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Abstract

This paper examines the union premium in wages and overall compensation packages, using a new, nationally representative Japanese micro data set that records individuals' union status. We find a robust union wage premium for both males and females. An Oaxaca-Blinder decomposition reveals that about one third of union workers' higher wage is explained by the difference in the wage structures of the union and nonunion sectors. We also can confirm the union-wage compression effect using the DiNardo, Fortin, and Lemieux (1996) method. Union workers are likely to think that they would not find jobs with similar compensation packages if they were to leave their current jobs. In sum, unions in Japan contribute to the transfer of rent from firms to workers, and this rent is evenly distributed among workers.

Key Words: Trade Union, Wage, Compensation Package, Job Security, Japan
JEL Classification Code: J31, J33, J51

1 Introduction

Union density has declined steadily for the last 25 years in Japan; in 2005, the estimated union density was 18.7%, as shown in Figure 1.

This figure has sparked a hot debate within the general public on the role of trade unions. Some critics argue that the role of trade unionism has ended in a time of global competition and that a decline in union density is a sign that the role of the trade unionism as it is known has ended (The Daily Yomiuri (2006)). Opposing this popular opinion, union leaders claim that the role of labor unions has not ended yet and that they still play a significant role in improving the welfare of the working class.

Despite the vast public interest in the role of unions, particularly in terms of wages and job security, surprisingly little is known about whether trade unions contribute to an increase in their members' wage level or job security. This is mainly due to a lack of micro data that records each worker's union status, as in the Current Population Surveys in the United States.

There are several exceptional studies. Kalleberg and Lincoln (1988) collected about 2,000 observations from the city of Atsugi in the Kanagawa prefecture, which used to be a motor town that had a Nissan assembly factory and its subsidiaries at the time. They found that male, union workers received about 10 to 20 percent *less* than male, non-union workers. Tsuru and Rebitzer (1995) examined the union wage premium based on the survey that the authors implemented. Based on about 500 observations obtained

from Tokyo metropolitan area, they concluded that there was no union wage premium for men or women. Based on this finding, the researchers attributed the unionization rate's decline to the absence of a union wage premium.

In contrast, Noda (2005) recently found about an 11 percent union wage premium among males, using about 320 individual observations. He points to the possibility that unions resisted nominal wage cuts when such cuts were common during the late 1990s. In the context of international comparison, Blanchflower and Bryson (2002) briefly mention that they regressed log annual earnings on union status, using data from the International Social Survey Program (ISSP) 1994-96, 1998, and 1999. They obtained a coefficient of .258 (which was statistically significant), using 2,505 observations for Japan.

Several studies have analyzed the union wage premium by comparing the wage levels of unionized and non-unionized firms. Noda and Tachibanaki (2000) examined whether unionized firms pay more to typical workers than non-unionized firms. They did not find the union wage premium. A comparison was made for "model" wages that are the typical wage for virtual workers who are, for example, college graduates at age 30. Brunello (1992) examined the relation between unionization and firms' profit and average wage level using about 900 small firms as the sample and found that unionized firms pay less than non-unionized firms on average.

The results for the union wage premium vary among studies, perhaps due to small sample sizes and differences in sampling methods. There seems to

be no consensus on the size of the union wage premium in Japan. A few studies have estimated the zero union premium, but this is rather puzzling, considering the robust and large union wage premiums in the US and Europe (Blanchflower and Bryson (2004)). The zero union premium also contradicts direct evidence that unions succeed in gaining wage increases as a result of wage bargaining (Fuess (2001)). It is also notable that studies that have covered the late 1990s as the sample period tended to obtain a positive union wage premium, while those studies that covered the 1980s and early 1990s as the sample period tended not to estimate a positive premium.

The purpose of this study is to examine the effect of labor unions on the wage structure, exploiting the newly available, household-based micro data that records workers' union status from the Japanese General Social Surveys (JGSS) 2000-2003. In addition, this study examines the union effect on the non-wage aspects of jobs. The subjective answers that are used as dependent variables are intention to quit, perceived risk of job loss, subjective job satisfaction, subjective probability of obtaining a similar compensation package once workers leave their current jobs, and training participation.

This paper's contribution to the literature is two-fold. First, we examine the effect of union status on the wage structure, using nationally representative survey data. The response rate is quite high (around 60%) by Japanese standards, and the survey information related to labor market information was collected by interviews. Due to the data's high quality, the results are improved upon those in previous studies. Second, the JGSS enables us to

capture the total compensation offered by jobs from several different angles based on differently posed questions. Some questions are very carefully designed so that we can capture workers' perceptions of how much they enjoy the relation-specific rent from their current jobs.

Our research strategy is quite simple. Hourly rate of pay or subjective responses to survey questions are regressed upon a union status dummy variable and other demographic covariates. Japan does not experience the fundamental institutional change that affects the unionization rate independent of wage determination. Without having a credible instrumental variable that affects union status, but is independent from wage determination, we rely on an OLS estimation as Lewis (1986) eventually recommended after reviewing many articles. Thus, we should note that the union wage premium reported in this study is an upper bound of the causal effect of the union status on wage because omitted variables in the wage equation are likely to have a positive correlation with union status.

In addition to the straight estimation of the union wage premium, we also analyze the effect of union status on the whole wage distribution by employing an Oaxaca-Blinder decomposition and DiNardo, Fortin, and Lemieux (1996).

Training participation and other subjective responses to survey questions, such as job satisfaction, are similarly regressed upon the union status and demographic covariates, assuming an exogeneity of the union status.

We found about an 8 percent union wage premium in the OLS regression, even after controlling for detailed industry and occupational dummy vari-

ables, along with demographic covariates. According to the Oaxaca-Blinder decomposition, of the 34 percent raw-wage differential between union and non-union workers, about two thirds of the difference is attributable to a difference in mean endowments and the other one third is attributable to the difference in wage structure. Unions compress the wage structure mainly by reducing the return to tenure. DiNardo, Fortin, and Lemieux (1996)'s procedure clearly indicates that if the wage determination mechanism is that of non-union workers, the wage distribution of union workers would be more unequal than the actual wage distribution of union workers.

Union status does not reduce workers' intention to quit, nor does it increase workers' participation in training or their subjective perceptions of job security after conditioning on industry, occupation, and firm size, along with the demographic covariates. However, union workers are more satisfied with their jobs than non-union workers. Moreover, once workers leave their current jobs, union workers are more likely to feel that they will not obtain an equivalent compensation package in their next jobs. This finding is consistent with the hypothesis that union workers are more likely to enjoy the relation-specific rent with their employers.

The data at hand do not allow us to determine whether union activity creates the relation-specific rent through productivity enhancement or unions simply claim the employers' existing rent. However, it is clear that labor unions in Japan contribute to extracting the relation-specific rent from the employers, and their rents are rather equally distributed among union

members.

The organization of the paper is as follows. Section 2 briefly overviews the institutional backdrop of Japanese industrial relations and the union's role in such relations. Section 3 introduces the empirical strategy. Section 4 explains the data, and section 5 lays out the results of the wage estimations. Section 6 explains the results of the regressions of the non-wage aspects of jobs on union status. Section 7 attempts to reconcile our results with those of previous studies, and the last section concludes.

2 Labor Unions in Japan

This section gives a brief overview of labor relations and trade unions in Japan.[1]

Regarding the formation of trade unions, Japan's Trade Union Law does not regulate the process by which new unions are certified, which differs from the U.S. case. In Japan, a minimum of two persons is required to form a new labor union, and they simply hold a conference concerning the union's formation, approve regulations, and elect a union executive. Once formed, union members can receive all of the protections granted under Japanese law.

The organizational structure of Japan's labor unions is overwhelmingly dominated by enterprise unions, which are organized at each business. Craft unions and industry trade unions also exist, but more than 90 percent of

[1]Those interested in more details about Japanese labor relations should refer to Sako and Sato (1997).

unions are enterprise unions. Most of the enterprise unions are only intended for a company's regular and permanent employees; non-regular and non-permanent employees generally are not included. In addition, each union comprises a mix of regular and permanent employees, without any distinction between white-collar and blue-collar workers.

Japanese labor unions basically have a "triplicate structure" that includes: (1) enterprise labor unions, (2) industrial trade unions organized as loose federations of enterprise union members gathered by industry, and (3) national centers (a typical example being the Japanese Trade Union Confederation, *Rengo*), which is made up of the industry trade unions gathered at the national level. Enterprise unions are limited by their own human and monetary resources to exercise their activities. To expand their effectiveness, they have established industrial trade unions and national centers. Both of them support their member unions' actions against business owners.

The union participation rate (or union density) differs significantly across industries. It is high in electricity, gas, heat supply, and water (58.4%) and financing and insurance (51.7%), while it is low in agriculture, forestry, and fisheries (3.8%), wholesale and retail trade (9.8%), food and beverage and hotel (2.9%), and service industries (6.6%). Union density also varies by the employer size. Large companies with more than 1,000 employees have a 57.6% participation rate. However, companies with less than 99 employees have only about a 4% participation rate. In sum, union workers tend to work for large-size companies.

Furthermore, about 65% of companies in Japan are union shops, or closed shops (*General Survey on Labor Relations 2002*, Ministry of Health, Labor and Welfare). In other words, most of union workers in Japan become members of unions automatically when they begin to work for a company and do not join unions on their own initiative.

Collective bargaining is mainly conducted between enterprise unions and companies, and working conditions, such as annual wage increases, lump-sum benefits, working hours, and fringe benefits, are determined. Typically, one enterprise union is organized per company and the union officials are also employees. Since the managers and executives that represent the employers had once been ordinary employees before being promoted to their positions, they generally share common interests with the union members.

Moreover, labor disputes rarely occur in Japan. Only 6% of labor unions had labor disputes between labor unions and employers between 2000 and 2002 (*Japanese Labor Unions Today II*, Ministry of Health, Labor and Welfare). The merit of enterprise-level bargaining, which has been firmly in place for several decades in Japan, is being able to introduce flexibility into the workplace.

Still, much coordination takes place among employers and unions at the industry and national levels in the process of wage bargaining, which is known as the Spring Wage Offensive (*Shunto*), to cover the shortcomings of enterprise-level bargaining.

The Spring Wage Offensive is a united campaign, mainly for higher wages,

launched each spring by each industrial trade union. There are two main objectives behind the establishment of the Spring Wage Offensive: to compensate for the enterprise unions' lack of bargaining power as individual entities and to distribute wage increases proportionately across companies and industries through simultaneous wage negotiations. That is, taking the wage increase rate set by the top firm in a major industry (i.e., the pattern setter) as the standard, the influence on wage increases spreads to the other large companies in the concerned industry, followed by large firms in other industries and government agencies, and finally to medium- and small-scale companies. Wage levels are thereby standardized nationwide.

During the era of rapid economic growth, labor unions won substantial wage increases through the Spring Wage Offensive. Even under the severe economic climate of the 2000s, it yielded minor wage increases; the wage- increase rate of major participant companies of the Spring Wage Offensive has been higher than Japan's real GDP growth rate. Japan's labor-management relations are basically cooperative; however, it seems reasonable to consider that Japanese labor unions play a significant role in improving union members' working conditions.

3 Empirical Strategy

3.1 Regression and the Blinder-Oaxaca Decomposition

We estimate the union wage premium by estimating the following equation that allows for different coefficients for the sexes:

$$\log(wage)_i = \alpha_1 union_i + x_i\beta_1 + \alpha_2 union_i female_i + female_i x_i\beta_2 + e_i, \quad (1)$$

where i is the index for workers, *wage* is hourly wage, *union* is the union status dummy variable that takes one if the respondent i is a union member, x is the vector of the explanatory variables that includes constant, actual job experience; its squared; job tenure; its squared; the dummy variable that takes one if married; and the dummy variables corresponding to the numbers of children. In the extended specification, regressors include the dummy variables for occupation (122 categories), industry (20 categories), and firm size (11 categories).

Under the exogeneity assumption, $E[e_i|union_i, female_i, x_i] = 0$, the OLS estimator is an unbiased estimator. We allow for the heteroskedasticity in e_i, and the standard errors are adjusted for the presence of this heteroskedasticity. The parameter α_1 corresponds to the union wage premium among males, and $\alpha_1 + \alpha_2$ corresponds to the premium for females.

This specification does not allow for the effect of unionism on the return to workers' characteristics. However, as Lewis (1986) and Booth (1995) review, trade unions are known to compress the wage structure by lowering the return to education, job tenure, etc. To allow for the difference in the wage

structures for the union and non-union sectors, we estimate (1) for union and non-union workers separately, as follows:

$$\ln(wage)_i = z_i[union_i\gamma^{union} + (1 - union_i)\gamma^{non-union}] + e_i, \tag{2}$$

where $z_i = [union_i \; x_i \; female_i \times x_i]$. We assume $E(e_i|z_i) = 0$ and from the law of iterated expectation, $E(e_i|union_i) = E(E(e_i|z_i)|union_i) = 0$.

Using the different coefficients for each sector, we can decompose the difference in the mean of the log wage for union and non-union workers by the Oaxaca-Blinder decomposition:

$$\begin{aligned} & E[\ln(wage)|union = 1] - E[\ln(wage)|union = 0] \\ = \; & E[z|union = 1]\gamma^{union} - E[z|union = 0]\gamma^{non-union} \\ = \; & (E[z|union = 1] - E[z|union = 0])\gamma^{non-union} \\ + \; & E[z|union = 1](\gamma^{union} - \gamma^{non-union}). \end{aligned} \tag{3}$$

The first term of the decomposition correspond to the wage differential due to the difference in the endowments. The second term of the decomposition corresponds to the wage differential due to the difference in the wage determination mechanism evaluated at the mean characteristics of union workers. In this decomposition, we assume that the non-union wage mechanism prevails in the absence of the union sector.[2]

[2]The estimation is implemented by the Stata ado command "oaxaca" by Ben Jann.

3.2 DiNardo, Fortin, and Lemieux (1996) Decomposition

The discussion thus far has focused on the union effect on the mean of the wage distribution. We may overlook the complex effect of unionism on the wage distribution just by looking at the means. For example, if the existence of unions compresses the residual wage distribution, we cannot detect this effect just by looking at the distribution's means. Thus, we attempt to examine the effect of unions on the whole wage distribution using the method proposed by DiNardo, Fortin, and Lemieux (1996).

First, the wage distribution of non-union workers is given as

$$f^{nu}(y) \equiv \int f^{nu}(y|z)h(z|nu)dz, \tag{4}$$

where $f^{nu}(y|z)$ is the wage determination mechanism in the non-union sector that maps human capital z to the distribution of the log (wage), which is denoted as y. The variable nu corresponds to the non-union sector, and u corresponds to the union sector.

The wage distribution of union workers is given as

$$f^{u}(y) \equiv \int f^{u}(y|z)h(z|u)dz. \tag{5}$$

We then ask what the wage distribution of union workers would be if the wage structure were that of non-union workers, while keeping the distribution of x identical to its distribution of union workers. This counter-factual distribution is given as:

$$f^{nu}_{u}(y) \equiv \int f^{nu}(y|z)h(z|u)dz. \tag{6}$$

The above counter-factual distribution is theoretically possible to calculate if we estimate the joint density $h(z|u)$, but it is difficult because the vector z in our application is high dimensional.

Then the trick of DiNardo, Fortin, and Lemieux (1996) is to replace $f^{nu}(y|z)h(z|u)$ with $f^{nu}(y|z)h(z|nu)$ with some reweighing. The $f^{nu}(y|z)h(z|nu)$ is simply the distribution of $\ln(wage)$ among non-union workers and it is easily estimated by the kernel density estimation. The transformation is

$$\begin{aligned} f_u^{nu}(y) &\equiv \int f^{nu}(y|z)h(z|u)dz \quad (7) \\ &= \int \theta f^{nu}(y|z)h(z|nu)dz, \quad (8) \end{aligned}$$

where $\theta \equiv \frac{h(z|u)}{h(z|nu)}$. Notice that $h(z|u) = \frac{h(u,z)}{P(u)} = \frac{P(u|z)h(z)}{P(u)}$ from the Beyes rule. Similarly, $h(z|nu) = \frac{P(nu|z)h(z)}{P(nu)}$. Thus $\theta = \frac{P(u|z)}{P(nu|z)}\frac{P(nu)}{P(u)}$. Note that $P(nu|z)$ is the propensity score to be in the non-union sector given z, and $P(u|z)$ is the propensity score to be in the union sector given z.

This counter-factual distribution is estimated by estimating the wage distribution of non-union workers by the kernel density estimation using reweighting.

4 Data

We use repeated, cross-sectional data from the Japanese General Social Surveys (JGSS) conducted in 2000, 2001, 2002, and 2003.[3] The JGSS is designed

[3]The JGSS are designed and carried out at the Institute of Regional Studies at Osaka University of Commerce in collaboration with the Institute of Social Science at the University of Tokyo under the direction of Ichiro Tanioka, Michio Nitta, Hiroki Sato, and

to be the Japanese counterpart to the General Social Surveys of the US. Each cross-section includes about 3,000 individuals that are representative of all men and women between the ages of 20 and 89. The surveys adopt a two-step, stratified sampling method and were conducted during October and November of each survey year. This survey asks standard survey questions regarding labor force status, working conditions, and family structure through face-to-face interviews.

The original pooled sample includes 12,299 observations. We dropped those ages 61 and above, as well as those not working, those self-employed, and those employed as public officers. We restrict the analysis sample to permanent and regular workers (*Joyo Ippan Rodosha*) without managerial responsibility. We restrict our analysis sample in this way because we are interested in unions' effects on workers in the private sector who are eligible for union membership according to the Japanese Trade Union Law. The resulting sample size is reduced to 2,605. Among these observations, we drop the observations with missing values for wage and for the explanatory variables in the wage regression. The final sample size is 2,001.

The union status variable is constructed from the question asking, "Do you belong to a labor union?" The respondents are asked to choose one from the following three options: 1. I am a member of a labor union at my

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workplace, 2. I am a member of a labor union outside of my workplace, 3. I am not a member of any labor union. Those who answered either 1. or 2. are coded as union members in this study.

The hourly wage is constructed from the previous year's annual labor income and the number of usual working hours including overtime. The annual income of the last year is asked in the following question. "What was the annual income from your main job during the last one year? Please state the amount before taxes and other deductions." The annual income is asked in ranges. The central value of each range is used to transform annual income into a continuous variable. Annual hours of work is calculated by multiplying the usual working hours per week by 52. This calculation of hourly wage is potentially erroneous, but it is the only way to calculate the hourly wage in a consistent way for the whole sample period.[4] In addition, this measurement is preferable because the numerator includes the bonus payment that unions often negotiate.

The descriptive statistics of the analysis sample by union status are tabulated in Table 1. Among the 2,001 respondents, 785 are union members and 1,216 are non-union workers. The union participation rate is about 40%, which is much higher than the national figure. This is not surprising because the sample dropped those age 61 or over, as well as part-time workers and

[4]Until 2002, workers were asked about their hourly, daily, or monthly wage depending on how often they received their payment. The robustness of the results are checked using these wage variables in the discussion section. The results of the wage regression were essentially unchanged.

full-time workers in managerial positions.[5]

The average hourly wage of union workers is about 32 % higher than the average of non-union workers. Union and non-union workers are about the same age at the mean. Union workers are more likely to be male, more educated, and have longer tenures. Union workers have fewer years of potential job experience because they are about the same age as non-union workers, but have more years of education. Union workers and non-union workers are similar in terms of marital status and number of children.

Table 1 Panel B separately tabulates the mean of the bivariate, dependent variable that is created from the answers to the subjective questions. The number represents the fraction of people who give positive answers. Union workers are less likely to fear job loss than non-union workers. They also are less likely to feel that it would be easy to find a comparable job in terms of its compensation package and are more likely to participate in training. Union workers are almost as equally likely to have intention to quit their jobs, and to be satisfied with their jobs as non-union workers.

5 Results

5.1 Basic Wage Regression Results

Table 2 reports the results of the OLS regressions of the log wage on union status, along with other control variables. The simplest regression result

[5]Among working people in non-agricultural sectors, the union participation rate is 24.80% in our sample. This is slightly higher than the national figures during the period, which is around 20%.

reported in Column 1 indicates that union workers earn about 34 % more than non-union workers.

After controlling for human capital and demographic variables, the union wage premium shrinks to 18 %. This result is consistent with the findings in Table 1, which indicate that union workers tend to have characteristics that result in higher wages. The coefficient for the interaction term of female and the union dummy variables is zero. Thus there is no difference in union wage premiums by gender.

The coefficients for the other explanatory variables are standard. There is a 5 percent return to education for males and a 9 percent return to education for females. The return to education for males is lower than the standard results found in Japanese studies, but this is most likely because managerial workers are not included in our analysis sample. Concave wage - experience/tenure profiles are estimated for both genders.

Married men earn more than unmarried men, while married women earn less than unmarried women. Women with children earn less than women without children. These findings are consistent with the predictions of the theory of household production, which holds that married men put more effort into market production, while married women put more effort into household production (Becker (1985)). The marriage premium for men also is explained by the institution of wage payment in many Japanese firms, which tends to compensate men for having dependent family members.

Adding the occupation, industry, firm size, and prefecture dummy vari-

ables further reduces the estimated union wage premium. As reported in column 3, union workers earn 8 % more than non-union workers. This is because union workers tend to work in high-wage industry/occupations and larger firms.

However, it is not very clear whether it is appropriate to control for the industry dummy variables because having a high union density in a certain industry could induce a higher wage for all firms in the industry through the spill-over effect of the Spring Wage Offensive. Also high pay in larger firms may be a result of their workers' high productivity induced by the existence of unions due to having better human resource management systems. Thus the 8 % union wage premium should be understood as the wage premium after netting out these possible causal effects of unionism on wages.

5.2 The Oaxaca-Blinder Decomposition

Table 3 reports the results of the separate wage regressions for union and non-union workers. Columns 1 and 2 report the results without the industry, occupation, and firm-size dummy variables. The returns to education are compressed for both sexes in the union sector. The returns to potential experience are similar for both sectors. However, the return to tenure is larger in the non-union sector than in the union sector for males, when neglecting the quadratic term. This is also understood as the union wage compression effect.

It is also worth pointing out that unions reduce both the marriage pre-

mium for males and the marriage penalty for females. Unions may neutralize the advantage of being free from household duties for males and the disadvantage of being burdened of household duties for females. Also, it is notable that women with 2 or less children are not penalized in the union sector, while comparable women earn about 20% less than women without children in the non-union sector. This finding is consistent with the possibility that unions induce so-called family friendly policies, which presumably enable workers to balance their work and family lives by offering flexible work time for working mothers (and fathers).

The effect of unionism on the wage structure is basically unchanged, even after controlling for industry, occupation, and firm-size dummy variables, as reported in Table 3, Columns 3 and 4.

As reported at the bottom of Table 3, the wage differential between union and non-union workers is about 34%, on average. This wage differential is decomposed using the Oaxaca-Blinder decomposition technique into the following two parts: 1. the wage differential due to the difference in the average characteristics between union and non-union workers if the non-union wage structure prevails for both sectors, 2. the wage differential due to the difference in the wage structure evaluated at the average characteristics of union workers. According to the regression specification without industry, occupation, firm- size, and prefecture dummy variables, 16 % of the difference comes from the difference in the average characteristics and 18% is explained by the difference in the wage structure evaluated at the sample mean of the

union workers.

The Blinder-Oaxaca decomposition applied to the regression with industry, occupation, firm-size, and prefecture dummy variables indicates that 20% of the wage differential comes from the difference in the mean characteristics of union and non-union workers, while 13 % of the wage differential comes from the difference in the wage structure. This latter number is the bottom line of the Blinder-Oaxaca decomposition. Had a union worker with average characteristics worked in the non-union sector, she would have earned 13% less. This union wage premium is larger than the estimate based on the estimation results, assuming the same parameter values for both sectors, which was 8%, as reported in Table 2, Column 3.

5.3 DiNardo, Fortin, and Lemieux (1996) Decomposition

The log wage distribution of union and non-union workers for the pooled sample appears in Figure 2. The figure clearly shows that the wage distribution of union workers is located to the right of the wage distribution of non-union workers. This shift in the location reflects the union wage premium without controlling for the explanatory variables.

A comparison of the actual wage distributions of union and non-union workers indicates that the slope of the distribution's upper tail is much steeper among union workers. A natural question to raise is whether this difference comes from the difference in the underlying distributions of work-

ers' characteristics or the difference in the wage determination mechanisms between sectors.

The counter-factual wage distribution is the wage distribution of union workers that would occur if the non-union-sector wage determination were to prevail in the union sector. The location difference of the counter-factual and actual-wage distributions of union workers reflects the union-wage premium adjusted for the detailed explanatory variables.

The greater dispersal of the counter-factual distribution as compared with the actual distribution reveals that the union wage- determination mechanism compresses the wage structure. Also, it is notable that the slopes of the right tail of the counter-factual and the actual distributions are almost identical. This steeper right distribution of union workers than non-union workers is mainly due to the distribution of union workers' characteristics. Union workers are more homogeneous than non-union workers in terms of observed, wage- determining characteristics.

6 The Union Effect on the Non-Wage Aspects of Jobs

So far, we have focused on the union effect on the wage distribution, but unionism is often said to enhance several aspects of working conditions, such as enhancing job security and offering an opportunity to speak out on workplace issues. Also, the work environment or fringe benefits, such as company offered housing, may be improved by union bargaining with employers.

The JGSS records rich sets of information regarding workers' opinions about their jobs, and we exploit this information to examine the effect of unionism on three sets of jobs' non-wage aspects: the stability of workers' relationships with employers, the non-wage work environment or compensation, and training participation.

Table 4, Columns 1-3 report the results of the probit regressions of the dummy variable that takes one if the worker is concerned about his or her job loss within 12 months of obtaining union status, as well as other explanatory variables. Although the estimation result becomes less precise after controlling for detailed industry/occupation/firm size and prefecture dummy variables, union workers are 4 percentage points less like to feel concerned about job loss. This could be interpreted as resulting from the union's job protection efforts. However, we cannot rule out the possibility that unions are more likely to be formed in firms that offer more stable jobs.

According to Hirschman (1970), labor unions can enable workers to voice their complaints about the workplace(Batt, Colvin, and Keefe (2002)). As a result of this voice mechanism, union workers may be less likely to quit their jobs. We unfortunately do not have information on how many respondents actually quit their jobs;, however, the survey asked whether the respondents had any intention to quit their current jobs. The dummy variable that takes one if the respondent answers yes to this question is regressed on union status and other explanatory variables. The results of the probit regression appear in Table 4, Columns 4-6. All of the estimated coefficients are virtually zero

and not statistically significant. From this result, we can infer that union workers are as equally likely to have an intention to quit as non-union workers, although union workers presumably have the voice option.

Labor unions in the workplace may enhance the work environment, and they may make workers happier (Denisi and Gordon (1995) and Sloane and Bender (1998)). To examine this possibility, the job satisfaction dummy variable that takes one if a worker answers that he/she is satisfied with his/her job is regressed on union dummy and other explanatory variables. The result of the probit regression appear in Table 5, Columns 1-4. After controlling for detailed industry/occupation/firm size/prefecture dummy variables, union workers are 9 percentage points more likely to answer that they are satisfied with their jobs, while 59 percent of non-union workers answer that they are satisfied with their jobs, on average. It is notable that union workers are 8 percentage points more likely to answer that they are satisfied with their jobs, even after conditioning on the log wage. This implies that unions enhance workers' satisfaction by improving the non-wage aspects of jobs.

A unique question that presumably captures whether respondents enjoy compensation packages above the ongoing market level is included in the survey. The question asks, "If you lose your (current) job, about how easy would it be for you to find a (new) job with another employer with approximately the same income and fringe benefits you now have?" Those who answer "easy" for this question are presumably receiving a compensation package at a level that is traded in a perfectly competitive labor market. In con-

trast, those who answer "not easy" enjoy some rent above the market level. This rent is perhaps created from the relation-specific productivity between workers and employers or from imperfect competition in the product market. Unions' collective bargaining may help workers obtain a larger proportion of the relation-specific rent.

Table 5, Columns 5-8 indicate that union workers are about 10 percentage points less likely to feel that it is easy to find a job comparable to their current job in terms of compensation package . This clearly shows that union workers tend to enjoy the rent above the compensation package offered in the perfectly competitive labor market. Thus unionism seems to work as a rent-squeezing device for workers. In addition, the result in Column 8 suggests that the union effect is virtually identical even after conditioning on the log wage. This implies that unions increase the level of non-wage fringe benefits.

Finally, Table 6 reports the results of the probit regression of training participation on union status. Booth, Francesconi, and Zoega (2003) and Booth and Boheim (2004) provide evidence that union recognition induces training participation, using British data. The theoretical discussion by Eguchi (2002) offers an interesting channel through which union recognition can induce the human capital accumulation of workers. In our sample, without controlling for detailed industry/occupation/firm size/prefecture dummy variables, union workers are 16 percentage points more likely to participate in training. After controlling for these dummy variables, union workers are 8 percentage points more likely to participate in training, though the estimate is statisti-

cally insignificant. Although we cannot derive a definitive conclusion, unions seem to enhance their members' training participation.

7 Discussion

Our results that confirm the union wage premium and the positive union effect on non-wage job aspects contradict the findings from most of the previous studies for Japan (Brunello (1992), Noda and Tachibanaki (2000) and Tsuru and Rebitzer (1995)). Previous studies tend to point to the weakness of enterprise-based unionism. Our results could differ from those of previous studies because of differences in the sample period, the sampling method, the sample geographic coverage, or the sample size.

Contrary to studies based on firm-level data by Noda and Tachibanaki (2000) and Brunello (1992), our study used data from individual-based interviews. If the workers with weaker earnings capacities are more likely to work for unionized firms, then the estimates based on firm-level data could underestimate the effect of unionism on the positive wage and non-wage aspects of jobs. In this sense, our study overcomes the data limitations of previous studies.

Tsuru and Rebitzer (1995) used individual survey data collected through interviews with respondents within a 30km radius of Tokyo station. To address the possibility that the difference in the results between their study and ours is due to regional coverage, we restrict our data to the sample taken from the following four prefectures that are often considered to form the Tokyo

metropolitan area: Tokyo, Kanagawa, Saitama, and Chiba. The results of the regression based on this limited sample appear in Table 7. Although the estimated coefficients become less precise due to the smaller sample size, the size of the coefficients is virtually unchanged from Table 2.

The other potential reason why our results differ from those of previous Japanese studies is that our sample period covers a period of deflation. In Japan, wage increases are generally classified as "*base-up*" or "*annual wage raise*." *Base-up* refers to the wage increase amount that occurs with changes in the pay scale when incorporating increases in commodity prices and strong business performance.[6] In contrast, *annual wage raise* means that the wage amount increases in accordance with the promotion or age (or length of service) of each individual employee.

During the sample period between 2000 and 2003, management has made efforts toward wage reduction, such as reconsidering annual wage increases, wage cuts, and the postponement of wage increases. A non-negligible number of workers, particularly elder workers, experienced nominal wage cuts during this period of deflation (Kawaguchi and Ohtake (2004)). Some of the main union participants in the Spring Wage Offensive deferred their requests for a wage *base-up* corresponding to the stagnated macroeconomic condition; however, they did not give up on obtaining an *annual wage raise* and actually continued to obtain such raises for union members. That is, they made every

[6]Therefore, despite retaining the same position as in the previous year, the wage will be higher in the current year than in the previous year due to the amount added to the wage that accompanies the change in the pay scale.

effort to maintain the "wage curve" that assures a steady wage increase over the job tenure. Such situations might make the difference between the wages of union and non-union workers.

Several studies confirm that unions' wage negotiations make the nominal wage more downwardly rigid, and accordingly, the union wage premium tends to be larger during recessions than during economic booms (Moore and Raisian (1980), Hendricks (1981), Pencavel and Hartsog (1984), Wunnava and Honney (1991)). Noda (2005) argues for the same possibility in the recent Japanese context. Due to a lack of data covering the booming period, we cannot reach a definitive conclusion. However, the sharp contrast of our results to previous results may well be due to differences in the sample period.

8 Conclusion

We examined how labor unions affect the wage structure in the Japanese labor market. In addition, we also examined how labor unions affect workers' perceptions of the non-wage aspects of their jobs. Although there has been research in other developed countries on these topics, studies on Japan have been scarce due to a lack of individual micro data that records workers' union status, as well as their earnings and work hours.

The newly available individual-level micro data set, the Japan General Social Surveys, enables us to examine the union effect on the wage distribution and the non-wage aspect of jobs. Contrary to empirical findings based

on firm-level surveys or relatively small-scale individual surveys, we robustly found that union workers enjoy higher wages on average. In addition, a Blinder-Oaxaca decomposition and a DiNardo, Fortin, and Lemieux (1996) decomposition clearly indicate that labor unions compress the wage structure among their members. These findings are consistent with findings from the US and the UK.

In addition to the significant union effect on the wage structure, we found supportive evidences that labor unions non-trivially affect their members' perceptions of the non-wage aspects of their jobs. Although the degree of statistical significance is weak, labor unions reduce the fear of job loss, increase job satisfaction, and increase training participation. Moreover, union workers are more likely to feel that it would be difficult to find new jobs that offer compensation packages that would be comparable to those of their current jobs than non-union workers.

Combining the results for the wage structure and non-wage aspects, we conclude that labor unions in Japan still play a significant role in improving workers' compensation packages, including both wage and non-wage aspects. In addition, unions have a significant ability to equalize the wage distribution among their members. Although these results are contrary to those of previous studies in Japan, we must note that our sample period mainly covers the extraordinary period during which the Japanese economy stagnated for about a decade.

Because the Japanese General Social Surveys are an on-going project and

the Japanese economy is recovering, estimating the union effect on the wage structure and the non-wage aspects of jobs in the booming economy and comparing it with the current results would be an interesting future research topic.

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References

Batt, R., A. Colvin, and J. Keefe (2002): "Employee Voice, Human Resource Practices, and Quit Rates: Evidence from the Telecommunications Industry," *Industrial and Labor Relations Review*, 55(4), 573.

Becker, G. S. (1985): "Human Capital, Effort, and the Sexual Division of Labor," *Journal of Labor Economics*, 3(1), S33–S58.

Blanchflower, D. G., and A. Bryson (2002): "Changes Over Time In Union Relative Wage Effects in the UK and the US Revisited," NBER Working Paper 9395.

——— (2004): "What Effect Do Unions Have on Wages Now and Would Freeman and Medoff Be Surprised?," *Journal of Labor Research*, 25(3), 383–414.

Booth, A. (1995): *The Economics of the Trade Union*. Cambridge University Press.

Booth, A., and R. Boheim (2004): "Trade Union Presence and Employer-Provided Training in Great Britain," *Industrial Relations*, 43(3), 520–545.

Booth, A., M. Francesconi, and G. Zoega (2003): "Unions, Work-Related Training, and Wages: Evidence for British Men," *Industrial labor relations review*, 57(1), 68–91.

Brunello, G. (1992): "The Effect of Unions on Firm Performance in Japanese Manufacturing," *Industrial and Labor Relations Review*, 45(3), 471–487.

Denisi, M., and A. Gordon (1995): "A Re-examination of the Relationship between Union Membership and Job Satisfaction," *Industrial and Labor Relations Review*, 48(2), 222–236.

DiNardo, J., N. Fortin, and T. Lemieux (1996): "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach," *Econometrica*, 64(5), 1001–1044.

Eguchi, K. (2002): "Unions as Commitment Devices," *Journal of Economic Behavior and Organization*, 47(4), 407–421.

Fuess, S. (2001): "Union Bargaining Power: A View from Japan," IZA Discussion Paper No. 393.

Hendricks, W. (1981): "Unionism, Oligopoly and Rigid Wages.," *The Review of Economics and Statistics*, 63(2), 198–205.

Hirschman, A. (1970): *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States*. Harvard University Press, Cambridge, Massatusetts.

Kalleberg, A. L., and J. R. Lincoln (1988): "The Structure of Earnings Inequality in the United States and Japan," *The American Journal of Sociology*, 94(Supplement), S121–S153.

Kawaguchi, D., and F. Ohtake (2004): "Testing the Morale Theory of Nominal Wage Rigidity," ISER Discussion Paper Series 602, Osaka University.

Lewis, G. H. (1986): "Union Relative Wage Effects: A Survey," in *Handbook of Labor Economics*, ed. by O. Ashenfelter, and R. Layard, vol. 2, pp. 1139–1181. North Holland, Amsterdam.

Moore, W. J., and J. Raisian (1980): "Cyclical Sensitivity of Union/Nonunion Relative Wage Effects.," *Journal of Labor Research*, 1(1), 115–132.

Noda, T. (2005): "The Effect of Labor Union (*Rodo Kumiai no Kouka*)," in *Decline or Revive?: Road to Vitalizing Labor Union (Suitai ka Saiseika: Rodo Kumiai Kasseika he no Michi)*, ed. by K. Nakamura, and RIALS, pp. 71–84. Keiso-syobo, Tokyo.

Noda, T., and T. Tachibanaki (2000): *The Economic Effects of Trade Unions in Japan*. Macmillan, New York.

Pencavel, J., and C. E. Hartsog (1984): "Reconsideration of the Effects of Unionism on the Relative Wages and Employment in the United States, 1920-1980," *Journal of Labor Economics*, 2(2), 193–232.

Sako, M., and H. Sato (1997): *Japanese Labour and Management in Transition: Diversity, Flexibility and Participation*. Routledge, London and New York.

Sloane, K., and P. Bender (1998): "Job Satisfaction, Trade Unions, and Exit-Voice Revisited," *Industrial Labor Relations Review*, 51(2), 222–240.

The Daily Yomiuri (2006): "Shrinking unions have to face up to new role," News Paper Article, February 18, 2006.

Tsuru, T., and J. Rebitzer (1995): "The Limits of Enterprise Unionism: Prospects for Continuing Union Decline in Japan," *British Journal of Industrial Relations*, 33(3), 459–492.

Wunnava, P. V., and J. K. Honney (1991): "The Union-nonunion Wage Differential Over the Business Cycle," *Economics Letters*, 37(1), 97–103.

Table 1: Descriptive Statistics

Sample: 2000-2003 Pooled

Panel A: Variables Used for Wage Distribution Analysis

	Non-Union		Union		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Hourly Wage	1631	1154	2152	1075	1835	1151
Age	39.86	11.52	38.13	10.64	39.19	11.21
=1 if Female	0.40		0.32		0.37	
Education	12.73	2.20	13.37	2.10	12.98	2.18
Experience	21.13	12.32	18.76	11.40	20.20	12.02
Tenure	9.77	8.74	13.74	10.01	11.33	9.46
=1 Married	0.68		0.69		0.69	
# of child	1.19	1.16	1.16	1.10	1.18	1.13
N	1216		785		2001	

Panel B: Descriptive Statistics of Subjective Perception

Sample: 2000-2003 Pooled

	Non-Union		Union		Total	
	Mean	N	Mean	N	Mean	N
Job Loss Concern	0.21	1107	0.13	738	0.18	1845
Quit Intention	0.07	1170	0.06	763	0.07	1933
Satisfied w/ Job	0.59	1215	0.62	780	0.60	1995
Easy to find comparable job	0.32	1138	0.21	751	0.27	1889
Training participation	0.36	587	0.59	423	0.46	1010

Note:

1. Information on training participation is recorded only until 2001.
2. The concerns about job loss dummy variable is constructed from the question asking "Thinking about the next 12 months, how likely do you think it is that you will lose your job or be laid off?". A dummy variable set equal to 1 if respondents chose 'Very likely' and 'Fairly likely', and to 0 'Not too likely' and 'Not at all likely.'
3. The job quit dummy variable is constructed from the question asking "Are you considering quitting your current job or business?" A dummy variable set equal to 1 if respondents chose 'I am considering quitting in the near future' and to 0 'I am not considering quitting (now)' and 'I am not considering quitting at all.'
4. The job satisfaction dummy variable is constructed from the question asking "On the whole, how satisfied are you with the (main) job you have?" A dummy variable set equal to 1 if respondents chose 'Satisfied', 'Somewhat satisfied' and 'Neither satisfied nor dissatisfied', and to 0 'Somewhat dissatisfied' and 'Dissatisfied.'
5. The opportunity for finding a new job with approximately the same income and fringe benefits once workers leave current job dummy variable is constructed from the question asking "If you lose your (current) job, about how easy would it be for you to find a (new) job with another employer with approximately the same income and fringe benefits you now have?". A dummy variable set equal to 1 if respondents chose 'Very easy' and 'Somewhat easy', and to 0 'Not easy at all.'
6. The training dummy variable set equal to 1 if respondent answered yes to the question, "Have you received training of any kind that seem to be useful for your job in the past year?"

Table 2: The Effect of Union Status on Log Wage

Sample: 2000-2003 Pooled

	(1)	(2)	(3)
	log(wage)	log(wage)	log(wage)
Union	0.34	0.18	0.08
	(0.03)	(0.03)	(0.03)
Education	-	0.05	0.02
		(0.01)	(0.01)
Experience	-	0.03	0.03
		(0.01)	(0.01)
Experience^2/100	-	-0.05	-0.05
		(0.01)	(0.01)
Tenure	-	0.03	0.03
		(0.00)	(0.00)
Tenure^2/100	-	-0.03	-0.04
		(0.01)	(0.01)
Married	-	0.11	0.13
		(0.05)	(0.05)
One Child	-	0.04	0.00
		(0.05)	(0.05)
Two Children	-	0.07	0.04
		(0.05)	(0.05)
Children $\geq$ 3	-	0.01	0.01
		(0.05)	(0.06)
Female	-	-0.62	-0.58
		(0.19)	(0.20)
Female * Union		-0.00	0.04
		(0.05)	(0.05)
Female * Education	-	0.04	0.03
		(0.01)	(0.01)
Female * Experience	-	-0.00	-0.00
		(0.01)	(0.01)
Female * Experience^2/100	-	-0.00	-0.00
		(0.02)	(0.02)
Female * Tenure	-	0.00	0.01
		(0.01)	(0.01)

Female * Tenure^2/100	-	0.01	-0.00
		(0.03)	(0.02)
Female*Married	-	-0.13	-0.11
		(0.08)	(0.08)
Female*One Child	-	-0.12	-0.06
		(0.09)	(0.09)
Female*Two Children	-	-0.13	-0.13
		(0.08)	(0.08)
Female*Children ≥ 3	-	-0.12	-0.10
		(0.09)	(0.09)
Occupation, Industry, Firm Size, Prefecture Dummy Variables	No	No	Yes
Observations	2001	2001	2001
R-squared	0.13	0.38	0.51

Note: Heteroskedasticity robust standard errors are reported in parenthesis. All specifications include year dummy variables.

Table 3: Oaxaca Decomposition

Sample: 2000-2003 Pooled

	(1)	(2)	(3)	(4)
	Non-Union	Union	Non-Union	Union
Education	0.05	0.04	0.01	0.03
	(0.01)	(0.01)	(0.01)	(0.01)
Experience	0.03	0.03	0.03	0.04
	(0.01)	(0.01)	(0.01)	(0.01)
Experience^2/100	-0.06	-0.05	-0.06	-0.06
	(0.02)	(0.02)	(0.02)	(0.02)
Tenure	0.04	0.02	0.03	0.02
	(0.01)	(0.01)	(0.01)	(0.01)
Tenure^2/100	-0.06	0.00	-0.06	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Married	0.18	0.01	0.18	0.02
	(0.07)	(0.06)	(0.07)	(0.06)
One Child	0.08	0.02	0.03	0.02
	(0.08)	(0.06)	(0.08)	(0.07)
Two Children	0.08	0.06	0.04	0.10
	(0.07)	(0.06)	(0.07)	(0.06)
Children ≥ 3	0.03	-0.01	0.00	0.10
	(0.08)	(0.07)	(0.08)	(0.07)
Female	-0.68	-0.53	-0.67	-0.54
	(0.26)	(0.28)	(0.27)	(0.31)
Female * Education	0.05	0.02	0.04	0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Female * Experience	-0.00	-0.01	-0.00	-0.03
	(0.01)	(0.01)	(0.01)	(0.01)
Female * Experience^2/100	0.01	0.01	0.01	0.03
	(0.02)	(0.03)	(0.03)	(0.03)
Female * Tenure	-0.02	0.04	-0.00	0.04
	(0.01)	(0.01)	(0.01)	(0.01)
Female * Tenure^2/100	0.07	-0.07	0.01	-0.07
	(0.04)	(0.03)	(0.04)	(0.04)
Female*Married	-0.19	-0.02	-0.16	-0.04
	(0.11)	(0.11)	(0.11)	(0.12)

Female*One Child	-0.21	-0.01	-0.14	0.08
	(0.13)	(0.13)	(0.13)	(0.13)
Female*Two Children	-0.20	-0.01	-0.17	0.02
	(0.11)	(0.11)	(0.12)	(0.11)
Female*Children ≥ 3	-0.14	-0.12	-0.09	-0.09
	(0.13)	(0.13)	(0.13)	(0.14)
Constant	5.95	6.47	-	-
	(0.14)	(0.14)		
Occupation, Industry, Firm Size, Prefecture Dummy Variables	No	No	Yes	Yes
$\bar{x}^u \hat{\beta}^u - \bar{x}^{nu} \hat{\beta}^{nu}$	0.34		0.34	
	(0.03)		(0.03)	
$(\bar{x}^u - \bar{x}^{nu})\hat{\beta}^{nu}$	0.16		0.20	
	(0.02)		(0.04)	
$\bar{x}^u(\hat{\beta}^u - \hat{\beta}^{nu})$	0.18		0.13	
	(0.02)		(0.04)	
Observations	1216	785	1216	785
R-squared	0.29	0.43	0.47	0.64

Note: The same notes apply as Table 2.

Table 4: The Effect of Union Status on Concerns about Job Loss and Intention to Quit

Estimation Method: Probit

Sample: 2000-2003 Pooled

	Have Concerns about Job Loss			Have Intention to Quit		
	(1)	(2)	(3)	(4)	(5)	(6)
Union	-0.08	-0.04	-0.04	-0.01	0.01	0.01
	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)	(0.02)
Demographic Controls	No	Yes	Yes	No	Yes	Yes
Occupation, Industry, Firm Size, Prefecture Dummy Variables	No	No	Yes	No	No	Yes
Observations	1845	1845	1485	1933	1933	1314
Log Likelihood	27.73	78.01	139.00	7.04	82.62	114.95

Note:

1. Marginal effects evaluated at the sample means of explanatory variables are reported. Standard errors are calculated so that the t-statistics is preserved.

2. All specifications include year dummy variables.

3. See the footnote for Table 1 Panel B for the definition of the dependent variables.

Table 5: The Effect of Union Status on Intention to Quit and Job Satisfaction and Opportunity for Obtaining Similar Compensation Package

Estimation Method: Probit

Sample: 2000-2003 Pooled

	Satisfied with Job				Easy to Find a Job with Similar Compensation			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Union	0.04	0.04	0.09	0.08	-0.11	-0.10	-0.09	-0.08
	(0.02)	(0.03)	(0.04)	(0.04)	(0.02)	(0.03)	(0.03)	(0.03)
ln (Wage)	-	-	-	0.07	-	-	-	-0.02
				(0.03)				(0.03)
Demographic Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Occupation, Industry, Firm Size, Prefecture Dummy Variables	No	No	Yes	Yes	No	No	Yes	Yes
Observations	1995	1995	1609	1609	1889	1889	1529	1529
Log Likelihood	9.42	69.86	181.61	187.76	34.94	217.38	304.00	304.57

Note: The same note applies as Table 4.

Table 6: The Effect of Union Status on Training Participation

Estimation Method: Probit

Sample: 2000-2001 Pooled

	Training participation		
	(1)	(2)	(3)
Union	0.23	0.16	0.08
	(0.03)	(0.04)	(0.06)
Demographic Controls	No	Yes	Yes
Occupation, Industry, Firm Size, Prefecture Dummy Variables	No	No	Yes
N	1010	1010	798
Log Likelihood	53.43	110.12	190.70

Note: The same note applies as Table 4.

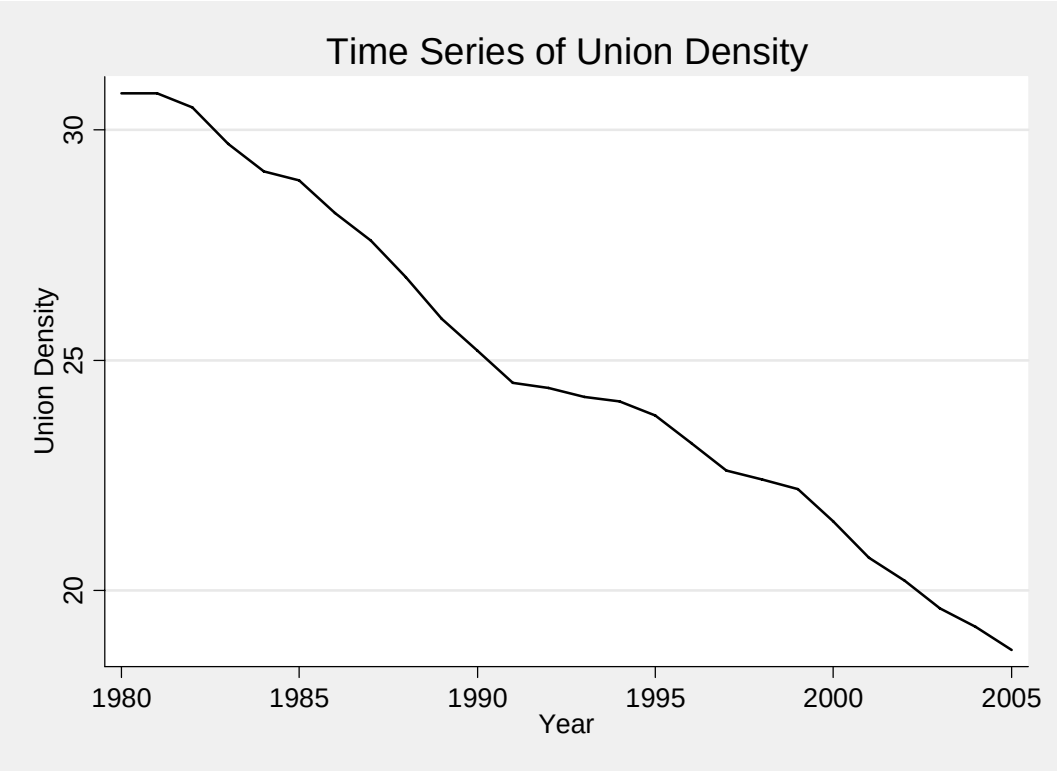
Table 7: Union Wage Premium Estimated with Metropolitan Area Sample

Sample: 2000-2003 pooled. Those who live in Tokyo, Kanagawa, Saitama and Chiba.

	(1)	(2)	(3)
	log(wage)	log(wage)	log(wage)
Union	0.29	0.18	0.06
	(0.06)	(0.06)	(0.07)
Demographic Controls	No	Yes	Yes
Occupation, Industry, Firm Size, Prefecture Dummy Variables	No	No	Yes
Observations	446	446	446
R-squared	0.07	0.39	0.65

Note: Heteroskedasticity robust standard errors are in parenthesis. Sample is restricted to be roughly consistent with Tsuru and Rebitzer (1995).

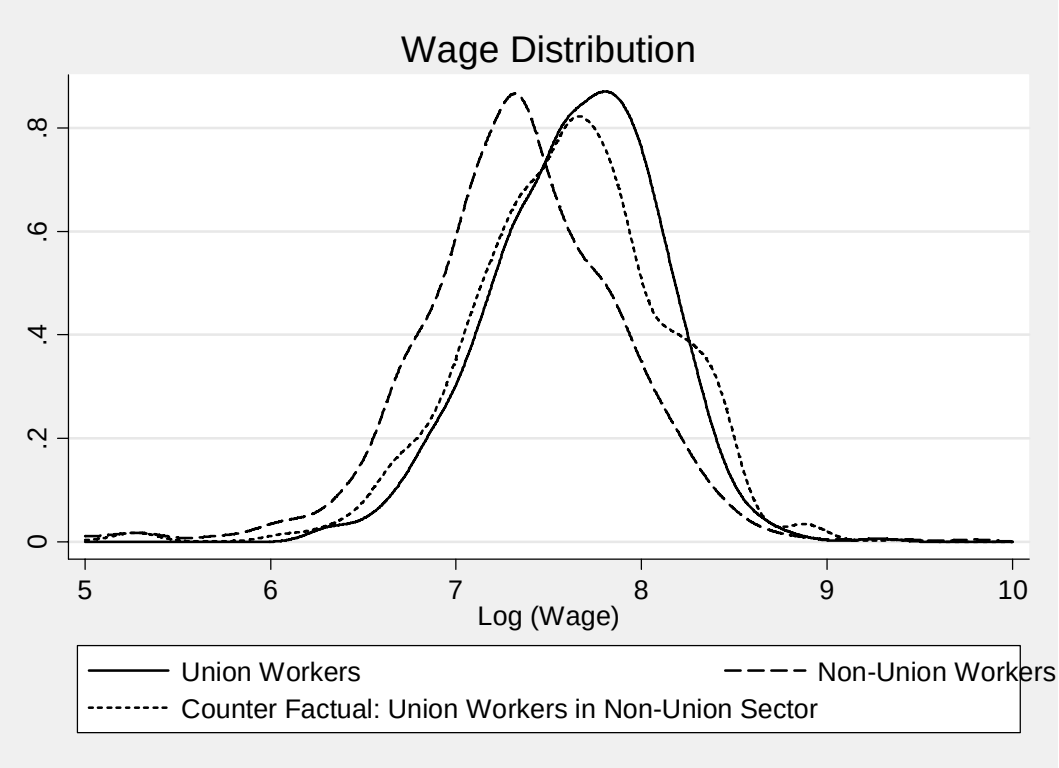
Figure 1: Time Series of Union Density



Source: Trade Union Membership Survey, Ministry of Health, Labor and Welfare (The estimate union density is computed as the number of union members divided by the number of employees recorded in the Labor Force Survey of the Statistics Bureau, the Ministry of Internal Affairs and Communications, and multiplied by 100）.

Figure 2: DiNardo, Fortain and Lemieux Decomposition

Sample: 2000-2003 Pooled



Note: The kernel density estimations are implemented using Gaussian kernel with the optimal bandwidth. The weight used for re-weighting is calculated based on the logit regression of union status on the explanatory variables included in Table 2 Column 3.

Appendix Table 1:

Union Participation Rate by Industry in the Analysis Sample

Industry	Participation Rate	N
Agriculture & Forestry & Fishery	0	6
Mining	0	4
Construction	22.53	182
Manufacturing	48.76	607
Electricity, gas, steam supply, water works	80	15
Transportation	51.9	158
Wholesale trade	27.47	91
Retail trade	34.42	154
Restaurants	12.9	31
Financial institution	72.94	85
Real estate	0	15
Broadcasting, publishing, advertising, film production	26.67	15
Information and commutation services	51.67	60
Medical and welfare services	31.6	212
Educational and research services	47.52	101
Legal and accounting	16.67	12
Other services	22.8	250
Industries not elsewhere classified	33.33	3
Total	39.23	2,001

Appendix Table 2:

Union Participation Rate by Firm Size in the Analysis Sample

Number of Employees	Participation Rate	N
1	0	1
2-4	7.53	93
5-9	9.55	157
10-29	14.7	313
30-99	23.36	381
100-299	35.35	297
300-499	51.33	150
500-999	64.29	140
1000-1999	70.9	134
2000-9999	75	188
10000-	81.63	147
Total	39.23	2,001

Note: The number of employees includes part-time and family workers.