheses regarding the continued rise in wage inequality that first emerged within each age group at the end of the 1990s in Japan. We conclude that these hypotheses are invalid. In Japan, the labour market liquidity is low and wages are chiefly determined on the basis of the wage system of each enterprise; although the demand shifts towards skilled labour owing to information technology (IT) and globalisation, this shift is not likely to directly lead to the wage increase of skilled workers. The influence of IT and globalisation on wages is mainly reflected in the institutional reactions of enterprises. These institutional reactions are influenced not only by IT and globalisation, but also by various internal and external changes in the enterprise, such as ageing of the employees and deregulation. We present the following institutional hypothesis to explain the cause of the rising income inequality since the end of the 1990s in Japan. The most important cause is the reforms in the wage system, such as the introduction of a performance-based wage system and the weakening of the spring labour offensive system. We examine the validity of this 'wage institution view' using the factor decomposition of micro data.

Keywords: Wage Inequality; Institution; Japan; Information Technology; Globalisation.

JEL Classification Numbers: J31

1. Introduction

Income inequality has risen in the United States and United Kingdom since the 1980s. There are several views that emphasise that this situation is the outcome of institutional factors such as deregulation, privatisation, tax reform favourable to high-income earners, reform of the social security system, the decreasing income transfer and attack on trade unions (Freeman and Katz, 1994; Pontusson, 2005;

Krugman, 2007; Goldin and Katz, 2007)¹⁾. However, the most popular view is the skill-biased technological change (SBTC) hypothesis wherein the main cause of the rising income inequality is the demand shift towards skilled labour through the diffusion of the 'IT-related technique' (Kats and Murphy, 1992; Berman, Bound and Griliches, 1994; Autor, Katz and Krueger, 1998; Autor, Katz and Kearney, 2008). As the SBTC hypothesis assumes that wages are determined chiefly by the supply-demand condition in the labour market, the demand shift towards skilled labour raises the wages of skilled workers. On the other hand, there are some studies that emphasise the influence of globalisation. This view is divided into two hypotheses. The first one emphasises the relocation (outsourcing) of non-skilled production to developing countries. As such outsourcing lowers the demand for non-skilled workers in developed countries, the relative demand for skilled labour increases, thus widening the wage gap between the two groups (Feenstra and Hanson, 1996). According to the SBTC and the outsourcing hypotheses, the demand shift towards skilled labour occurs within each industry. The second hypothesis based on globalisation emphasises the factor price change in developed countries (an increase in the wages of skilled labour and a decrease in those of non-skilled labour) as an effect of trade in the Heckscher-Ohlin-Samuelson model (Woods, 1994; Sachs and Shatz, 1994)²⁾. According to this hypothesis, the demand shift towards skilled labour is caused by the changes in the industrial structure that lead to the production specialisation for skilled labour-intensive goods in developed countries.

In this paper, using the factor decomposition of micro data³⁾, we examine the validity of the SBTC and outsourcing hypotheses regarding the continued rise in wage inequality within each age group that first emerged at the end of the 1990s in Japan. If the conclusion is presented in advance, these hypotheses are invalid. In Japan, the labour market liquidity is low and wages are chiefly determined on the basis of the wage system of each enterprise; although the demand shifts towards skilled labour owing to IT and globalisation, this shift is not likely to directly lead to the wage increase of skilled workers. The influence of IT and globalisation on wages is mainly reflected in the institutional reactions of enterprises. These

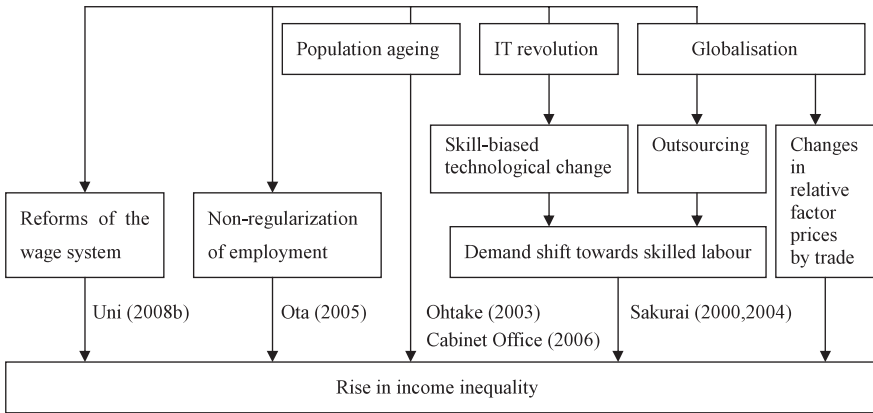
¹⁾ These studies, which emphasised institutional factors, did not necessarily deny the influence of IT and globalisation on income inequality. They attached importance to institutional factors in order to explain the fact that the United States and United Kingdom were the only ones among the many countries similarly affected by IT and globalisation to experience the rising income inequality. Freeman and Katz (1994) called their own theory the 'supply-demand-institutional (SDI) explanation'.

²⁾ Krugman (1995) criticised this hypothesis.

³⁾ We used the anonymized micro data of the *Employment Status Survey* for 1997 and 2002 and the *National Survey of Family Income and Expenditure* for 1999 and 2004, both of which are conducted by the Ministry of Internal Affairs and Communications every five years. The sample of the former survey comprises household members aged 15 years or above from about 450 thousand households. The sample of the latter survey comprises around 50 thousand households. These micro data were provided by the Research Centre for Information and Statistics of Social Science, Institute of Economic Research, Hitotsubashi University.

institutional reactions are influenced not only by IT and globalisation, but also by various internal and external changes in the enterprise, such as ageing of the employees and deregulation. Moreover, the existing industrial relations and customary practices act as constraints to managerial decisions. As an alternative to the SBTC and outsourcing hypotheses, we present the following institutional hypothesis to explain the cause of rising income inequality since the end of the 1990s in Japan. The most important cause is the reforms in the wage system, such as the introduction of a performance-based wage system and the weakening of the spring labour offensive system. We examine the validity of this ‘wage institution view’ using the factor decomposition of micro data.

Figure 1 Views on the Cause of the Rising Wage Inequality in Japan



The organization of this paper is as follows. Section 2 examines the validity of the SBTC and outsourcing hypotheses. Section 3 explains our ‘wage institution view’ and examines its validity. A criticism of the ‘population ageing view’, the most popular view in Japan, is presented in Section 4. The effect of non-regularization of employment on wage inequality is analysed in Section 5, and Section 6 presents the conclusion. In addition, Figure 1 illustrates the various views regarding the cause of the rising wage inequality in Japan.

2. The influence of IT and globalisation

As the wage differential between skilled and non-skilled workers based on educational background or profession was stable in Japan throughout the 1980s and 1990s, neither the SBTC nor outsourcing hypothesis became as popular in Japan, unlike in the United States and United Kingdom. However, there are a few studies related to the above hypotheses on Japan, such as Sakurai (2000, 2004), Sasaki and Sakura (2005), Ikenaga (2007) and Cabinet Office (2007)⁴⁾.

Sakurai (2004) and Sasaki and Sakura (2005) conducted the following three types of analyses. First, as the wage differential by educational background or

profession has been almost constant in the aggregated data of the official wage statistics, they tried to determine the wage differential between skilled and non-skilled workers using the following procedures. They estimated the 'Mincer-type' wage function by taking into account the workers' characteristics such as the duration of their schooling and working years. Using the estimation results, they quantitatively evaluated the hourly wage differentials among workers with different educational backgrounds after controlling for the workers' characteristics. Both these studies found that the hourly wage differentials between university and non-university graduate workers increased in 1985–2000 or 1985–2003. Second, they decomposed the increase in the wage bill share of university graduates during this period into 'within' and 'between' shifts. The within shift denoted the increase in this share within each industry, which was consistent with the SBTC and outsourcing hypotheses. The between shift represented the increase in this share through the changes in the industrial structure, which was consistent with the effect of trade in the Heckscher-Ohlin-Samuelson model. Both these studies found that the contribution rate of the within shift largely exceeded that of the between shift and concluded that 'the relative demand for university graduate workers within the same industry increased due to SBTC and the expansion of foreign outsourcing'. Third, they estimated the extent of influence of SBTC and outsourcing by using a regression analysis based on the panel data on Japan's manufacturing sector by industry. The explained variable is the wage bill share of university graduates and the explaining variables are the research and development (R&D) expenditures ratio as an SBTC factor and the import ratio or the foreign production ratio as a globalisation (outsourcing) factor. Sasaki and Sakura (2005) mentioned that 'the sum of contribution ratios of both globalisation and SBTC factors is approximately equivalent to slightly less than 20 percent; and it can be said that the impact of a globalisation factor has been, at least, the same as, or more than, that of an SBTC factor'.

In a section of the *Annual Report on the Japanese Economy and Public Finance 2007* (Cabinet Office, 2007), the gap problem was analysed in line with the same report of the previous year (Cabinet Office, 2006). In this section titled 'The relation between economic growth and inequality', the rising income inequality in the United States and United Kingdom since the 1980s was examined. In this context, the Cabinet Office (2007) commented on 'the development of IT', 'deepening globalisation' and 'the ageing of the population'. With regard to the rising income inequality in Japan, the Cabinet Office (2007) stated — in keeping with the findings of the Cabinet Office (2006) — that, 'the main cause of the recent rise in income inequality in Japan is the ageing of the population'. The new opinion added to the report of the Cabinet Office (2006) is that 'globalisation and IT partially contributed to the rising income inequality'. On

⁴⁾ Sakurai (2000) and Ikenaga (2007) make a distinction between skilled and non-skilled workers using the occupational classification. Sakurai (2004), Sasaki and Sakura (2005) and Cabinet Office (2007) regard university graduate workers as skilled workers.

the basis of a regression analysis similar to that in Sasaki and Sakura (2005), the Cabinet Office (2007) mentioned the following: ‘the contribution ratio of globalisation factors is significantly larger than that of the technological change factor. These two factors explain only 10% of the changes in the relative wage of university graduate workers. These results are similar to those of previous empirical studies’.

The above-mentioned studies attempt to measure the influence of SBTC and globalisation on wage inequality, focusing on the wage differential by educational background or profession. The results of the regression analyses conducted herein reveal that the amount of this influence — measured in terms of the contribution ratio to the wage bill share of university graduates — was 10–20% in Japan. However, it would be premature to state, on the basis of these results, that ‘globalisation and IT partially contributed to the rising income inequality’. First, the wage bill is the product of the wages per capita and number of workers. Therefore, the increase in the wage bill share of university graduates can be decomposed into the rising wage differential by educational background and the increase in the number share of university graduate workers. As the latter is an obvious fact in Japan⁵⁾, the former would be considerably small. Therefore, the above-mentioned results of regression analyses are likely to indicate the contribution ratio of globalisation and IT to the number share of university graduate workers rather than to the relative wage of university graduate workers. Second, if a part of the above-mentioned contribution ratio (10–20%) pertained, to the relative wage of university graduate workers, answering the following question becomes necessary. How much weight did the increase in the relative wage of university graduate workers carry in the recent rise in income inequality in Japan? If it was on the smaller side, the influence of IT and globalisation on the rising income inequality would be negligible. The above-mentioned studies did not measure this weight.

In the rest of this section, we measure this weight using micro data. From the anonymised micro data of the *Employment Status Survey* in 1997 and 2002, we calculate the hourly wages of regular male workers⁶⁾ with 200 working days or more per year (See Uni (2008b) for more precise procedure). Thereafter, we decompose the changes in the log variance of the hourly wages in each age group into three factors: within-education effects (effects of wage disequalisation within each educational background group), between-education effects (effects of wage disequalisation between different educational background groups) and the effects

⁵⁾ On the basis of the *Employment Status Survey* in 1997 and 2002, the share of ‘university and graduate school graduates’ in the total regular male workers increased from 30.2% to 34.1%. As a control variable in the regression analysis, Sasaki and Sakura (2005) used such average share of university graduates in the whole economy, not in each industry. Therefore, their control of the number share is very insufficient.

⁶⁾ As shown in Uni (2008b), the increase in the rates of inequality in hourly wages among female regular workers was smaller than that among male regular workers. Therefore, in this paper, we focus on the wage inequality among male regular workers.

of the change in workers' distribution by educational background (effects of the popularisation of higher education). We conduct a similar decomposition in the case of professions (the method is presented in the Appendix).

Table 1a shows the result of the decomposition by educational background. As shown in this table, the log variance of the hourly wages increased in all age groups in the period 1997–2002. Among the three above-mentioned factors, the within-education effects were the largest while the between-education effects and effects of the change in worker distribution by educational background were very small⁷⁾. The growth rates of the log variance in each educational background group were 13.5% in the case of 'elementary school or junior high school graduates', 14.3% in 'high school graduates', 17.0% in 'junior college or college of technology graduates', and 12.4% in 'university and graduate school graduates' (these figures are the averages of the four age groups). Thus, the wage inequality rose uniformly within all educational background groups. This uniform disequalisation within each educational background group and the non-disequalisation between different educational background groups contradicts the SBTC and outsourcing hypotheses. This pattern of disequalisation is consistent with the wage institution view that we will explain in the next section.

Moreover, we examined the validity of the SBTC and outsourcing hypotheses regarding the rising wage inequality in male full-time workers⁸⁾ in the United States

Table 1a Decomposition of the Changes in the Hourly Wage Inequality Regarding Education (Male Regular Workers with 200 Working Days or More per Year, 1997–2002, Japan)

Age	20–29	30–39	40–49	50–59
Change in log variance	0.022	0.028	0.018	0.030
Within-education effects	0.025	0.028	0.023	0.031
Between-education effects	–0.002	0.000	0.004	0.000
Effects of changes in educational structure	–0.001	0.000	–0.009	–0.002

Source: The author calculated the above figures using the anonymised micro data of the *Employment Status Survey* of 1997 and 2002.

Note: The educational background groups are 'elementary school or junior high school graduates', 'high school graduates', 'junior college or college of technology graduates' and 'university and graduate school graduates'.

⁷⁾ Regarding female regular workers in Japan, we obtained results similar to Table 1a, although the change in log variance and the within-education effects were smaller than those in the result of male workers. For example, in the female regular workers aged 30–39, the change in log variance was 0.006, the within-education effects were 0.010, the between-education effects were 0.000 and the effects of changes in educational structure were –0.004.

⁸⁾ As regards the female full-time workers in the United States, we obtained results similar to Table 1b, although the between-education effects were slightly smaller than the within-education effects. For example, in the female full-time workers aged 30–39, the within-education effects were 0.052, the between-education effects were 0.037 and the effects of changes in educational structure were –0.007.

using the above-mentioned factor decomposition. We used the micro data of the *Current Population Survey, Merged Outgoing Rotation Groups* of 1980, 1990 and 2000. Table 1b shows the result of the decomposition of the changes in the hourly wage inequality regarding education in 1980–1990. In contrast to the result in Japan (Table 1a), the between-education effects were as large as the within-education effects in the United States⁹⁾. The effects of the change in the workers' distribution by educational background were very small, like in Japan. These two characteristics were also found in 1990–2000, although the number of effects were about half of the data in 1980–1990¹⁰⁾. Thus, the disequalisation between different educational background groups contributed largely to the rising wage inequality in the United States. This pattern of disequalisation is consistent with the SBTC and outsourcing hypotheses.

Table 2 shows the result of the decomposition by occupation in Japan. Similar to the decomposition by educational background, the rising inequality of hourly wages was chiefly caused by the within-occupation effects. The between-occupation effects and the effects of the change in the workers' distribution by occupation are very small. The uniform disequalisation within each occupation group and non-disequalisation between different occupation groups contradicts the SBTC and outsourcing hypotheses and is consistent with the wage institution view.

According to the results of these two decompositions, the wage disequalisation between workers with different educational backgrounds or occupations did not

Table 1b Decomposition of the Changes in the Hourly Wage Inequality Regarding Education (Male Full-Time Workers except for Self-Employed, 1980–1990, the United States)

	Age	20–29	30–39	40–49	50–59
Change in log variance		0.044	0.060	0.070	0.070
Within-education effects		0.024	0.034	0.029	0.034
Between-education effects		0.019	0.030	0.035	0.026
Effects of changes in educational structure		0.001	–0.005	0.007	0.010

Source: The author calculated the above figures using the anonymised micro data of the National Bureau of Economic Research (NBER), and *Current Population Survey, Merged Outgoing Rotation Groups* of 1980 and 1990.

Note: The educational background groups are 'high school dropout', 'high school graduate', 'some college', 'college graduate' and 'post college'. Except for hourly-paid workers, an hourly wage rate is computed by dividing the usual weekly earnings by usual weekly hours of work. The top-coded weekly earnings number is multiplied by 1.4 just like Lemieux (2006).

⁹⁾ Juhn, Murphy and Pierce (1993) obtained the results similar to ours using the *March Current Population Survey* in 1979–1988. Although their method of factor decomposition was different from ours, they showed that the between-education effects were as large as the within-education effect and the effects of the change in the workers' distribution by educational background were very small (p. 430, Table 4).

¹⁰⁾ According to Autor, Katz and Kearney (2008), the college plus/high school wage gaps grew rapidly during the 1980s and decelerated in the 1990s (p. 303, Figure 2).

Table 2 Decomposition of the Changes in the Hourly Wage Inequality Regarding Occupation (Male Regular Workers with 200 Working Days or More per Year, 1997–2002, Japan)

Age	20–29	30–39	40–49	50–59
Change in log variance	0.021	0.028	0.018	0.030
Within-occupation effects	0.019	0.023	0.018	0.024
Between-occupation effects	0.000	0.004	0.003	0.007
Effects of changes in occupational structure	0.003	0.001	–0.002	0.000

Source: See Table 1a.

Note: The occupation groups are ‘specialist and technical workers’, ‘administrative and managerial workers’, ‘clerical workers’, ‘sales workers’, ‘service workers’, ‘security workers’, ‘agriculture, forestry and fishery workers’, ‘transport and communication workers’ and ‘production process and related workers’.

really contribute to the recent rise in wage inequality in Japan. Measured on the basis of the hourly wages of each age group, these two types of wage disequalisation did not occur in 1997–2002¹¹⁾. This fact can be confirmed by the uniform decrease in the average hourly wages of each educational background or occupation group. The decrease rates in these five years were 11.8% in ‘elementary school or junior high school graduates’, 11.5% in ‘high school graduates’, 14.5% in ‘junior college or college of technology graduates’ and 11.6% in ‘university and graduate school graduates’ (these figures were the averages of the four age groups).

Therefore, even if IT and globalisation contributed slightly to the wage disequalisation between workers with different educational backgrounds, the influence of IT and globalisation on the rising income inequality was negligible. Consequently, the SBTC and the outsourcing hypotheses are hardly valid as an explanation for the recent rise in income inequality in Japan. The statement of the Cabinet Office (2007) that ‘globalisation and IT partially contributed to the rising income inequality’ is thus an unsubstantiated assertion.

3. The influence of the wage system reform

As mentioned above, the wage inequality between workers with different educational backgrounds has been constant in Japan, although the share of university graduate workers has increased. This fact is not unnatural if we take

¹¹⁾ Nomura (2007) considers that the essence of Japanese-style employment practice is ‘the management order segmented by educational background and sex’. He mentions that the employment practice is not the dependent variable of economic and managerial conditions but the persistent social norms and values once they are established. He states that ‘the management order segmented by educational background is unlikely to change in the foreseeable future’ (p. 431).

into account the characteristics of the employment and wage systems in Japan. Table 3 shows the median years of tenure of university graduate workers with their current employers. In Japan, the years of tenure increase in parallel with the worker's age. In other words, the majority of university graduate male workers work exclusively for one company in their lifetime. It means that so-called 'lifetime employment system' still exists. On the other hand, the short duration of tenure in the United States indicates that career change and mid-career hiring are widespread. The low mobility of university graduate male workers in Japan means that the adjustment of wages in correspondence with the supply-demand condition in the labour market is difficult to function. Such market coordination of wages is effected — to some extent — only in the case of new graduate workers. The other aspects of wage profiles are chiefly determined by the wage system that is institutionalised in each enterprise. This wage system has mid- and long-term stability and is not much influenced by a short-term fluctuation of the supply-demand condition in the labour market. Consequently, even if the demand shifts towards skilled labour due to IT and globalisation, it is unlikely that it will directly raise the wages of skilled labour. The influence, if any, of IT and globalisation on wages in Japan is reflected mainly in the reform of the wage system in each enterprise. This wage system reform is planned by not only taking into account IT and globalisation, but also the various internal and external changes in the enterprise, such as the ageing of the population and deregulation. Moreover, the existing harmonious industrial relations and numerous customary practices serve to constrain managerial decisions.

Table 3 Median years of tenure with current employer for university graduate workers (2006)

Age	25-34	35-44	45-54	55-64
The United States	3.0	5.2	8.8	11.1
Japan	5.5	13.3	20.3	22.0

Sources: Japan: The Ministry of Health, Labour and Welfare's *Basic Survey on Wage Structure in 2006*, The U. S.: The U. S. Department of Labor's *Employee Tenure in 2006*.

In Japan, IT and globalisation not only caused a demand shift towards skilled labour in the 1990s, but also eroded the profitability of Japanese companies through factors such as intensified international competition. Many enterprises tried to reduce wage costs to recover their profitability. IT and globalisation were not the only factors that forced enterprises to reduce wage costs; the disposal of bad debt caused by the bursting of the bubble economy, the accelerating ageing¹²⁾ of the workforce and the changes in the competitive environment caused by deregulation policies were also contributors. There are two ways to reduce wage costs: employment and wage reduction. However, the former is constrained due to some factors in Japanese companies. The downsizing of the existing employees

cannot be implemented easily, although it is possible to suspend or reduce recruitments. Although some companies solicited voluntary retirement as the last option towards reducing the number of employees in the 1990s, many companies tried to reduce wages. It was done through the introduction of a performance-based system and the weakening of the spring labour offensive system in addition to the control of the rate of wage increase.

Until the 1960s, the seniority-based system was the dominant wage system in Japan. Under this system, the main basis for the wage level and promotions was the age of the employees. Since the 1970s, merit-based wage systems have been introduced on the basis of the initiatives of the Japan Federation of Employers' Association that intended to strengthen the skill upgrading and incentive functions of the wage system. The merit-based wage system and competency assessment comprise the special Japanese personnel and wage system known as 'the merit-based grade system'. Managers assess workers' competency, referred to as 'merit'. Subject to this assessment, workers are ranked on the basis of a merit grade that is linked with remuneration. However, the introduction of this merit-based wage system gave rise to a problem. As it was very difficult to objectively quantify a worker's merit through this assessment, the managers often assigned a high weight to the worker's seniority or years of experience. Such 'seniority-based operation of the merit-based grade system' contributed to reducing the wage inequality generated by the merit-based wage system (Kusuda, 2002).

In the long period of stagnation following the collapse of the bubble, the intensified international competition and rising wage costs due to the ageing of employees, Japanese companies were forced to reduce their wage costs¹²⁾. As shown in Figure 3, the annual wage growth slowed down drastically and the wage rise — excluding the regular wage increase based on seniority — ceased from the mid-1990s. In the 1990s, many enterprises introduced a performance-based wage system in which the link between wages and individual performance was strengthened by the management through objectives, self-assessment and interview systems. As the 'seniority-based operation of the merit-based grade system' was

¹²⁾ An increase in the ageing population raises the wage costs of enterprises in two ways. The first is through the seniority-based operation of the merit-based grade system; in fact, under this operation, the ageing of the labour force naturally leads to a rise in the total wage costs. The second way is by increasing the social security burden of employers (Uni, 2008a).

¹³⁾ In order to chart a course of direction for reforms in the wage system, the Japan Federation of Employers' Associations (1995) declared that enterprises should attach more importance to employee merit and performance rather than age and seniority. The national centre for trade unions opposed such a direction (RENGO, 1995). However, in the questionnaire survey of leaders in enterprise unions (RENGO Research Institute for Advancement of Living Standards, 1998), the option 'performance should be given more importance as a determining factor for wages of university graduate workers' constituted 33.8% of the respondents' replies, and the option 'performance should be given more importance to some extent' constituted 45.4%. In total, most of the leaders in the enterprise unions agreed with the performance-based wage system, at least in 1998. This contributed to the rapid and wide-spread introduction of this system (the adoption rate in 2004 is shown in Figure 2).

eliminated in the performance-based wage system, the wage gap between the employees within an enterprise widened. Actually, it was confirmed that wage inequality rose after the performance-based wage system was introduced¹⁴⁾. The most prominent performance-related wage system is the annual salary system. In 1996, about 10% of Japanese enterprises had introduced the annual salary system for administrative jobs, and this figure increased to 40% in 2002¹⁵⁾. Moreover, the Cabinet Office, Economic and Social Research Institute (2005) conducted a questionnaire survey on the adoption rate of the performance-based wage system. As shown in Figure 2, the larger the amount of capital stock of enterprises, the higher were their rates of adoption of the performance-based wage system¹⁶⁾.

The wage bargaining system also changed. The 'spring labour offensive system' plays an important role as an inter-firm wage standardisation mechanism in Japan, where intra-firm wage bargaining by enterprise unions is popular. In this system, the date for each wage bargaining session is set as follows. The enterprises which are comparatively more successful than the others are the first to conduct their bargaining sessions and they then become the pattern setters who develop the social standard of wage increase. Other enterprises schedule their bargaining sessions a few days after those of the comparatively more successful enterprises in order to follow the wage increase of the pattern setters as much as possible. From the mid-1990s, however, the pattern setter unions were often unable to achieve their wage demands. Moreover, in many cases, trade unions could not coordinate their wage demands in each industry. The spring labour offensive in 1995 marked a turning point (Takanashi, 2002). The Great Hanshin

¹⁴⁾ According to the *Questionnaire Survey on Business Behavior* (Cabinet Office, Economic and Social Research Institute, 2005), the intra-firm wage inequality is greater and the rate of its increase is higher in the enterprises in which the weight of the performance-based wage is 50% or more, compared with in the other enterprises. The Japan Institute for Labour Policy and Training (2007) inquired of employees whether the wage differentials had expanded among their colleagues with similar seniority in 2002-05. In enterprises with a performance-based wage system in place, 43.2% of the employees answered 'yes' and in enterprises without one, 15.7% of the employees answered 'yes'. Moreover, the SANRO Research Institute (1999) inquired of managers the manner in which they would like to change the wage differentials in university graduate male white-collar employees in the future. 20.7% of enterprises answered that they would expand them greatly. 50.8% of enterprises answered that they would expand them slightly and only 23.8% answered that they would not change them.

¹⁵⁾ Japan Productivity Center for Socio-Economic Development conducted a *Survey on Changes in the Japanese Personnel System*. The adoption rate of the annual salary system for non-administrative jobs was below 10%. The performance-based wage system for non-administrative jobs generally involves the following two methods on the basis of which wages are decided. First, a part of the wages is adjusted according to managers' assessment of individual performance. Second, the annual wage increase is adjusted according to this assessment.

¹⁶⁾ The samples of Figure 2 are limited to the companies listed on the first and the second sections of the Tokyo, Osaka and Nagoya Stock Exchanges. 92% of these samples are large sized enterprises with over one billion yen in capital stock. In medium and small-sized enterprises, the adoption rates of the performance-based wage system seem to be smaller than shown in Figure 2.

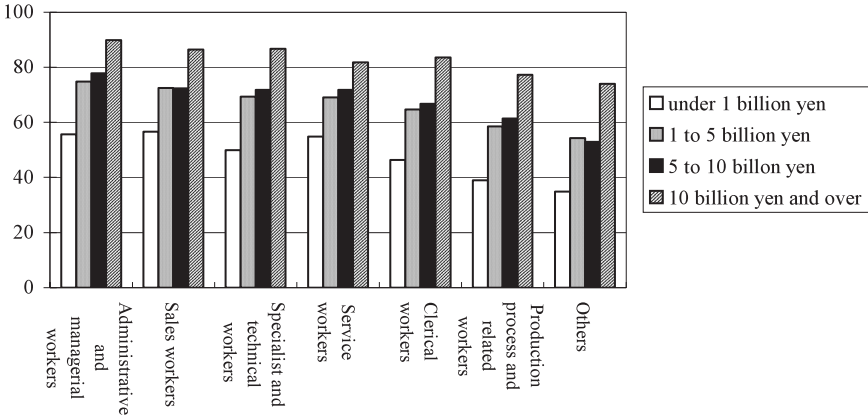
Earthquake of January 17th, 1995 especially affected the public utility sectors. The General Federation of Private Railway & Bus Workers Union of Japan could not schedule a strike. The union and the management of Nippon Telegraph and Telephone Corporation (NTT) reached an agreement earlier than scheduled. The centralized collective bargaining in the private railway sector that had continued since 1967 collapsed in 1995 and strikes in this sector became fewer after 1995. Although the public utility sectors had supported a wage rise during the recession, this function was lost under the pressure of the deregulation in the public utility sectors. In the spring labour offensive in 2000, the bargaining in NTT, electric power companies and private railway companies was settled without a wage increase although the major metal and machinery companies responded with a wage increase of about 500 yen. Moreover, the bargaining in Toyota — a significant pattern setter which had been performing successfully since the 1990s — was also settled with no wage increase in 2001 and 2002. In 2003, the labour union in Toyota abandoned the demand for a wage increase.

As far as the management perspective is concerned, managers attach low importance to the social standard of wages in wage determination¹⁷⁾. The Japan Federation of Employers' Associations (1995), which served to guide the managers' decisions, declared that managers' should attach more importance to an intra-firm relationship rather than an industry-level relationship. 'The intra-firm wage determination' was arrived at in the spring labour offensive in 1997. The management of Toyota responded with a wage increase of about 700 yen, which exceeded the demand by the Confederation of Japan Automobile Workers' Unions. Moreover, the continuing unified efforts of five steel major companies since 1957 failed in 2000. According to the *Basic Survey on Labour Unions* conducted by the Ministry of Health, Labour and Welfare, the unionisation rates in 2005 were 47.7% in enterprises with 1000 employees and more, 15.0% in those with 100 to 999 employees and 1.2% in those with less than 99 employees. In non-union enterprises, wages are likely to be determined at the discretion of the employers. Therefore, employers' disregard of the social standard of wages widens the wage gaps within workers, especially in small-sized enterprises.

Such a weakening of the spring labour offensive causes an increase in inter-firm wage inequality. Figure 3 shows the annual growth rate of per capita wage by enterprise size. Large-sized enterprises (with 5,000 employees and over) and middle-sized enterprises (with 100–299 employees) had raised wages at approximately the same rate until the mid-1990s. However, a remarkable gap emerged between them in the period 1998–2004. On the basis of the *Basic Survey on Wage Structure* (Ministry of Health, Labour and Welfare), we can calculate the

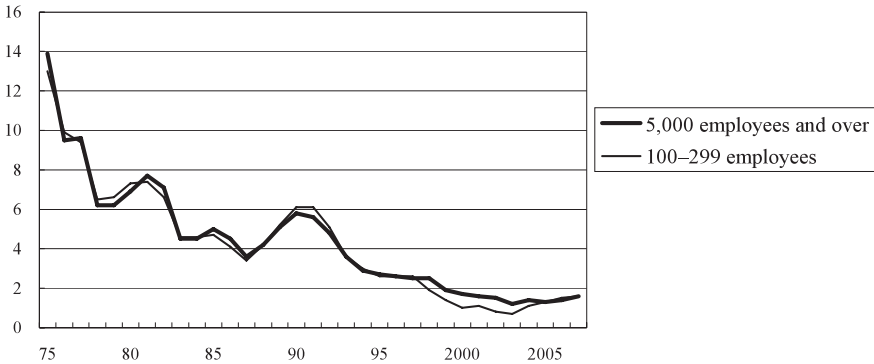
¹⁷⁾ According to the *Survey on Wage Increase* conducted by the Ministry of Health, Labour and Welfare, 25% of Japanese enterprises attached importance to the social standard of wages in 1980–97 in wage determination. This ratio declined to 11% in 1998–2006. On the other hand, the ratio of enterprises that attached importance to business performance increased from 62% to 75%.

Figure 2 The adoption rate of the performance-based wage system by occupation and enterprise size (the amount of capital stock) (in 2004, unit: %)



Source: Cabinet Office, Economic and Social Research Institute (2005)

Figure 3 The annual growth rate of per capita wage by enterprise size (unit: %)



Source: The Ministry of Health, Labour and Welfare's *Survey on Wage Increase*.

annual growth rate of the per capita wage in large-sized enterprises (with 1,000 employees and over) and small-sized enterprises (with 10-99 employees). The gap between them emerged in the mid-1990s. If a value of 100 is assigned to the wages in large-sized enterprises, the value of the wages in small-sized enterprises was stable at approximately 78-80 until the mid-1990s, but decreased to 73 in 2006.

Taking into account the above-mentioned facts regarding the performance-based wage system and the spring labour offensive system, we can set up the following hypotheses on the rising wage inequality. First, as shown in Figure 2, the larger the size of the enterprise, the higher is the adoption rate of the

performance-based wage system. Therefore, an increase in wage inequality within an enterprise due to the performance-based wage system would be more remarkable in large-sized enterprises. Second, the weakening of the spring labour offensive would lead to the disregard of the social standard of wages by managers. This would cause the rising wage inequality within workers, especially in small-sized enterprises of which almost all are non-union companies. Third, as shown in Figure 3, the weakening of the spring labour offensive system would increase the wage differential between the large-sized, medium and small-sized enterprises. This would lead to a rise in wage inequality between enterprises of different sizes. After all, the introduction of the performance-based wage system causes wage inequality to rise chiefly in large-sized enterprises. The weakening of the spring labour offensive system chiefly causes an increase in wage inequality in the small-sized enterprises and between enterprises of different sizes.

To affirm the above three hypotheses, we decomposed the changes in the wage inequality in each age group into the following three factors: (1) within-firm size effects (effects of wage disequalisation within each firm size group), (2) between-firm size effects (effects of wage disequalisation between different firm size groups) and (3) the effects of the change in the workers' distribution by firm size. We used the same data set as in Section 2: the hourly wages of regular male workers calculated from the anonymised micro data of the *Employment Status Survey* in 1997 and 2002.

Table 4 shows the result of the decomposition. As shown in this table, the within-firm size effects were the largest, followed by the between-firm size effects. The effects of the change in worker distribution by firm size were very small. As the rising wage inequality between different size enterprises can be regarded as the result of the weakening of the spring labour offensive system, it proves the third of the hypotheses mentioned above. The growth rates of the log variance in each firm size group were 15.2% in '1-29 employees', 3.9% in '30-99 employees', 10.7% in '100-299 employees', 9.6% in '300-999 employees', 16.0% in '1,000 employees and over' and 3.9% in 'government and other public offices' (these figures are the averages of the four age groups). Although the wage inequality rose in all the firm sizes, it was remarkable in large-sized enterprises (with 1,000 employees and over) and small-sized enterprises (with 1-29 employees). As the rising wage inequality in large-sized enterprises can be regarded as the result of the introduction of the performance-based wage system, it proves the first hypothesis mentioned above¹⁸⁾. The rising wage inequality in small-sized enterprises proves the second hypothesis. Thus, the growth pattern of the wage inequality in each

¹⁸⁾ In order to identify the effect of the strict introduction of the performance-based pay system, it is necessary to decompose the increase in wage inequality within the large-sized enterprises group to the within-firm increase and between-firm increase. This decomposition is impossible because the micro data of the *Employment Status Survey* do not contain the name of the place of employment. However, according to the three surveys quoted in footnote 14, it is almost certain that there was a within-firm increase in wage inequality.

firm size group is consistent with the wage institution view. Moreover, taking into account the fact that the adoption rate of the performance-based wage system is low in the government and other public offices and the uniform wage rise is guaranteed for government employees by the recommendation of the National Personnel Authority, the slow rate of increase in the wage inequality in the government sector (3.9%) is also consistent with the wage institution view.

In addition, the point in time when the wage inequality in each age group started to rise is consistent with this view, taking into account the fact that both the introduction of the performance-based wage system and the weakening of the spring labour offensive system started in the mid-1990s¹⁹⁾.

Furthermore, as mentioned in footnotes 6 and 7, the fact that the increase in the rate of wage inequality among female regular workers was smaller than that among male regular workers is also consistent with the wage institution view because of the following reason. In Japan, the percentage of female managerial staff is very low²⁰⁾. Due to this strong gender segregation at work, the impact of the performance-based wage system on female wages is relatively small.

Table 4 Decomposition of the Changes in the Hourly Wage Inequality Regarding Firm Size (Male Regular Workers with 200 Working Days or More per Year, 1997–2002, Japan)

Age	20–29	30–39	40–49	50–59
Change in log variance	0.022	0.028	0.018	0.030
Within-firm size effects	0.017	0.022	0.013	0.021
Between-firm size effects	0.005	0.006	0.008	0.010
Effects of changes in firm size structure	0.000	0.000	–0.003	–0.002

Source: See Table 1a.

Note: The firm size groups are '1–29 employees', '30–99 employees', '100–299 employees', '300–999 employees', '1000 employees and over' and 'government and other public offices'.

¹⁹⁾ The Development Bank of Japan (2002) calculated the return on assets (ROA) of about 1400 listed Japanese companies, and clarified the trend of the inter-company disparities of ROA measured by the coefficient of variation. These disparities of ROA were almost constant in the 1980s and increased from the beginning of the 1990s. On the other hand, the *Survey on Productivity Model Wage* undertaken by the Japan Productivity Center investigated about 1200 companies' normal wages by age, educational background, sex and occupation (clerical or technological staff and production worker). The inter-company disparities of wages were measured by the coefficient of variation in each category. There was no trend of increase in these wage disparities in any category in 1991–96. On the basis of this difference in trend between profitability disparities and wage disparities, we can understand that the increase in profitability disparities is not a sufficient condition for the increase in wage disparities, although it might be one of the necessary conditions.

²⁰⁾ According to the *Basic Survey on Wage Structure* in 2000 (Ministry of Health, Labour and Welfare), the percentage of female workers at the subsection chief level is 8.1%, the percentage at the section chief level is 4.0% and the percentage at the department manager level is 2.2%.

4. Influences of the ageing of the population

Tachibanaki (1998) drew attention to the continuous increase in the income inequality in Japan since the 1980s. From this period onwards, the gap issue has come to be recognized as a great social problem. The predominant view in Japan is that the main cause of the rising income inequality is the ageing of the population. The higher the age, the larger is the income inequality in the age group. Therefore, according to this view, the income inequality in the entire economy naturally increases due to the ageing of the population. Ohtake (2003, 2005) analysed the micro data of the *National Survey of Family Income and Expenditure* until 1999 and found that the inequality in each age group had been very stable. On the basis of this fact, he insisted that the rise in the income inequality in Japan was a superficial one and that true disequalisation had not occurred²¹⁾. Although Ohtake's view was valid towards explaining the rise in the income inequality until 1999, it did not hold true for the rise post-1999 since the inequality increased in each age group from this year onwards, as shown in Uni (2008b). On comparing the results of the survey in 2004 with the results of the one in 1999 (the previous survey), the Gini coefficients of most age groups are seen to have increased²²⁾. This rate of increase is particularly higher in the age group below 30 years. The proponents of the population ageing view, including Ohtake, have admitted to the fact of the problem of wage inequality in young people. However, we should pay attention to the disequalisation in the age groups of people in their 30s, 40s and 50s.

Using the same procedures as Ohtake and the anonymised micro data of the *National Survey of Family Income and Expenditure* in 1999 and 2004, Uni (2008b) decomposed the changes in the income inequality in households comprising two or more members. To put it concretely, the changes in log variance of equivalent income or expenditure were decomposed into three factors: cohort effects (or within-age effects), between-age effects and demographic effects (or effects of the ageing of the population). Table 5 shows a part of the result. As demonstrated in this table, the rise in the log variance by within-age effects was 0.008, which was as large as that by the effects of the ageing of the population, namely 0.009. Uni (2008b) found that the rising income inequality within each age group was based on the rising wage inequality. This trend of a rise in wage inequality can be found in the Ministry of Health, Labour and Welfare's *Basic Survey on Wage Structure* and SANRO Research Institute's *Actual Data of the Model Wage (Moderu Chingin Jittai Shiryou* in Japanese). In the rest of this section, we will criticise the opinion of the Cabinet Office (2006) insisting that the

²¹⁾ Ohtake and Saito (1998) analysed the causes of the rising consumption inequality in 1979-89 by using this method. The details of this method are described in the Appendix.

²²⁾ The simple average of the Gini coefficients of annual receipts in workers' households aged 25-59 years was 0.217 in 1999 and 0.226 in 2004. The rate of increase was 4%.

Table 5 Decomposition of the Changes in the Income Inequality Regarding Age Using Micro Data of the *National Survey of Family Income and Expenditure* (1999–2004, Japan)

	Uni (2008b)			Cabinet Office (2006)
	Annual receipts	Consumption expenditure	Food expenditure	Annual receipts
Change in log variance	0.008	0.011	0.016	−0.0050
Within-age effects	0.008	0.010	0.015	−0.0077
Between-age effects	−0.009	−0.003	0.002	−0.0067
Effects of population ageing	0.009	0.005	0.000	0.0095

Sources: The rightmost column: Cabinet Office (2006) pp. 263 and 353. Others: Uni (2008b).

Note: As mentioned in the text, the statistical method of the Cabinet Office (2006) differed from the one employed by Uni (2008b).

population ageing view is valid.

The Koizumi and Abe administrations (from April 2001 to September 2007) — both of which had a strong neo-liberal character — maintained the stance of positively regarding income disequalisation as an outcome of free competition. Naturally, this stance was applied to the income disequalisation caused by the ageing of the population²³⁾. On the basis of Ohtake's view, the Cabinet Office (2006) justified the stance of the government that countermeasures against income disequalisation were not necessary. The Cabinet Office presented the 'Ministerial Conference Material Concerning Monthly Economic Report, etc.' in the ministerial conference in January 2006. In this material, the Cabinet Office mentioned that 'although some people insist that there is a rising inequality in income, consumption or wages, there is no statistical evidence' and that 'the slow rise in the income inequality is mainly caused by the ageing of the population and the decreasing size of family'. Prime Minister Koizumi adopted this explanation in his statement in the Upper House plenary session of January 25th, 2006. The precise proof and data were shown in the *Annual Report on the Japanese Economy and Public Finance 2006* (Cabinet Office, 2006). In the result shown in the rightmost column of Table 5, only the effects of the ageing of the population indicate a positive value in 1999–2004, supporting the population ageing view. However, this result was high-handedly derived from the micro data of the *National Survey of Family Income and Expenditure* through the doctoring of Ohtake's statistical procedures. The following three points were the major changes artificially introduced into the data: (1) calculations were based on the total households in

²³⁾ An example would be Prime Minister Koizumi's statement in the Upper House plenary session of January 25th, 2006. The government party and the Abe administration suffered a crushing defeat in the Upper House election in 2007. The next Fukuda administration made a public commitment to correct income inequality, regional inequality in particular.

which single-member households are included together with households comprising two or more members, (2) the calculations used the income, and not the equivalent income and (3) the mean logarithm deviation, instead of log variance, was used in the calculations. These changes lowered the accuracy and the quality of the analysis. First, the accuracy of the analysis decreased due to the addition of single-member households because their sample design and survey method differ greatly from households comprising two or more members²⁴⁾. Second, as the amount of income was not adjusted in correspondence with the number of household members, a 'superficial' inequality based on the difference in the number of income earners in a household came to be mixed in the result. Third, as the mean logarithm deviation is sensitive to the inequality in the lower income group, the focus of the analysis shifted towards single-member households from households comprising two or more members, on which the previous studies of income inequality had focused.

Moreover, as Ohtake's analysis had been standard, the Cabinet Office also ought to have analysed the data in 2004 through the same method as his. However, the Cabinet Office did not publish this result, which contradicted the population ageing view. Obviously, the publication of only the result that appeared compatible with the population ageing view due to the introduction of various inappropriate changes in method was not a conscientious move. If this published result affected the policy decision of the Koizumi administration, the Cabinet Office is heavily accountable.

5. Influences of the non-regularization of employment

Eventually, the persuasive power of the ageing of the population view as an explanation of the rise in wage inequality from the end of the 1990s declined. Instead, the view that the non-regularization of employment was the cause of the wage disequalisation has begun to attract attention. As a directive towards the reform of the employment system, the Japan Federation of Employers' Associations (1995) declared that long-term employment should be limited to administrative, managerial and core jobs, and that a fixed-term employment contract should be in place for the others, such as specialist jobs and jobs at the general level. After the financial crisis in 1997, the substitution of full-time workers with part-time, dispatched and contracted workers increased. According to the *Labour Force Survey* conducted by the Ministry of Internal Affairs and Communications, the share of part-time workers in the total labour force rose from 16.3% in 1998 to 19.5% in 1999 and 23.7% in 2004. Deregulation is a

²⁴⁾ For example, although the share of single-member households in the total households in Japan is about 30%, their share is less than 10% in the samples of *National Survey of Family Income and Expenditure*. Moreover, although the income and expenditure in single-member households is surveyed for two months, that in households comprising two or more members is surveyed for three months.

contributing factor in such non-regularization of employment. When the Worker Dispatch Law was enacted in 1986, the dispatched work was limited to 13 jobs that required expertise and skill. The revision of the law in 1999 permitted the employment of dispatched workers for every job except construction, security guard, harbour loading and unloading, medical treatment and manufacturing. In addition, 'manufacturing work' was included within the scope of dispatched work from 2004 onwards. Moreover, the period of contract for dispatched workers was extended drastically. According to the *Employment Status Survey* conducted by the Ministry of Internal Affairs and Communications, the number of regular workers in Japan decreased by 3,940 thousand (the rate of decrease: 10.3%) from 1997 to 2002, while that of non-regular workers increased by about 3,617 thousand²⁵⁾.

In Japan, the law for equal treatment between part-time and full-time work was not comprehensive²⁶⁾. This contributed to the large wage inequality between the same²⁷⁾. Given this significant wage inequality, the average wage rate among the total workers decreased along with the non-regularization of employment.

The non-regularization view emphasises the effects of a rapid increase in non-regular workers as the main cause of the rising wage inequality, particularly in young people such as 'freeter (free + Arbeiter)'. For instance, Ota (2005) analysed the published statistical tables of the *Employment Status Survey*²⁸⁾ in 1997 and 2002 and concluded that the main cause of the rising inequality in young people's annual income was the increase in the non-regular workers' share in the total employment. Ota decomposed the changes in the log variance of annual income into three factors: within-form effects (effects of wage disequalisation within each employment form group), between-form effects (effects of wage disequalisation between different employment form groups) and effects of the change in the worker distribution by form of employment (effects of non-regularization). On the basis of the results of his study, as indicated in the left half of Table 6, Ota stated the following: 'In the case of workers aged 20–24, the within-form and between-form effects are small. The total rise in log variance is 0.75, of which the effects

²⁵⁾ In the calculation of these figures, the revision of the classification of the forms of employment in 2002 was not taken into account.

²⁶⁾ The law for part-time work in Japan that was enacted in 1993 merely obliged managers to make efforts to consider the balance of conditions of full-time and part-time work. In the amendment to the law implemented in April 2008, equal treatment was legislated for full-time and part-time work for the first time. However, it only covers part-time workers whose job is the same as that of regular workers. The coverage of equal treatment is only about 5% of the total part-time workers.

²⁷⁾ When the female full-time hourly wage is assumed to be 100, the value of the female part-time wage is 62.5 in the United States (1996), 65.7 in Japan (2003), 74.5 in the U. K. (2000), 87.5 in Germany (1995) and 92.3 in Sweden (1995). Japan: Ministry of Health, Labour and Welfare, *Basic Survey on Wage Structure 2003*; the U. S., Germany and Sweden: OECD, *Employment Outlook 1999*; the U. K.: *New Earning Survey 2000*.

²⁸⁾ Ota used data from the published tables of distribution of annual income by form of employment and age group.

of non-regularization are 0.70. Moreover, of the effects of non-regularization, 0.40 is due to an increase in the share of the non-regular workers whose income inequality is higher than that of the regular workers. On the other hand, 0.31 is due to an increase in the share of the non-regular workers whose average income is far from the average income of the total workers' (Ota, 2005, p. 19).

This non-regularization view appears to be valid. However, it includes some erroneous findings that are mentioned below. Moreover, it may be used as the basis to justify the lack of countermeasures by the government as well as Ohtake's population-ageing view²⁹⁾.

Firstly, Ota's remark that 'the within-form and between-form effects are small' is incorrect. Ota overlooked the following revision of the employment classification in the *Employment Status Survey*. The forms of employment in the survey in 2002 were 'Regular staff', 'Part-timers', 'Arbeiders', 'Dispatched workers', 'Contract workers + Employees on a short-term contract (shokutaku)' and 'Others'. In the survey in 1997, the fifth form 'Employees on a short-term contract (shokutaku), etc' was defined. Therefore, contract workers might have been included in Regular staff. This can be examined by comparing the number of employees under the fifth form, which was about 90,000 in 1997 and about 580,000 in 2004. These data demonstrate that in 1997, Ota's 'Regular' group included about 500,000 contract workers. This led to the overestimation of income inequality and the underestimation of the income average of the Regular group in 1997. If we substitute the above data of the Regular group in 1997 with the correct data, the income inequality within this group might be higher than the finding while the income inequality between the Regular and Non-regular groups might be lower.

Secondly, Ota's remark that whether the income inequality among non-regular workers is higher than that among regular workers depends on the definition of non-regular workers. As most of the non-regular workers in Japan are part-time workers, including the workers with short annual working hours, the hourly wages of regular and non-regular workers should be compared. If this is impossible because of the unavailability of data, the workers with short annual working hours should be excluded while comparing annual income. Ota recognized this problem and attempted to remove the samples of 'persons with lower income because of voluntary shorter working hours'. However, he could not remove them completely because his analysis was not based on the micro data. Consequently, as such low-income workers were included in Ota's Non-regular group, the inequality of their annual incomes within the Non-regular group defined by Ota was higher than it actually was. In fact, as the hourly wages for part-time work in Japan is concentrated at about 800 yen, the income inequality among non-regular workers

²⁹⁾ For instance, the opinion that income inequality increased due to the non-regularization of employment is easily refuted by the one that the annual income of people who voluntarily work for shorter hours is low. This supports the argument that the government is not required to correct such rising income equality.

is not necessarily higher than that among regular workers if the comparison is based on hourly wages.

In practice, by using the anonymised micro data of the *Employment Status Survey* in 1997 and 2002, Uni (2008a) decomposed the changes in the log variance of the hourly wages of workers with 200 working days or more. Moreover, we took into account the above-mentioned revision of the employment classification³⁰⁾. The result is shown in the right half of Table 6.

As indicated in Table 6, in the case of the more appropriate decomposition using micro data, the effects of non-regularization are small in any age group. The within-form effects are the main cause of the rising inequality in hourly wages. The wage disequalisation within each form of employment largely affects the rising inequality in hourly wages. The wage disequalisation among regular workers is the most remarkable, although it is not shown in this table. The following conclusions made by us are contrary to Ota's above-mentioned conclusions. (1) The inequality in hourly wages among regular workers increased. (2) The income inequality between regular workers and non-regular workers decreased because of the reduction of the wage levels of regular workers. (3) The income inequality among non-regular workers is not necessarily higher than that among regular workers. Therefore, non-regularization of employment is not necessarily related to the rising income inequality among all workers. In short, the non-regularization view is not valid for all workers.

Needless to say, wage inequality between regular workers and non-regular workers is an important cause of the largeness of the gap. Moreover, non-regular

Table 6 Decomposition of the Changes in the Wage Inequality Regarding Employment Form (Male Employees, 1997–2002, Japan)

Age	Ota (2005)			Uni (2008a)		
	20–24	25–29	30–34	20–24	25–29	30–34
Change in log variance	0.075	0.045	0.044	0.026	0.027	0.028
Within-form effects	0.005	–0.002	0.016	0.022	0.022	0.022
Between-form effects	–0.001	0.010	0.010	–0.002	0.002	0.001
Effects of non-regularization	0.070	0.038	0.019	0.006	0.003	0.004

Sources: Ota (2005) and Uni (2008a).

Notes: As mentioned in the text, the statistical method of Ota (2005) differed from that of Uni (2008a).

Ota (2005) analysed the annual income of two groups (regular workers and non-regular workers) using the published statistical tables of the *Employment Status Survey*. Uni (2008a) analysed the hourly wages of five groups using the anonymised micro data of this survey.

³⁰⁾ Although Ota (2005) used the published tables and two groups — Regular group and Non-regular group — we used the anonymized micro data of the *Employment Status Survey* in 1997 and 2002, and five groups — Regular staff + Contract workers + Employees on a short-term contract (shokutaku), Part-timers, Arbeiters, Dispatched workers and Others.

workers are more burdened with the problems of the so-called 'Working Poor'. In fact, the number of workers who work for 200 days or more a year and 35 hours or more a week with an annual income less than 1.5 million yen is overwhelmingly large among non-regular workers (about 2.5 million persons in 2002). However, it is necessary to focus on the rising wage inequality among regular workers as a cause of the widening gap.

6. Conclusion

In this paper, we examined the validity of six hypotheses — the SBTC hypothesis, the outsourcing hypothesis, the trade effect view, the wage institution view, the population ageing view and the non-regularization view — concerning the continued rise in the income inequality within each age group that first appeared at the end of the 1990s in Japan. Table 7 summarises the result. As the wage bill share of university graduates increased mainly within each industry, the trade effect view is hardly valid. Furthermore, the increase in this share was caused chiefly by the increase in the number share of university graduate workers and the wage differential between university graduate and other workers was almost constant. Therefore, most of the rising wage inequality in recent Japan occurred within each educational background group. A similar result was obtained regarding occupation. The SBTC and outsourcing hypotheses that assume an increase in the relative wages of skilled workers are hardly valid as explanations for the recent rise in income inequality in Japan.

Wage determination is a strongly institutionalised process within Japanese enterprises. If we take this characteristic of the Japanese wage system into account, it is not unnatural that the wage inequality between workers with different educational backgrounds has been constant despite the demand shift towards skilled labour. Paraphrased conversely, the remarkable rise in income inequality in the United States and United Kingdom might be due to their institutional character whereby the wage determination is only weakly institutionalised within enterprises. In Japan, even if the demand shifts towards the skilled labour because of IT and globalisation, its influence on wages is mainly reflected in the reform of the wage system in each enterprise. In the 1990s, this wage system reform was planned by taking into account not only IT and globalisation, but also other factors. The most important purpose of this reform was to reduce the wage costs in the wake of the bursting of the bubble economy, accelerating ageing and the changing competitive environment owing to deregulation and globalisation. Although there were several ways to reduce wage costs, many Japanese companies chose to introduce a performance-based wage system and weaken the spring labour offensive system. Consequently, the rise in wage inequality since the end of the 1990s appeared not between workers with different educational backgrounds or occupations, but within each educational background and occupation group. The wage institution view is also supported by the growth pattern of the wage inequality in each firm size group.

The population ageing view was valid for the rise in income inequality until the 1990s. However, the rise in income inequality from the end of the 1990s cannot be explained only on the basis of the ageing of the population because the inequality in each age group showed an increase. In order to control wage costs, many enterprises reformed not only the wage system, but also the employment system. This relates to the view that the non-regularization of employment was the main cause of wage disequalisation. Contrary to this view, the effects of the non-regularization of employment on the changes in wage inequality were small owing to the following reasons³¹⁾. Firstly, the disequalisation of hourly wages occurred among regular workers, not among part-time workers. Secondly, the inequality of hourly wages between regular workers and non-regular workers was partly lowered by a decrease in regular workers' wages.

According to the wage institution view, managers were principally responsible for the rising wage inequality. Trade unions who agreed with the introduction of a performance-based wage system were also to blame. Some leaders of the national centre of trade unions have already recognised this responsibility. The wage institution view supports this recognition of union leaders. The rising wage

Table 7 The Outline and Validity of Six Hypotheses on the Rising Income Inequality in Japan

	Wage institution view	The population ageing view	Non-regularization view	SBTC hypothesis	Outsourcing hypothesis	Trade effect view
	Uni (2008b)	Ohtake (2003)	Ota (2005)	Sakurai (2004)	Sakurai (2000)	
The main factor	The introduction of a performance-based system and the weakening of the spring labour offensive system	The ageing of the population	Non-regularization of employment	The demand shift towards skilled labour through the diffusion of IT	The demand shift towards skilled labour through the outsourcing of the non-skilled production process	Factor price change due to trade
The main focus	Wage differential in each educational background group among regular workers	Income differential between age groups	Wage differential between regular and non-regular workers	Wage differential between educational background groups	Same as on the left	Same as on the left
Validity	High, because it is consistent with the rising wage inequality within each educational background group and the growth pattern of the wage inequality in each firm size group	Limited, because inequality in each age group increased since the end of the 1990s	Limited, because the effects of non-regularization of employment on the changes in income inequality were small	Low, because the wage differential between university graduate workers and other workers was almost constant	Same as on the left	Low, because the wage bill share of university graduates increased mainly within each industry

³¹⁾ Wage inequality between regular workers and non-regular workers is important not as a cause of the widening gap, but as a cause of the largeness of the gap.

inequality among regular workers stemmed from the lack of response by unions to the weakening of the spring labour offensive system and the introduction of a performance-based wage system. Paraphrased conversely, income inequality in Japan can be reduced through efforts to recover wage solidarity within industries or professions and to weaken the link between remuneration and individual performance. To back these efforts, reforms in the labour law towards strengthening the bargaining power of trade unions may be necessary.

Appendix: The method of decomposing the changes in inequality using log variance³²⁾

The log variance of income implies the variance of the logarithm value of income, as shown in the following equation.

$$LV = \frac{1}{n} \sum_{i=1}^n (ly_i - \mu)^2$$

Here, LV : log variance, n : the number of samples, μ : the mean of log income, and ly_i : log-income of the i th sample

When there are m groups, the above-mentioned log variance is decomposed into within-group inequality (log variance) and between-group inequality (log variance).

$$LV = \sum_{i=1}^m s_i LV_i + \sum_{i=1}^m s_i (\mu_i - \mu)^2$$

The first term on the right side is the within-group inequality and the second term is the between-group inequality.

Here, LV_i : log variance of the i th group, m : the number of groups, s_i : share of the i th group, $s_i = n_i/n$ (n_i : the number of samples in the i th group) μ_i : the mean of log income in the i th group

In addition, an intertemporal change in log variance (ΔLV) is decomposed as follows.

$$\Delta LV = \sum_{i=1}^m s_i \Delta LV_i + \sum_{i=1}^m s_i \Delta (\mu_i - \mu)^2 + \sum_{i=1}^m \Delta s_i LV_i + \sum_{i=1}^m \Delta s_i (\mu_i - \mu)^2$$

The first term on the right side is the contribution of changes in the within-group inequality.

³²⁾ Here, we follow the explanation of Ota (2005).

The second term is the contribution of changes in the between-group inequality. The sum of the third term and fourth term is the contribution of changes in the composition. The third term is the contribution of different log variance by group and the fourth term is the contribution of the difference between the overall mean and the mean in each group.

In the actual calculations, we used the mean values of the two time points as s_i , LV_i and $(\mu_i - \mu)^2$.

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