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Union's Effects on Wage Inequality in Japan

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Abstract

There has been no agreed conclusion on the union wage effect in Japan, with most research indicating that there is only a minimal effect. This paper re-evaluates the effect of unions on wage levels and distributions in the Japanese labor market, using surveys conducted by RENGO-RIALS, an affiliation of the largest national trade union center in Japan. The research indicates that most of the observed union wage gap comes from differences in firm size and differences in worker characteristics, especially tenure, between unionized and nonunionized firms, confirming no marginal effect of unions independent from these factors. However, unions exercise their influence by maintaining the wage structure that unions have long advocated, rather than simply increasing the wage level. In unionized firms, wages increase with age/tenure, and the slope of the wage curve becomes steeper after age 40. As for wage distribution, unions do not reduce the overall wage dispersion of male workers within unionized firms but reduce wage inequality within the same age groups. As for female workers, inequality is consistently larger in unionized firms than in nonunionized firms, and the gap has continued to expand in recent years. The results show that unions exert their influence by maintaining the wage structure that they have promoted. While they have been successful in implementing union wage policy, their traditional concept of fairness is challenged.

Introduction

The Union Effects on Wages

What effect do labor unions have on the Japanese labor market? The effects of labor unions are manifold, including wages, turnover, employment, and productivity. Researchers have tackled the question "What do Unions Do?" from various perspectives (Freeman and Medoff 1984; Bennett and Kaufman 2007). In the United States and other western countries, union effects on wages have been extensively discussed, and there have been generally agreed conclusions: unions increased wages, reduced the returns on worker characteristics, and compressed the wage structure, leading to less inequality in the labor market. Research indicates that union decline has been an important factor for widening wage inequality since the 1990s (DiNardo, Fortin, and Lemieux 1996, Fortin and Lemieux 1997; Card 2001).

However, research on union effects in Japan has been scarce, and there has been no clear conclusion on the effect of labor unions on wages. Several studies indicated that unions had zero or even negative impact on wages until the 1990s(Tachibanaki and Noda 2000; Todate 2010). Given that labor unions engage in the famous annual wage bargaining ("Shunto," the spring wage offensive) on a nationwide scale, it is puzzling why previous studies do not show the impact of unions on wages. In the 2000s, some research suggested that unions may have positively impacted wages during the long period of the recession. However, there have still been very few discussions on wage dispersion and union effects on the widening inequality in the labor market. One of the reasons for this scarcity of research is the lack of appropriate data in Japan. Although the unionization rate has now fallen to 17% of the employed population, this does not mean the decline of unions, especially in terms of the relative rank of union members in the labor market. In 2023, the rate of wage increase for large companies reached 3.9%, the highest in the past 30 years, according to Keidanren (Japan Business Federation)[1]. However, it is unclear whether this wage increase is due to the labor unions or the inflation and the "government-led wage bargaining (Kansei-Shunto)", in which the government requests wage increases from large companies. In order to assess the impact of labor unions on current wage increases, it is vital to summarize how the presence of labor unions had affected wages over the past 20 years, when wages remained stagnant. Therefore, this research tries to re-evaluate the union effects on wages in Japan from 2000 to 2017 by using newly available data and applying different analytical

models from those in previous studies.

Developments in the Japanese Labor Market

There are two aspects we should remember in considering union effects in the recent developments in the Japanese labor market. First, wages has been stagnant in the last 30 years. Figure 1 shows average annual wages for full-time employees, with the lines representing the changes of wages indexed to 1990. While average wages has steadily increased in other OECD coutries including the U.S., Japan is the only economy that has experienced consistent wage stagnation.

Figure 1. Average Annual Wages for Full-Time Workers (indexed to 1990)
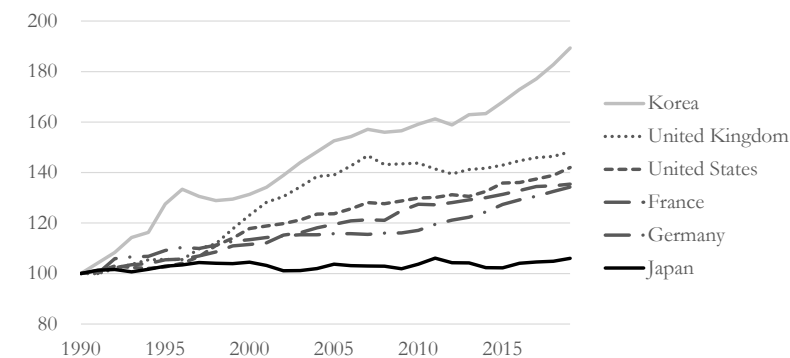
Source: OECD.stats, Average Annual Wages, 2019 constant prices

The second aspect is that there has been a steady rise of nonstandard types of employees. In the Japanese employment system, the terms "regular" *(seiki)* and "nonregular" *(hiseiki)* partially correspond with the terms "standard" and "nonstandard" in other employment systems, but have distinctive characteristics and connotations of their own. I have therefore chosen to use them here rather than the more widely used terminology. Figure 2 shows the number of regular and nonregular employees. While regular employees have slightly decreased in the last 30 years, nonregular employees have rapidly increased and reached around 40% of the total employees.

Figure 2. Number of people in the employment
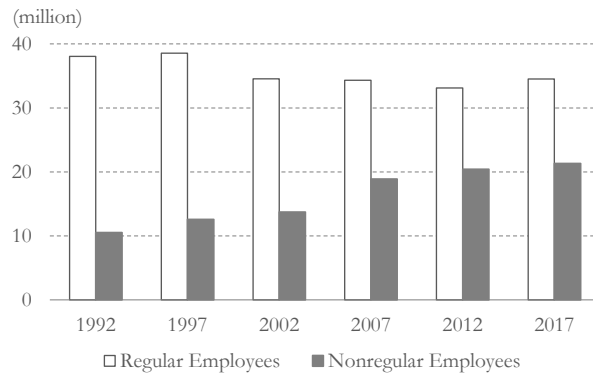
There are significant disparities in labor conditions between these two types of employees, including wages, other benefits, and job security. While those in regular employment are offered seniority-based wages, job security, and long-term employment, nonregular employment is confined to jobs with low wages and less security (Gordon 2017). It is more important to note that the wages of nonregular employees do not increase no matter how many years they work for the same company. While many nonregular employees perform the same tasks and work for the same hours as regular employees, their wages will not increase in the same way as regular employees even if they continue to work in the same company for many years (Osawa 2013). The distinction between these two categories lies in whether or not an employee is granted the status of a corporate community member. As already mentioned, nonregular employment has rapidly expanded since the 1990s, meaning that the share of low-wage workers in the labor market has increased. Therefore, if we look at the overall Japanese labor market, many workers have experienced even worse than their wages "being stagnant". In considering union effects, it is essential to relate the unions to these trends.

Labor Market Segments and Union Membership

The increase of nonregular employees has a significant impact not only on lowering average wages but also on union presence. The fact that labor unions in Japan have been organized on a company-by-company basis, and have only allowed regular employees to join, is believed to be the cause of this growing faultline. Figure 3 illustrates how the Japanese labor market has segmented. The labor market consists of unionized firms and nonunionized firms (solid vertical lines in the figure). The labor market is also divided by the type of employment, i.e., regular employment and nonregular employment (horizontal line in the figure). In

Japan, labor unions are organized by companies, and people hired by unionized companies as regular employees automatically become union members. However, nonregular employees have long been excluded from unions even when they are hired by unionized firms. As a result, only the segment (A) in Figure 3 corresponds to union members[2].

Figure 3. Labor market segments and union membership
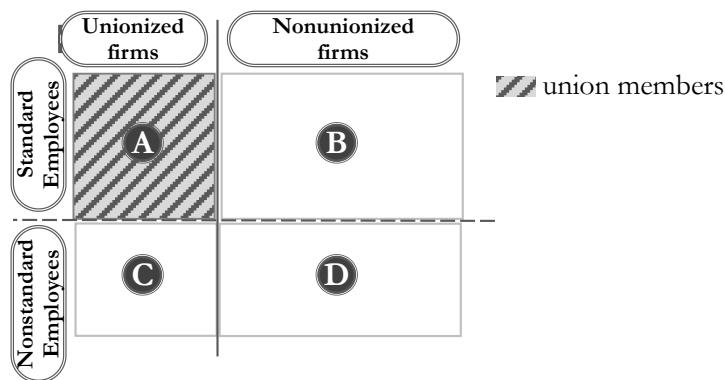
There are two aspects to the union effects on the Japanese labor market: one is the aspect that divides union members and non-members within regular employment (A v.s. B). The other aspect divides regular employees (A), who are eligible for union membership, and nonregular employees, who are not eligible for it (A v.s. C&D). The latter aspect is critical in evaluating union effects, as this linkage between union membership and type of employment itself suggests that labor unions play a significant role in shaping disparities between regular and nonregular employment. However, it is difficult to measure its impact, because the categories of union membership overlap with the categories of employment type, making it hard to distinguish those two effects. On the other hand, the former aspect of union effects (A vs. B) has been widely discussed in previous studies. Therefore, this article also examines the union effects within regular employment as most previous studies did.

Contrary to common belief, the division between regular and nonregular employment is not the most prominent faultline in the Japanese labor market. A previous study estimated the latent structure of the Japanese labor market and found that it is composed of two heterogeneous segments with different wage-determining systems, just as suggested by the dual labor market theory (Suzuki 2020). However, the division between the two sectors does not entirely correspond to the division between regular and nonregular employees. The faultline extends into the regular employees: a quarter of the regular employees are indistinguishable from nonregular employees in terms of the wage-determining system. Therefore, it is

important to examine what causes this segmentation among regular employees. Since the previous study (Suzuki 2020) does not investigate the effect of labor unions due to the lack of information on union membership in the data, this paper will examine the division among the regular employees using a survey containing the necessary information on unions.

Union Wage Policies in Japan

It is crucial to understand for what labor unions have campaigned in order to choose criteria for evaluating union effects. There are some differences in union wage policy between western countries and Japan. Unions in the U.S. and other countries have promoted policies that seek to standardize wages within and across firms and establishments. (Freeman and Medoff 1984). This policy aims to reduce management's discretion on wage determination, leading to narrower wage gaps among different demographic and skill groups. Freeman (1980) and subsequent research confirmed that unions compress wage distribution within union sectors, and this effect was significant enough to improve overall wage equality in the labor market (Freeman 1980; Card, Lemieux and Riddell 2004).

Unions' wage policy in Japan is quite different. Unions have long promoted a wage structure in which wages increase with age/tenure so that workers can support their families with the income of the male workers. Wages are determined according to workers' membership of the company, which has little relevance to each worker's occupation. Unions have advocated proper "discrimination" of wages according to workers' contribution, often leading to disparities by age and gender (Nimura 1994). Japanese workers consider it fair if employees are treated uniformly within the same age groups in the same company, no matter what kind of work they undertake. This unique sense of fairness that unions have advocated stems from the history of labor unions in Japan.

A key feature of Japanese unions is that they have been organized at the enterprise level and not at the occupation or industry level. These "enterprise unions" are also "mixed occupation unions" which include both blue-collar and white-collar workers. According to Nimura (1994), these characteristics were formed in the 1950s and have left a significant impact on unions' policies. For example, unions have campaigned for abolishing differences between blue- and white-collar workers in terms of status as well as wages and other benefits, and demanded to integrate the two different compensation systems. As a result, blue-collar

workers came to have a similar wage structure as white-collar workers by the end of the 1960s (Nimura 1994).

The essential value advocated through this campaign was "equality as a member of the company". However, this equality was applied only for regular employees and was also limited to male workers. When the economy requires more flexibility in workforce management, it has been female workers who bear its cost (Osawa 2001). Nonregular employment has been expanding since the 1980s, and married women have filled these positions at the minimum wage. Unions have repeatedly rejected the concept of equal pay for equal work by promoting wages that increase with age and tenure.

While the union-promoted wage structure increases the wage gap between different age groups, it reduces the dispersion of wages among workers of the same age group within the same company. This kind of wage structure may still be maintained in some unionized companies. Since the 1990s, Japan has suffered from a prolonged recession, and many companies were forced to cut wages. During this period, enterprise unions made every effort to maintain the existing wage structure within each company, while managements have tried to introduce the performance-based system to modify seniority-based wage systems. If data shows a wage distribution corresponding to union wage policy across the entire labor market, it could be said that there is a union effect on wages in Japan.[3]

Measuring Union Wage Effect

Statistical models to estimate union effects on wages have long been discussed. Given that union wage policies are different in each country, it is important to choose the appropriate model capturing union effects according to union wage policy. In Japan, there has been no agreed conclusion on whether there is any union effect on wages (Todate 2010). It was not thought that union membership would have any wage-increasing effect until the 1990s(Tachibanaki and Noda 2000; Noda 1997). Some research indicated that unions raised wages for both men and women in the early 2000s (Hara and Kawaguchi 2008; Nitta and Shinozaki 2008) and unions raised wages only for men in the late 2000s (Nitta and Shinozaki 2008; Tsuru 2010). Hara and Kawaguchi (2008) suggested that positive union effects in the 2000s may have occurred because wages in unionized firms remained relatively high during the prolonged recession period of the 2000s. However, there are differences in variables and analytical models among those studies, and they also

rely on surveys with relatively small sample size, it is still unclear whether union effects could be observed when those factors are fully taken into account[4]. Also, there are only a few discussions on union effects in the 2010s, which requires further studies on union effects in Japan.

One of the reasons why previous studies could not capture union effects lies in their analytical model. Most of the previous studies have adopted an approach of estimating the union effects, using Ordinary Least Squares (OLS) as follows:

$$lnW = aU + \sum_1^k b_k X_k \tag{1}$$

where lnW is the log wage, U is a binary variable representing union membership, and X_k represent other variables for individual characteristics. This model estimates the marginal effect of union membership, controlling for other factors, such as gender, age, and company size. Since these factors are strongly related to union membership in Japan, the simple OLS model is not suitable for capturing the union effect. Union effect is no longer observed after controlling for them (Tachibanaki and Noda 2000; Nitta and Shinozaki 2008). However, the marginal effect is not the only aspect we should consider. The relationships between union status and other factors are also important to understand the role of unions in generating inequality.

In the U.S. and other countries, it is widely accepted that unions positively impact wages they negotiate. A widely used model is to estimate two separate wage functions for the unionized and nonunionized firms, assuming that wage-determining systems (represented as wage function) are different between the two sectors. The wage functions are written as:

$$lnW^u = \sum_k b_k^u X_k^u, \qquad and \qquad lnW^n = \sum_k b_k^n X_k^n \tag{2}$$

where index "u" and "n" represent unionized and nonunionized firm respectively, lnW^u, lnW^n are log wage, b_k^u, b_k^n are coefficients of wage function, and X_k^u represent variables for individual characteristics. The difference between the two equations represents the wage gap due to different effects of worker characteristics in the two sectors (Lewis 1986).

$$\widehat{lnW^u} - \widehat{lnW^n} = \sum_k (\widehat{b_k^u} - \widehat{b_k^n}) X_k \tag{3}$$

This model is more suitable for measuring the union effect in Japan as it can take account of different effects of individual characteristics between unionized and nonunionized firms. While previous research in the U.S. and other countries has put much importance on the issues of unobserved characteristics (Farber 1983; Card 1996; Lemieux 1998), observable variables such as age and tenure may be more important in

Japan, given the union wage policy. Therefore this paper adopts Blinder-Oaxaca Decomposition to examine union effects, decomposing them into two components: the differences in the composition of worker characteristics and the differences in returns on worker characteristics[5].

Methodology

Viewpoints

This paper adopts an approach different from previous studies on the following three points. First, as for the variable representing union status, organization-level information ("Is your company/establishment organized by a union?") is used rather than individual-level information ("Are you a member of a union?"). This is because union status is not determined by the choice of an individual. Workers hired by unionized firms as regular employees will automatically become union members. If workers are hired by nonunionized firms or as nonregular employees, they may not have an opportunity to become union members. For example, Hara and Kawaguchi (2008) suggest that the reason for union effects in Japan is that it is difficult for management to cut wages during recession periods if the company is unionized. To capture the impact of such management practice, union status should be defined as an organization-level variable rather than as an individual-level variable[6].

Secondly, middle management will be included in the analysis. In most previous studies, managers have been excluded from the analysis because they are not eligible for union membership. However, given that we focus on the union effects at the organizational level, it is reasonable to assume union effects extend to the managerial class. This comes from the fact that many employees work for the same company for many years and promote to managers, which makes the wage structures of managers and non-managers continuous.

Thirdly, the focus of the analysis will not be limited to the marginal effect of unions but includes the broader aspects, including interaction with other factors. The relationships between union membership and other factors can be considered to be an important part of union influence.

Research Questions

The relationship between the presence of unions and wages will be examined from three perspectives. First,

union effects on wage level and wage curve will be examined. While it is obvious that a large disparity in average wages is observed between unionized and nonunionized firms, the study aims to examine where these gaps come from. The Blinder-Oaxaca Decomposition will be used to analyze how various factors relate to wage gaps between the two sectors. This model decomposes the wage gaps into two components: the difference in the composition of worker characteristics and the difference in returns on them[7]. Also, the differences in wage structures between the two sectors will be analyzed. In particular, how the effect of age differs between the two groups will be examined, based on a finding by Noda (1997) that age has been an essential factor for union wage effects[8].

The second question is how unions affect wage distribution. Previous studies in the U.S., U.K., and Canada have consistently found that the distribution of wages is smaller in the union sector (Freeman & Medoff 1984; Card, Lemieux and Riddell 2004). However, in Japan, little has been known about union effects on wage distribution (Hara and Kawaguchi 2008)[9]. As discussed earlier, unions have advocated a wage structure that progressively increases with age/tenure and keeps wage differences within the same age group minimal. However, with the recent efforts to introduce a performance-based pay system, these characteristics may be changing. Therefore, this study will examine whether the traditional union-wage structure is still maintained in unionized firms by decomposing the distribution of log wages into within- and between-age groups.

The third question is how the presence of unions affects the overall wage inequality among all regular empoyees. Unions increase wage inequality in the labor market by creating wage gaps between unionized and nonunionized sectors. On the other hand, unions also reduce wage inequality by promoting standardized wages within the unionized sector (Freeman 1980). Whether the effect of increasing or decreasing inequality is more significant depends on the magnitude of each effect and unionization rate. Previous research found that the equalizing effect was more significant than the de-equalizing effect in the U.S. from the 1970s to the 1990s, suggesting that unions made the labor market more equal (Freeman 1980; DiNardo, Fortin and Lemieux 1996; Card, Lemieux and Riddell 2004). Using the same method as Freeman (1980) and Card, Lemieux, and Riddell (2004), the paper will examine the overall union effects on wage inequality for regular employees in Japan.

Data

The data used in this analysis is the "The Survey on Work and Life of People" conducted by the Rengo Research Institute for Advancement of Living Standards (RENGO-RIALS), an affiliation of the RENGO, or Japanese Trade Union Confederation, the largest national trade union center in Japan. The survey is conducted every six months, targeting people employed in the private sector (aged 20-64) who live in the Tokyo metropolitan and the Kansai metropolitan area. The sample size is from 2,000 to 4,000 per survey. The surveys adopt a quota sampling method, and the quotas are defined by sex and age groups based on the "Employment Status Survey" by the Ministry of Internal Affairs and Communications[10]. The analyses use repeated, cross-sectional data from the 9th survey (April 2005) to the 34th survey (October 2017)[11].

This survey includes essential questions for the analyses in this paper. The survey asks two different questions on union status together with standard questions on wages and individual characteristics: one is "Are you a member of a labor union?" and the other is "Does the company you work for have a labor union?". These questions allow us to analyze the union effects with a sample of sufficient siz[12].

In the analysis, the target is restricted to regular employees in the private sector between the ages of 20 and 59. Top management (*Yakuin*) are excluded from the analysis, while middle managers are included. The dependent variable is the log of hourly wages[13]. As for union status, the question "Does the company you work for has a union?" is used. Other variables include education, company size, tenure, gender, marital status, industry, and occupation. Data with missing values are excluded from the analysis. The final sample size is 21,439, of which the descriptive statistics is provided in Appendix 1. The data is pooled for three years to ensure a sufficient size for each group: for example, data from 2005, 2006, and 2007 are merged into one group and labeled as 2005, and data from 2008, 2009, and 2010 are merged into one group and labeled as 2008. Note that there was a change in the survey method (from mail to web-based survey) in 2011.

Figure 4 shows the responses to the two questions "Does the company you work for have a union?" and "Are you a member of a labor union?". The solid line represents the percentage of people who answered, "There is a union in my company." The broken line represents the percentage of people who answered, "I am a member of the union in my company."[14] The dotted line represents the percentage of people who answered, "I am a member of a union outside the company."

Figure 4   Union Presence and Union Memership
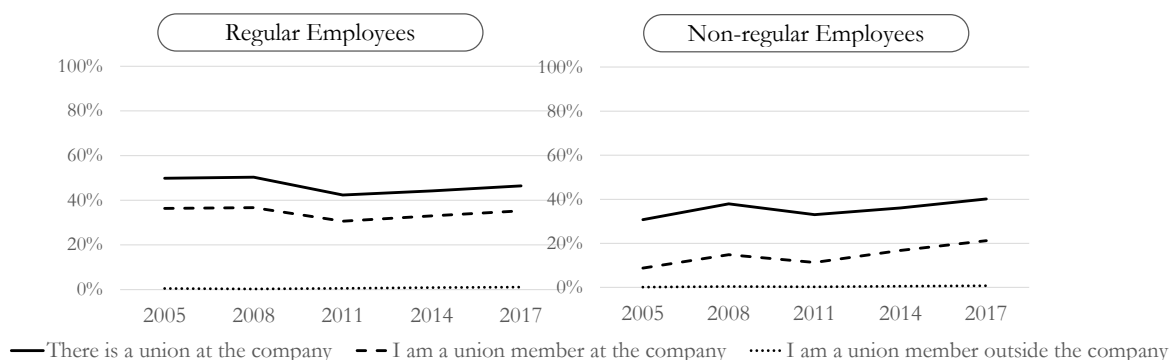
Note: "The Survey on Work and Life of People."

The percentage of people working for unionized firms (solid line) has been hovering around 40% for both regular and nonregular employment, with no significant difference in recent years. While most of the regular employees in unionized firms are also union members, less than half of the nonregular employees in unionized firms are union members. Some companies started to organize nonregular employees, but most unions are slow and reluctant to include them. The percentage of people who join external unions is tiny for both regular and nonregular employees.

Analytical Models

Impact on the wage level. I use the Blinder-Oaxaca Decomposition of the wage function to examine the union effects on the wage level. The model used in this analysis is called the Three-fold Decomposition (Jann 2008), which decomposes the average wage difference between the two groups into i) differences in mean covariate values (Endowment), ii) differences in the regression coefficients (Coefficients), and iii) interaction between the two (Interaction). Now, the wage functions of the unionized firms (u) and the nonunionized firms (n) are defined as follows:

$$ lnW^u = \sum_k b_k^u X_k^u, \qquad\qquad lnW^n = \sum_k b_k^n X_k^n \qquad\qquad (4) $$

where lnW^u, lnW^n are logs of hourly wage, b_k^u, b_k^n are coefficients of wage functions, and X_k^u represents independent variables for individual characteristics. Index "u" and "n" represent unionized firms and nonunionized firms respectively, and k is the number of independent variables. In this case, the mean difference in outcomes of the two wage functions can be decomposed as follows:

$$E(\widehat{lnW^u}) - E(\widehat{lnW^n}) = \sum_k \widehat{b_k^u} E(X_k^u) - \sum_k \widehat{b_k^n} E(X_k^n)$$

$$= \sum_k\{\widehat{b_k^n}[E(X_k^u) - E(X_k^n)] + (\widehat{b_k^u} - \widehat{b_k^n})E(X_k^n) + (\widehat{b_k^u} - \widehat{b_k^n})[E(X_k^u) - E(X_k^n)]\} \quad (5)$$

where the three terms of equation (5) represent the following components respectively:

Endowments: $\quad E = \sum_k \widehat{b_k^n}[E(X_k^u) - E(X_k^n)]$

Coefficients: $\quad C = \sum_k(\widehat{b_k^u} - \widehat{b_k^n})E(X_k^n)$

Interaction: $\quad I = \sum_k(\widehat{b_k^u} - \widehat{b_k^n})[E(X_k^u) - E(X_k^n)]$ $\qquad$ (6)

Effect on the distribution of wages. This study uses the variance of the logarithms to measure the distribution of wages in the two groups of firms. When the wage of an individual is defined as x_i, the variance of logarithm (V) is defined as follows[15]:

$$V = \frac{1}{n}\sum_{i=1}^{n}(z_i - \bar{z})^2, \quad z_i = logx_i \qquad (7)$$

Now, assuming several groups, the overall variance can be decomposed into within-group variances and between-group variances. Between-group variances refer to variances caused by the average wage gap among subgroups.

Total variances: $V(s, V, \overline{W}) = \{\sum_{j=1}^{J} s_j \cdot V_j\} + \{\sum_{j=1}^{J} s_j \cdot \overline{W_j}^2 - (\sum_{j=1}^{J} s_j \cdot \overline{W_j})^2\}$ $\qquad$ (8)

Within-group variances: $\sum_{j=1}^{J} s_j \cdot V_j$

Between-group variances: $\sum_{j=1}^{J} s_j \cdot \overline{W_j}^2 - (\sum_{j=1}^{J} s_j \cdot \overline{W_j})^2$

where j is an index representing subgroup $(j=1\cdots J)$, s_j is population share of group $j (\sum_{j=1}^{J} s_j = 1)$, V^j is variances within group j, and $\overline{W_j}$ is an average wage for group j.

The overall impact on regular employment. To estimate the overall impact on regular employment, I rely on the method used by Freeman (1980) as well as Card, Lemieux, and Riddle (2004). This method assumes a hypothetical situation in which there is no labor union, with the variance of V^n. Then the labor market will be divided into two groups of firms; one is for unionized firms, and the other is for nonunionized firms. When the wage level and dispersion in the unionized sector change, it also changes the overall dispersion of the entire labor market. If the average wage and the variance for each group are (W^u, W^n) and (V^u, V^n), respectively, the overall variance (V) is defined as follows[16]. α represents the unionized

sector's share.

$$V = \alpha V^u + (1 - \alpha)V^n + \alpha(1 - \alpha)(\overline{W^u} - \overline{W^n})^2 \qquad (9)$$

Equation (6) can be transformed to obtain the difference between the variance in the initial state (V^n) and variances after the change (V):

$$V - V^n = \alpha(V^u - V^n) + \alpha(1 - \alpha)(\overline{W^u} - \overline{W^n})^2 \qquad (10)$$

The first term represents the change due to the difference of variance between unionized and nonunionized firms, which is negative if the unionized firms have a smaller variance and positive if they have a larger variance. The second term represents the change caused by the difference in average wages in the two groups. This term is positive as long as there is a difference in the average wage between the two groups. The change in overall variance is the sum of these two effects, whose sign depends on the size of each effect. Using the observed data for $\overline{W^n}$, $\overline{W^u}$, V^n, and V^u, the change in variance $(V\text{-}V^n)$ due to the presence of unionized firms can be calculated. In this model, variance of nonunionized firms in the initial state and after unionization are assumed to be equal. However, in reality, there might be various heterogeneities between the two situations. An analytical model suggested by Card, Lemieux and Riddell (2004) will be used to address this issue. It first divides the sample into age and gender group, calculate union effecs in each group, and then aggreagate these union effects in each age and gender group.

Results

Union Effects on Wage Levels and Structures

As mentioned earlier, most previous studies did not conclude that there are union effects independent from other factors. In order to understand the reason behind this result, I estimate the basic OLS regression of wage function (1) which is commonly used in previous studies. Figure 5 summarizes the results, with the detailed estimation results shown in Appendix 2.

Figure 5   Effects of Unions and Other Control Variables
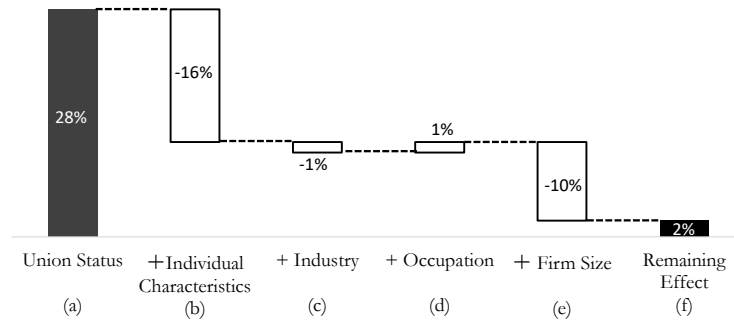
Notes: 1)Created based on the estimation results of Appendix 2.
2) Values are based on coefficients of union status and their changes among the models.
3) Values are not exponentially transformed but are interpreted as a percentage change for simplicity.

Five models were estimated, with variables being added sequentially from Model (a) to Model (e). The figure shows the changes in the coefficient of the binary variable for union status. Since the dependent variable of the equation is the log of wage, the values can be interpreted as a percentage point change in the wage gaps[17]. Model (a) is the simplest regression, where log wages are regressed only on the union status. The result indicates that the average wage in unionized firms is about 28% higher than nonunionized firms. In Model (b), variables for worker characteristics such as education, work tenure, gender, and marital status are controlled. The result shows that 16 percentage points out of 28 percentage points of union effects are absorbed. Industry and occupation are further controlled in Model (c) and Model (d), respectively, but results suggest that these factors hardly influence the size of union effects. However, when the firm size is controlled in Model (e), it absorbed a further 10 percentage points of the union effects. The remaining union effect is only 2% (f) and is no longer statistically significant. The results indicate that the observed union wage gap (28%) is mostly due to differences in worker characteristics and firm size. It suggests that union membership largely overlaps with worker characteristics and firm size, and this is why previous studies could not capture union effects independent from other factors. As shown in Appendix 2, this feature did not change during the 2010s.

Next, the Blinder-Oaxaca Decomposition is applied to analyze whether the union wage gap is explained by differences in worker characteristics (Endowments) or by differences in returns to those characteristics (Coefficients)[18]. Figure 6 summarizes the results, with the detailed estimation results shown in Appendix 3.

Figure 6   Decomposition of Union Effects
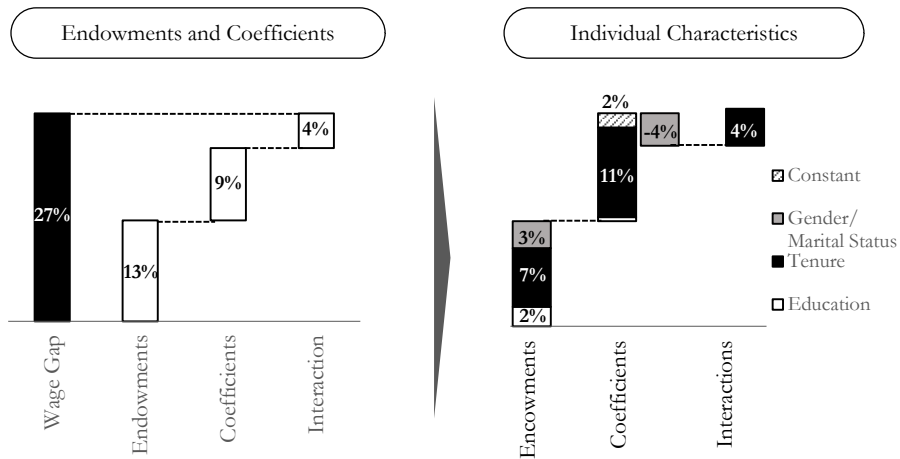
Notes: 1)Created based on the estimation results of Appendix 3.
2) Values are not exponentially transformed but are interpreted as a percentage change for simplicity.

The bar graph on the left shows an overall union wage gap of 27%. Almost half (13%) of this overall union gap comes from the difference in endowments of individual characteristics, while a minor part (9%) comes from the difference in coefficients. This suggests that unionized firms have a higher concentration of workers with characteristics leading to higher wages and have higher returns on those characteristics.

The graph on the right shows the decomposition of these parts into each variable. As for the "Endowments" gap (13%), the largest part comes from tenure (years of service in the company). As for "Coefficients" (9%), most of the gap also comes from tenure. The results indicate that union wage gap arises mostly from tenure: the average tenure in unionized firms is longer, and returns on tenure are also higher than those of nonunionized firms.

Although "tenure" and "age" are two different concepts, they can be treated as almost the same thing, especially for unionized firms, where most employees work for the same company for quite a long time. Figure 7 shows the marginal effects of age and union status on wage for male and female workers based on OLS regression results. The horizontal axis represents age, and the vertical axis represents wage level. The estimation results are shown in Appendix 4. The scale on the vertical axis is a percentage increase of wage based on the 20-24 age group in nonunionized firms[19]. Thus, the solid line represents the wage curve in the nonunionized firms, the short dotted line is the wage curve in the unionized firms, and the broken line is the wage curve in the unionized firms after controlling for firm size[20].

Figure 7   Effects of Age, Unions, and Firm Size
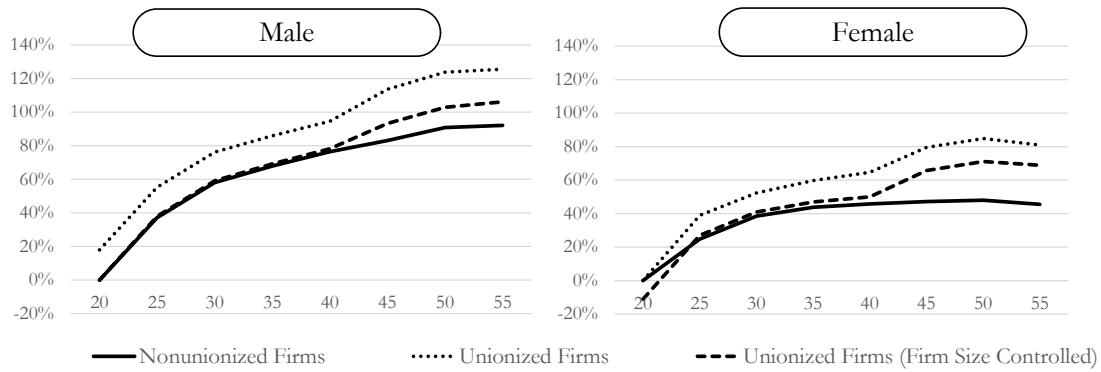
Notes: 1) Created based on the estimation results of Appendix 4.
2) The group of age 20-24 is taken as a base category.
3) "Nonunionized Firms" represents marginal effects of each age category.
4) "Unionized Firms" represents the sum of marginal effects of each age category, union effect, and interaction effects of union and each age category.
5) "Unionized Firms (Firm Size Controlled)" represents the sum of marginal effects of each age category, union effect, and interaction effects of union and each age category, controlling for firm size.

As for male workers, the wage increases steadily with age, even in the nonunionized firms (solid line), reaching an almost 100% increase at age 55, compared to the wage level at age 20. Wages are consistently higher in unionized firms, and this union effect becomes larger after age 40. When controlling for firm size (broken line), there is no union effect before age 40 but union effect remains after that age. As for female workers, the trend is somewhat similar to male workers. However, the wage level in nonunionized firms does not increase with age as much as for the male workers, and the wage curve reaches a plateau at the age of 30 with just a 40% increase compared to the wage level at age 20. Wages are consistently higher for unionized firms, and the union effect becomes much larger after age 40. When controlling for firm size (broken line), the union effect after age 40 remains large and is more significant than for male workers. These results suggest that unionized firms have maintained the wage curve that increases with age and tenure.

Impact on Wage Distribution

This section analyzes how unions affect wage distribution by decomposing log variance of wages into within- and between age groups. The results by union status and gender appear in Figure 8.

Figure 8   Changes in Within- and Between-Group Variances
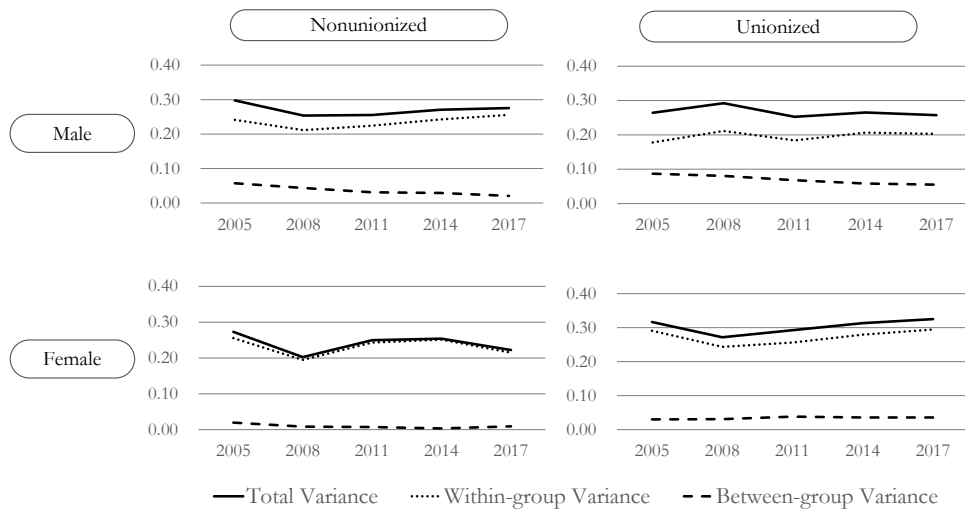
Note: Created based on Appendix 5

The solid line represents the total variance, the dotted line represents the within-group variance, and the broken line represents the between-group variance. As for male workers, while there is no significant difference in the total variance between unionized and nonunionized firms, a comparison between the two groups of firms indicates that the share of between-group variance (broken line) is larger in unionized firms than in unionized firms. This suggests that unionized firms have a wage-age curve whose slope is steeper and the dispersion within the same age group is smaller than those in nonunionized firms, which corresponds to the traditional union wage policy in Japan. However, looking at the changes over time, the between-group variance (broken line) has decreased in both groups, suggesting that the wage curve is flattening out. At the same time, while the within-group variance has increased in the nonunionized firms, it has remained almost constant in the unionized firms, suggesting that unions have managed to hold back the widening wage gap within the same age groups.

As for female workers, the total variance is consistently larger in unionized firms than nonunionized firms. However, the two groups of firms have in common that the between-group variance is minimal, and most of the total variance is accounted for by the within-group variance. This means that the wage-age curve for female workers is flat, with larger wage gaps within the same wage group than male workers. Looking at the changes over time, within-group variance in the unionized firms has consistently increased in recent years.

As we have examined, there are apparent differences in the wage distributions between the unionized and nonunionized firms. Research in the U.S. and other countries has consistently found that wage

inequality is smaller in unionized sectors. However, this is not the case for both male and female workers in Japan. As for male workers, there is almost no difference in the total variance between the unionized and nonunionized firms. As for female workers, the total variance of wages is consistently larger in unionized firms, and the within-group variance in the same age group has continues to rise.

Overall Impact on Regular Employment

How do the unionized firms affect the overall wage distribution of regular employees? The results of the analysis appear in Figure 9. The solid line represents the total effect, i.e. the extent unionized firms increase or decrease the overall wage dispersion. This total effect is decomposed into two parts: the part coming from the difference in wage levels between the two groups (broken line), and the part coming from the difference in dispersion between the two groups (dotted line). The effects are calculated by age groups first and aggregated to adjust for the different individual characteristics of each group (Card, Lemieux and Riddell 2004)[21].

Figure 9　　　Overall Effects of Unions on Wage Distribution of Regular Employees
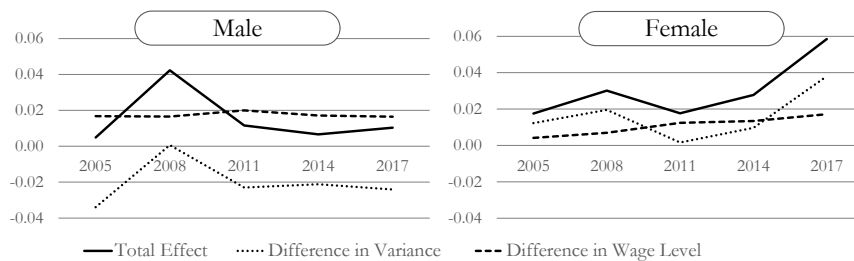
Note: Created based on Appendix 6.

As for male workers, the total effect (solid line) increased in 2008, but remained close to zero after that. The variance is slightly smaller in the unionized firms than nonunionized firms, which makes the effect coming from the difference in variance of the two groups (dotted line) negative. However, this is offset by the positive effect coming from the difference in wage level between the two groups (broken line). As for female workers, the result shows that the total effect (solid line) is positive and increasing rapidly. There is also an increase in the two components of this total effect: the effect coming from the difference in variance (dotted line), and the effect coming from the average wage difference between the two groups (broken line). These two effects have combined to increase the overall wage dispersion among regular employees (solid line).

In sum, among male workers in regular employment, the unionized firms have relatively high wages and small dispersion but have little effect on the overall wage dispersion. Among female workers, however, unionized firms have relatively high wage levels and large variances among women, which also rapidly increases the overall wage dispersion.

Discussion and Conclusion

This paper analyzed the union effects on wage level and distributions of regular employees. Although there is a large union wage gap of about 30%, the largest part comes from differences in worker characteristics and firm size. Unionized firms tend to hire people with characteristics that lead to higher wages, such as male and college-graduate workers. Also, firm size is a particularly important factor in considering union effects in Japan, where unionization is concentrated in the large firm sector. There is no marginal effect of unions remaining after controlling for these factors, which confirms most previous studies on union effects in Japan (Tachibanaki and Noda 2000).

However, this does not mean that unions do not have a substantial impact on wages. The results suggest that unions exercise their influence by maintaining the wage structure that has been advocated by union policy, rather than simply increasing the wage level. Unions have long promoted a wage structure in which wages continue to increase with age/tenure over a period of more than 20 years after a worker has been hired. In unionized firms, tenure (years of service in the company) has higher returns to wage than in nonunionized firms, and the average length of tenure is also longer, and these two factors together increase workers' wages. While both unionized and nonunionized firms still maintain wage curves increasing with age, the slope becomes steeper in unionized firms after age 40. This impact can be confirmed for women in unionized firms, though the wage curve for women is flat in nonunionized firms. I suggest that maintaining this traditional wage structure of the "long-time commitment model" is the major effect of union presence.

The results also found that union effects on the distribution of wages in Japan are different from those of western countries. While studies on the U.S., U.K., and Canada found that unions reduce wage distribution, no such effects are observed in Japan. As for male workers, total variances are almost the same between unionized and nonunionized firms. However, the composition of variance is different between

the two sectors. When decomposing variances into between- and within-age groups, results indicate that unionized firms maintain the wage structure with smaller variances within the same age groups and retain larger wage gaps between different age groups.

As for female workers, variances are consistently larger in unionized firms than in nonunionized firms, and the gap has continues to expand in recent years. This trend is related to the expanding wage gap between unionized and nonunionized firms and the rapidly increasing variance within unionized firms. Female workers used to be uniformly confined to low wages in the past. While wages for some female workers have improved in unionized sectors, most of them have still been left behind.

The results suggest that absence of marginal union effect on simple wage increase does not necessarily mean absence of union effects. The wage structure advocated by unions has been maintained in unionized firm, and this should be considered as an important union effect. Unions have been successful in defending the union wage policy and concept of fairness. However, wages and other benefits have deteriorated outside the union sector, such as people who work for small- and medium-sized firms, nonregular employees, and the self-employed. This means unions' concept of fairness have been challenged. The union effects in the entire labor market need to be investigated in future research.

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[1] Nihon Keizai Shimbun, May 19, 2023.

(https://www.nikkei.com/article/DGXZQOUA1946C0Z10C23A5000000/)

[2] Unionization rate in nonregular employment has been rapidly increasing in recent years.

[3] Industrial relations in Japan are characterized by "enterprise-unionism", consisting of labor unions organized on a company-by-company basis. Given that wages are primarily determined in a company's own wage system, wage structure can be completely different from company to company. However, unionized firms have shared wage policies and practices through collaborations such as industry-wide negotiations, which leads to similar characteristics of wage structure among them.

[4] Nitta and Shinozaki (2008) and Tsuru, Yoshinaka, and Enoki (2009) adopt annual income as the dependent variable rather than hourly wages.

[5] There are a few previous studies that adopt this approach in Japan. For example, Noda (1997) emphasizes that returns to individual characteristics differ between unionized and nonunionized firms, and Hara and Kawaguchi (2008) also conduct a decomposition analysis of the wage difference.

6 These two answers coincide in the union shop system that is primarily adopted in large companies. In these cases, it is appropriate to treat union status as an organization-level variable. Tachibanaki and Noda (2000) discussed this point and adopted organization-level union presence as a union status variable.

7 Hara and Kawaguchi (2008) adopt the Cotton-Neumark Decomposition to decompose the union wage gap into the difference in endowments and difference in coefficients. The effects of each separate variable are not examined.

8 Noda (1997) confirms that the effect of tenure and age is more significant in unionized firms.

9 Hara and Kawaguchi (2008) and Tsuru (2010) apply the DFL Decomposition method and report that labor unions have the effect of compressing the wage distribution.

10 It should be noted that surveys targeted areas limited to Tokyo and Kansai Metropolitan Area, and were also conducted via web-based questionnaires, which may lead to potential bias in characteristics of respondents and their employers compared to samples of official statisitcs.

11 Although the survey started in 2001, it started to include working hours as a survey item in 2005 and hourly wages can only be calculated after that. Also, the surveys were conducted by mail from the 1st to 20th (2010) surveys, and the 21th (April 2011) and subsequent surveys were conducted via web-based questionnaire.

12 In contrast to the U.S., where microdata of official surveys has been available since the 1970s, large-scale surveys including union status were not available in Japan until the Japanese General Social Survey (JGSS) started in 2000. Even in research to study the union wage gap using JGSS, the sample size is between 500 and 2,500 (Nitta and Shinozaki 2008; Kawaguchi and Hara 2008).

13 The hourly wage is calculated using annual income and weekly working hours. Since annual income and weekly work hours are asked in ranges, the central values of each range is used for calculation. Annual work hours are calculated by multiplying weekly work hours by 52. The hourly wage is then calculated by dividing the annual income by annual work hours. The survey does not include a question to determine whether the work schedule is constant throughout the year, and the calculation of hourly wage may contain some errors.

14 Among full-time employees, most of those who work for a unionized firm but are not union members are managers who are not eligible to join a union. When managers are excluded from the sample, the rate

of union membership becomes higher.

[15] Variance of log is constructed by taking the log of wages and calculating their variance. It is scale-invariant and can be compared among samples with a different unit of measurement (Allison, 1978). This index is used in previous studies that estimated the union effects in the U.S. and other countries.

[16] The basic idea of this equation is the same as that of the decomposition equation (5) in the previous section, and it corresponds to the case with only two subgroups.

[17] Values could be exponentially transformed, but instead, they are interpreted as a percentage change for simplicity.

[18] Firm size is excluded from this model, as it overlaps with the distinction between the two wage functions. Therefore, union effects include the effect of firm size in this model.

[19] Since the graph shows a wage distribution in cross-sectional data, it is not exactly a wage-age curve that workers follow over time.

[20] As shown in Appendix 4, the coefficients of age differ slightly when firm size is controlled for in nonunionized firms, but only the result of the model without firm size is shown in the graph for simplicity.

[21] Age groups in 10-year increments are used to ensure a sufficient sample size in each group.

		Nonunionized Firms	Unionized Firms	Total
Total		11,693	9,750	21,443
		55%	45%	-
Gender	Female	30%	21%	26%
	Male	70%	79%	74%
Age	20-24	3%	5%	4%
	25-29	13%	16%	15%
	30-34	13%	12%	13%
	35-39	20%	17%	18%
	40-44	14%	13%	14%
	45-49	14%	14%	14%
	50-54	13%	14%	13%
	55-59	9%	10%	9%
Marital Status	Married	55%	64%	59%
	Unmarried	45%	36%	41%
Education	College or above	56%	69%	62%
	Middle/High/Vocational Sch	44%	31%	38%
Firm Size	- 29	48%	6%	29%
	30 - 99	19%	9%	14%
	100 - 299	10%	8%	9%
	300 - 499	7%	9%	8%
	500 - 999	7%	16%	11%
	1,000 - 2,999	7%	39%	22%
	3,000-	1%	14%	7%
Tenure	Average (year)	9.72	14.52	11.91
	s.d.	8.25	10.51	9.65
Hourly Wage (Log)	Average (yen)	7.50	7.77	7.62
	s.d.	0.52	0.55	0.55
Survey Year	2005 (2005/2006/2007)	1,303	1,295	2,598
	2008 (2008/2009/2010)	1,665	1,685	3,350
	2011 (2011/2012/2013)	3,926	2,882	6,808
	2014 (2014/2015/2016)	3,643	2,885	6,528
	2017 (2017)	1,156	1,003	2,159

Appendix 2   The Effects of Unions on Log Wage

	(1)	(2)	(3)	(4)	(5)
	Union Effects	(1) + Individual Characteristics	(2) + Industry	(3) + Occupation	(4) + Firm Size
Union Status	0.278***	0.116***	0.103***	0.116***	0.020
	(0.021)	(0.018)	(0.018)	(0.018)	(0.018)
Education (1=college or above)		0.173***	0.156***	0.110***	0.085***
		(0.007)	(0.007)	(0.007)	(0.007)
Tenure		0.030***	0.030***	0.029***	0.027***
		(0.001)	(0.001)	(0.001)	(0.001)
Tenure (squared)		-0.000***	-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)	(0.000)
Gender (1=Female)		-0.074***	-0.076***	-0.083***	-0.081***
		(0.010)	(0.010)	(0.010)	(0.010)
Marital Status (1=Married)		0.232***	0.234***	0.197***	0.196***
		(0.008)	(0.008)	(0.008)	(0.008)
Gender * Marital Status		-0.199***	-0.200***	-0.162***	-0.159***
		(0.015)	(0.015)	(0.014)	(0.014)
Industry			Yes	Yes	Yes
			-	-	-
Occupation				Yes	Yes
				-	-
Firm Size（Base：below 29）					
30 - 99					0.084***
					(0.010)
100 - 299					0.113***
					(0.012)
300 - 499					0.133***
					(0.012)
500 - 999					0.161***
					(0.012)
1,000 - 2,999					0.224***
					(0.011)
3,000 or above					0.275***
					(0.017)
Survey Year（Base: 2005）					
2008	0.029	0.034**	0.034**	0.036**	0.038**
	(0.020)	(0.017)	(0.017)	(0.016)	(0.016)
2011	0.016	0.046***	0.051***	0.056***	0.094***
	(0.017)	(0.015)	(0.015)	(0.014)	(0.014)
2014	0.043**	0.060***	0.066***	0.079***	0.116***
	(0.017)	(0.015)	(0.015)	(0.014)	(0.014)
2017	0.088***	0.100***	0.106***	0.124***	0.156***
	(0.022)	(0.019)	(0.018)	(0.018)	(0.018)
2008 * Union Status	-0.014	-0.004	-0.005	-0.004	-0.004
	(0.028)	(0.024)	(0.024)	(0.023)	(0.023)
2011 * Union Status	-0.004	0.001	0.004	0.003	0.009
	(0.025)	(0.021)	(0.021)	(0.021)	(0.021)
2011 * Union Status	-0.024	-0.010	-0.006	-0.012	-0.005
	(0.025)	(0.021)	(0.021)	(0.021)	(0.021)
2011 * Union Status	-0.027	0.006	0.010	0.005	0.017
	(0.031)	(0.027)	(0.027)	(0.026)	(0.026)
Constant	7.472***	7.032***	6.965***	7.001***	6.955***
	(0.015)	(0.015)	(0.019)	(0.020)	(0.020)
Observations	21,443	21,439	21,439	21,439	21,439
R-squared	0.059	0.312	0.322	0.356	0.372

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

| | (1)
Unionized
Firms | (2)
Nonunionized
Firms | Blinder-Oaxaca Decomposition | | | |
			(3) Total	(4) Endowments	(5) Coefficients	(6) Interaction
Education (1=College or above)	0.174*** (0.009)	0.183*** (0.010)		0.024*** (0.002)	0.005 (0.007)	0.001 (0.002)
Tenure	0.027*** (0.002)	0.040*** (0.002)		0.129*** (0.009)	0.130*** (0.022)	0.064*** (0.011)
Tenure (squared)	-0.000*** (0.000)	-0.000*** (0.000)		-0.057*** (0.009)	-0.021* (0.011)	-0.020* (0.011)
Gender (1=Female)	-0.042*** (0.013)	-0.123*** (0.015)		0.004*** (0.001)	-0.025*** (0.006)	0.008*** (0.002)
Marital Status (1=Married)	0.245*** (0.011)	0.192*** (0.012)		0.021*** (0.002)	-0.029*** (0.009)	-0.005*** (0.001)
Gender * Marital Status	-0.242*** (0.020)	-0.118*** (0.023)		0.008*** (0.001)	0.014*** (0.003)	-0.004*** (0.001)
Unionized Firms (Average)			7.768*** (0.006)			
Nonunionized Firms (Average)			7.503*** (0.005)			
Difference			0.265*** (0.007)			
Endowments			0.129*** (0.005)			
Coefficients			0.092*** (0.007)			
Interaction			0.044*** (0.004)			
Constant	7.109*** (0.013)	7.127*** (0.015)			0.018 (0.020)	
Observations	11,691	9,748	21,439	21,439	21,439	21,439
R-squared	0.196	0.359				

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 4   Effects of Age, Union Status, and Firm Size

	Male		Female	
		Firm Size Controlled		Firm Size Controlled
Union Status	0.180***	0.049	-0.020	-0.112**
	(0.043)	(0.042)	(0.050)	(0.050)
Education (1=College or above)	0.177***	0.139***	0.169***	0.137***
	(0.008)	(0.008)	(0.014)	(0.014)
Age（Base: 20-24)				
25-29	0.372***	0.380***	0.248***	0.253***
	(0.035)	(0.034)	(0.044)	(0.043)
30-34	0.581***	0.591***	0.385***	0.392***
	(0.035)	(0.034)	(0.045)	(0.044)
35-39	0.679***	0.692***	0.437***	0.448***
	(0.033)	(0.033)	(0.045)	(0.044)
40-44	0.765***	0.782***	0.458***	0.483***
	(0.034)	(0.033)	(0.046)	(0.045)
45-49	0.831***	0.840***	0.472***	0.503***
	(0.034)	(0.033)	(0.046)	(0.045)
50-54	0.908***	0.912***	0.480***	0.514***
	(0.035)	(0.034)	(0.046)	(0.045)
55-59	0.920***	0.933***	0.456***	0.489***
	(0.036)	(0.035)	(0.048)	(0.047)
25-29 * Union Status	-0.028	-0.041	0.142**	0.129**
	(0.047)	(0.046)	(0.058)	(0.057)
30-34* Union Status	-0.029	-0.045	0.138**	0.129**
	(0.047)	(0.046)	(0.061)	(0.060)
35-39* Union Status	0.033	0.016	0.160***	0.133**
	(0.046)	(0.044)	(0.061)	(0.060)
40-44* Union Status	0.085*	0.049	0.189***	0.128**
	(0.047)	(0.045)	(0.064)	(0.063)
45-49* Union Status	0.125***	0.093**	0.323***	0.266***
	(0.046)	(0.045)	(0.066)	(0.065)
50-54* Union Status	0.149***	0.117**	0.369***	0.309***
	(0.047)	(0.045)	(0.067)	(0.066)
55-59* Union Status	0.154***	0.129***	0.354***	0.312***
	(0.048)	(0.047)	(0.075)	(0.074)
Firm Size（Base：below 29)				
30 - 99		0.123***		0.114***
		(0.012)		(0.020)
100 - 299		0.181***		0.131***
		(0.014)		(0.026)
300 - 499		0.206***		0.206***
		(0.014)		(0.027)
500 - 999		0.253***		0.245***
		(0.013)		(0.026)
1,000 - 2,999		0.343***		0.258***
		(0.012)		(0.022)
3,000 or above		0.411***		0.244***
		(0.018)		(0.037)
Survey Year（Base: 2005)				
2008	0.012	0.017	0.037	0.041
	(0.013)	(0.013)	(0.027)	(0.027)
2011	-0.013	0.053***	0.039	0.074***
	(0.012)	(0.012)	(0.024)	(0.025)
2014	-0.004	0.060***	0.044*	0.080***
	(0.012)	(0.013)	(0.024)	(0.025)
2017	0.040***	0.102***	0.104***	0.135***
	(0.015)	(0.015)	(0.029)	(0.030)
Constant	6.775***	6.625***	6.813***	6.709***
	(0.033)	(0.033)	(0.043)	(0.044)
Observations	15,819	15,819	5,622	5,622
R-squared	0.284	0.325	0.127	0.154

		Male									
		Non-Union					Union				
		20	30	40	50	subtotal	20	30	40	50	subtotal
Share	2005	18%	35%	23%	24%	100%	17%	29%	26%	27%	100%
	2008	15%	36%	26%	23%	100%	16%	29%	29%	27%	100%
	2011	14%	36%	28%	22%	100%	18%	28%	28%	26%	100%
	2014	12%	32%	35%	20%	100%	17%	27%	31%	25%	100%
	2017	13%	31%	33%	23%	100%	16%	29%	32%	22%	100%
Mean	2005	7.10	7.52	7.70	7.80	7.55	7.28	7.72	8.00	8.13	7.83
	2008	7.19	7.49	7.74	7.80	7.58	7.32	7.72	8.04	8.13	7.86
	2011	7.20	7.52	7.64	7.78	7.56	7.40	7.71	7.98	8.14	7.84
	2014	7.22	7.54	7.65	7.81	7.60	7.41	7.76	7.95	8.13	7.85
	2017	7.37	7.57	7.68	7.84	7.64	7.45	7.80	7.99	8.17	7.89
Var	2005	0.258	0.219	0.244	0.258	0.298	0.223	0.162	0.141	0.202	0.264
	2008	0.237	0.177	0.226	0.232	0.254	0.280	0.167	0.217	0.212	0.292
	2011	0.221	0.180	0.216	0.310	0.256	0.196	0.192	0.159	0.194	0.252
	2014	0.294	0.203	0.233	0.290	0.271	0.276	0.176	0.206	0.193	0.265
	2017	0.227	0.200	0.241	0.373	0.276	0.250	0.157	0.204	0.228	0.257
Within	2005	0.047	0.078	0.055	0.061	0.241	0.038	0.048	0.037	0.056	0.178
	2008	0.036	0.063	0.060	0.052	0.211	0.044	0.048	0.062	0.057	0.211
	2011	0.031	0.066	0.059	0.069	0.224	0.035	0.054	0.045	0.051	0.184
	2014	0.037	0.066	0.081	0.059	0.243	0.047	0.047	0.063	0.049	0.207
	2017	0.030	0.063	0.080	0.084	0.256	0.041	0.046	0.065	0.051	0.203
Between	2005	-	-	-	-	0.057	-	-	-	-	0.087
	2008	-	-	-	-	0.044	-	-	-	-	0.081
	2011	-	-	-	-	0.031	-	-	-	-	0.068
	2014	-	-	-	-	0.029	-	-	-	-	0.058
	2017	-	-	-	-	0.021	-	-	-	-	0.055

		Female									
		Non-Union					Union				
		20	30	40	50	subtotal	20	30	40	50	subtotal
Share	2005	27%	27%	21%	24%	100%	38%	34%	12%	16%	100%
	2008	23%	33%	21%	23%	100%	39%	29%	20%	12%	100%
	2011	22%	31%	24%	23%	100%	38%	29%	20%	13%	100%
	2014	20%	29%	29%	22%	100%	36%	30%	23%	12%	100%
	2017	21%	30%	29%	19%	100%	35%	29%	21%	14%	100%
Mean	2005	7.05	7.36	7.20	7.39	7.25	7.13	7.37	7.33	7.63	7.32
	2008	7.14	7.35	7.36	7.37	7.31	7.19	7.51	7.51	7.65	7.40
	2011	7.16	7.33	7.38	7.38	7.32	7.26	7.43	7.71	7.74	7.46
	2014	7.23	7.36	7.39	7.35	7.34	7.25	7.53	7.60	7.81	7.48
	2017	7.20	7.43	7.45	7.37	7.38	7.32	7.69	7.70	7.77	7.57
Var	2005	0.303	0.214	0.330	0.187	0.273	0.305	0.279	0.359	0.230	0.317
	2008	0.152	0.175	0.291	0.176	0.202	0.255	0.211	0.305	0.184	0.272
	2011	0.224	0.236	0.306	0.207	0.250	0.299	0.297	0.168	0.175	0.293
	2014	0.250	0.231	0.251	0.280	0.254	0.277	0.266	0.317	0.246	0.313
	2017	0.192	0.234	0.254	0.150	0.222	0.287	0.251	0.297	0.397	0.325
Within	2005	0.082	0.059	0.069	0.046	0.256	0.117	0.095	0.043	0.036	0.291
	2008	0.034	0.058	0.062	0.040	0.195	0.099	0.061	0.060	0.022	0.244
	2011	0.049	0.073	0.073	0.049	0.243	0.113	0.087	0.033	0.023	0.256
	2014	0.050	0.067	0.072	0.062	0.251	0.100	0.079	0.071	0.029	0.279
	2017	0.041	0.070	0.075	0.029	0.215	0.101	0.074	0.062	0.057	0.294
Between	2005	-	-	-	-	0.019	-	-	-	-	0.030
	2008	-	-	-	-	0.008	-	-	-	-	0.031
	2011	-	-	-	-	0.007	-	-	-	-	0.038
	2014	-	-	-	-	0.003	-	-	-	-	0.036
	2017	-	-	-	-	0.009	-	-	-	-	0.036

		Male					Female				
		20	30	40	50	subtotal	20	30	40	50	subtotal
Union	2005	51%	48%	57%	57%	53%	47%	43%	26%	28%	38%
Rate	2008	54%	48%	55%	57%	53%	55%	38%	40%	27%	41%
	2011	51%	39%	46%	50%	45%	47%	33%	30%	22%	34%
	2014	55%	43%	44%	53%	47%	50%	36%	31%	23%	36%
	2017	55%	47%	48%	49%	49%	53%	40%	32%	33%	40%
$\triangle$w(c)	2005	0.18	0.20	0.30	0.33	0.28	0.08	0.01	0.13	0.24	0.07
	2008	0.13	0.23	0.30	0.33	0.28	0.05	0.16	0.15	0.28	0.09
	2011	0.20	0.19	0.34	0.36	0.28	0.10	0.10	0.33	0.36	0.14
	2014	0.19	0.22	0.30	0.32	0.25	0.02	0.17	0.21	0.46	0.14
	2017	0.08	0.23	0.31	0.33	0.25	0.12	0.26	0.25	0.40	0.19
$\triangle$v(c)	2005	-0.035	-0.057	-0.103	-0.056	-0.033	0.002	0.065	0.029	0.044	0.044
	2008	0.043	-0.009	-0.009	-0.020	0.038	0.103	0.036	0.014	0.008	0.070
	2011	-0.025	0.012	-0.057	-0.116	-0.003	0.075	0.061	-0.138	-0.032	0.043
	2014	-0.018	-0.027	-0.027	-0.097	-0.006	0.027	0.035	0.066	-0.034	0.060
	2017	0.024	-0.043	-0.038	-0.145	-0.018	0.095	0.017	0.042	0.247	0.103
Difference in Variance	2005	-	-	-	-	-0.034	-	-	-	-	0.012
	2008	-	-	-	-	0.001	-	-	-	-	0.020
	2011	-	-	-	-	-0.023	-	-	-	-	0.002
	2014	-	-	-	-	-0.021	-	-	-	-	0.010
	2017	-	-	-	-	-0.024	-	-	-	-	0.038
Difference in Average	2005	-	-	-	-	0.017	-	-	-	-	0.004
	2008	-	-	-	-	0.017	-	-	-	-	0.007
	2011	-	-	-	-	0.020	-	-	-	-	0.012
	2014	-	-	-	-	0.017	-	-	-	-	0.013
	2017	-	-	-	-	0.016	-	-	-	-	0.017
Total Effects	2005	-	-	-	-	0.005	-	-	-	-	0.018
	2008	-	-	-	-	0.042	-	-	-	-	0.030
	2011	-	-	-	-	0.012	-	-	-	-	0.018
	2014	-	-	-	-	0.007	-	-	-	-	0.028
	2017	-	-	-	-	0.010	-	-	-	-	0.058

References

Bennett, James T., and Bruce E. Kaufman. 2007. *What do unions do? : A twenty-year perspective.* Transaction Publishers.

Blanchflower, David G., and Alex Bryson. 2004. What effect do unions have on wages now and would Freeman and Medoff be surprised? *Journal of Labor Research* 25 (3): 383-414.

Blanchflower, David G., and Richard B. Freeman. 1992. Unionism in the united states and other advanced OECD countries. *Industrial Relations: A Journal of Economy and Society* 31 (1): 56-79.

Blau, Francine D., and Lawrence M. Kahn. 1996. International differences in male wage inequality: Institutions versus market forces. *Journal of Political Economy* 104 (4): 791-837.

Card, David. 1996. The effect of unions on the structure of wages: A longitudinal analysis. *Econometrica: Journal of the Econometric Society*: 957-79.

Card, David, Thomas Lemieux, and W. Craig Riddell. 2004. Unions and wage inequality. *Journal of Labor Research* 25 (4): 519-59.

DiNardo, John, Nicole M. Fortin, and Thomas Lemieux. 1996. Labor market institutions and the distribution of wages, 1973-1992: A semiparametric approach. *Econometrica* 64 (5): 1001-44.

Farber, Henry S. 1983. The determination of the union status of workers. *Econometrica* 51 (5): 1417-37.

Fortin, Nicole M., and Thomas Lemieux. 1997. Institutional changes and rising wage inequality: Is there a linkage? *Journal of Economic Perspectives* 11 (2): 75-96.

Freeman, Richard B. 1980. Unionism and the dispersion of wages. *ILR Review* 34 (1): 3-23.

———. 1982. Union wage practices and wage dispersion within establishments. *ILR Review* 36 (1): 3-21.

Freeman, R. B., and J. L. Medoff. 1984. *What do unions do?.* New York: Basic Books.

Gordon, Andrew. 2017. New and enduring dual structures of employment in japan: The rise of nonregular labor, 1980s–2010s. Social Science Japan Journal 20 (1): 9-36.

Hara, Hiromi, and Daiji Kawaguchi. 2008. The union wage effect in Japan. *Industrial Relations: A Journal of Economy and Society* 47 (4) (10/01; 2021/05): pp.569-90.

Jann, Ben. 2008. The Blinder–Oaxaca decomposition for linear regression models. *The Stata Journal* 8 (4): 453-79.

Kahn, Lawrence M. 2000. Wage inequality, collective bargaining, and relative employment from 1985 to 1994: Evidence from fifteen OECD countries. *Review of Economics and Statistics* 82 (4): 564-79.

Kambayashi, Ryo. 2013. Differences in definitions of nonregular employees in government statistics. Japan Labor Review 10 (4): 55-66.

Lemieux, Thomas. 1998. Estimating the effects of unions on wage inequality in a panel data model with comparative advantage and nonrandom selection. *Journal of Labor Economics* 16 (2): 261-91.

Lewis, H. Gregg. 1986. Union relative wage effects. *Handbook of Labor Economics* 2 : 1139-81.

Nimura, Kazuo. 1994. "Sengo-shakai no kiten ni okeru rodokumiai-undo [The Labor Union Movement at the Beginnings of Post-WWII Society in Japan]", In Watanabe Osamu et al. eds., *Nihon kingendaishi - Kôzô to Hendô 4. Sengo kaikaku to gendai shakai no keisei (The History of Modern Japan - Structure and Change, vol.4, Post-War Reforms and the Formation of Modern Society).* Iwanami Shoten (english translation: http://nimura-laborhistory.jp/English/en-postww2laborunion.html)

Nitta, Michio, and Takehisa Shinozaki. 2008. "Roudou Kumiai no Chingin Kouka." [Union Wage Effect.] In Ichiro Tanioka, Michio Nitta, and Noriko Iwai ed., *Nihon Jin no Ishiki to Koudou [The Mind and Behavior of Japanese People]*, Tokyo: University of Tokyo Press: pp. 121–33.

Noda, Tomohiko. 1997. Chingin kozo to kigyobetsu kumiai [wage structure and enterprise labor unions]. *Nihon Keizai Kenkyu*: 26-44.

Osawa, Mari. 2001. People in irregular modes of employment: Are they really not subject to discrimination? Social Science Japan Journal 4 (2): 183-99.

Suzuki, Kyoko. 2020. The Latent Structure of the Japanese Labor Market and the Type of Employment: Latent Class Analysis with Finite Mixture Model. *Japan Labor Issues* 22: 42 – 58.

Tachibanaki, Toshiaki, and Tomohiko Noda. 2000. *The economic effects of trade unions in Japan.* Springer.

Todate, Mitsunori. 2010. Economic effect of labor unions. *Japanese Economy* 37 (1): pp.111-29.

Tsuru, Tsuyoshi. 2010. "The union wage premium, voice, and nonunion workers' attitudes: Before and after Japan's lost decade." In Eriksson, T, ed., *Advances in the Economic Analysis of Participatory & Labor-Managed Firms.* Bingley, Emerald Group Publishing Limited: pp.161-204.