Effects of Enterprise Labor Unions: Reviewing the Effects on Wages and Employment Adjustment

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1. Introduction

This paper is written for the purpose of verifying the effects of labor unions in Japan. Tsuru (2002) presents a noteworthy opinion in his research on Japanese labor unions and industrial relations in recent years. According to Tsuru, Japanese enterprise labor unions provide neither "effects on wages" (increasing wages) nor "effects on voice" (collectively voicing the dissatisfaction of union members with the effect of reducing the rate of those leaving employment). In short, he claims that labor unions do not provide union members with any benefits, but his research seems to be insufficient from the viewpoint of evaluating the effects of labor unions. This paper reviews the effects of labor unions based on Tsuru's ideas, makes empirical analysis of the effects on wages and employment security, and finally provides explanation for the result of the analysis.

Among the issues dealt with by Tsuru, firstly he does not examine the role played by labor unions for the security of worker's employment, which is the most important factor in the activities of labor unions in Japan. It is generally known that labor unions concentrated their efforts on maintaining and improving working conditions and securing employment after World War II. While we must inevitably make an analysis of the relation between the labor union and employment security when speaking about the effects of labor unions, Tsuru's research does not cover this relation between the labor union and employment security. This is due to the fact that his analysis is concentrated on verification of the presence of effects on wages and effects on voice.

Secondly, since Tsuru's relies on a questionnaire survey conducted in 1992 for his conclusion that no effect on wages or voice are provided, and it is not appropriate to claim that labor unions are not effective based on the analysis made at a single point in time, although there is a decreasing trend for the unionization rate. In relation to the effects of labor unions on wages, not only Tsuru but also Tachibanaki and Noda (2000) and Noda (1997) negate the effects on wages for men, presenting mostly negative opinions on the effects of labor unions on wages. These research reports were based on the information obtained in the first half of the 1990s; more recent researches based on information obtained

after 2000 show different results. Based on the *Chingin Hikiageto no Jittai ni Kansuru Chosa* [Fact-finding survey on pay raise] conducted by the Ministry of Health, Labor and Welfare, Tanaka (2002) examined the results of pay rises in 1991 and 2001 in his recent research, comparing them with and without labor unions, and presented the following conclusion:

While no difference was observed in the amount of pay raise between "with labor union" and "without labor union" in 1991, the disparity in pay raise between with and without labor union increased in 2001, despite the fact that the disparity was minimized at the time in 1991.

Hara (2003) also concluded in her research that effects on wages were present for men based on information obtained in 2002.

Accepting these research reports as they are, it can be said that labor unions have an effect on wages particularly during a period of prolonged recession in an extremely difficult economic environment. Assuming that this is the case, it may be possible to verify the effects of labor unions by evaluating them in an environment that is economically more difficult than 1992, which is the timeframe for Tsuru's research.

Based on hints obtained from the research of Tsuru, a survey was conducted on the effects on wages and effects on employment adjustment. Section 2 introduces empirical analysis in two areas: employment security and wages. Section 3 reviews and discusses whether or not labor unions are effective.

2. Assumed Effects of Labor Unions

2.1 Effects on Wages

A few research reports are available on the effects on wages, notably Tachibanaki and Noda (2000) and Tsuru (2002). Using the model wage of the standard worker obtained from a special survey conducted by JTUC Research Institute for Advancement of Living Standards (the RENGO RIALS), Tachibanaki and Noda (2000) point out that no effects on wages were found for men, while positive effects are found for women.

Tsuru (2002) estimated the wage function based on the data obtained from his survey on workers in the metropolitan area and points out that labor unions do not provide effects on pay increases for both men and women.

These research reports are based on the information obtained in the first half of the 1990s or before, confirming that there is no wage disparity between companies with labor unions (or with unionists) and companies without labor

unions (or workers working for the company without labor unions). So, what about effects of labor unions on wages in more recent years? Analysis is made on the data obtained after 2000.

We analyze the determinants of wage with the information obtained from *Dai 7 kai Kinrosha no Shigoto to Kurashi no Anketo Chosa* [The 7th questionnaire survey on work and life of workers] conducted by the RENGO RIALS in April 2004. The analysis includes 391 samples with regular employees (executives excluded).[1] 190 companies have labor unions and 201 do not. As for the labor union dummy, "1" is given to respondents who answered "Yes" to the question about whether or not a labor union is present where they work and "0" is given to respondents who answered "No." The analysis excludes those who answered that they do not know whether a labor union is present.

The wage is based on the income over the last 12 months; however, this data is provided only in the class value, and therefore the median is used for the wage.

For the size of company, dummies are based on companies with less than 300 employees, with the label ‘medium size companies’ for those with from 300 to less than 1,000 employees and ‘large size companies’ for those with 1,000 or more employees. Industry dummy and occupation dummy are also included. Table 1 shows the result of estimate with labor union dummy, 1 indicating with labor union and 0 indicating without labor union. The size of this dummy variable indicates the wage disparity between companies with and without labor unions.

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[1] We analyze the determinants of wage with the information obtained from *Dai 7 kai Kinrosha no Shigoto to Kurashi no Anketo Chosa* [The 7th questionnaire survey on work and life of workers] conducted by JTUC Research Institute for Advancement of Living Standards (the RENGO RIALS) in April 2004. The survey was conducted on workers at private companies in the age range from the 20s to 50s living in the metropolitan Kanto and Kansai areas. Samples were taken based on the sampling criteria, which were created based on the demography of private company workers in the metropolitan Kanto and Kansai areas, using the distribution of gender, age groups and employment types described in *Heisei 14 nen Shokugyo Kozo Kihon Chosa* [The employment status survey 2002.] Based on these sampling criteria, 900 workers were selected by monitors of a survey company living in the metropolitan Kanto and Kansai areas, and self- administered questionnaire sheets were distributed for posting. 900 sheets were distributed and 806 valid responses were received, with the valid response rate being 89.6 percent. 36.0 percent of the total replied that they had a labor union. This data is available from the SSJ Data Archive at the Information Center for Social Science Research on Japan, Institute of Social Science, the University of Tokyo.

Table 1. Effects of labor unions on wages (coefficients and t value for labor union dummy)

Men and Women	Men 1	Men 2	Women 1	Women 2
-0.001	0.113	0.191	-0.053	-0.308
(0.044)	(2.506)	(2.011)	(0.105)	(0.400)

Note: These are coefficients and t values for labor union dummy for the wage function. t values are in parentheses. For both men and women, 1 indicates the result with no presence of cross term of the labor union dummy and company size dummies, and 2 indicates the result with the presence of cross term.

For the total of men and women, the average wage amounts to 6,665.7 thousand yen with labor union and 4,715.7 thousand yen without. The average wage is higher at companies with labor unions since these are large companies.

For the total of men and women, the labor union dummy is not statistically significant, implying that labor unions do not provide any effects.

Let us now examine the estimate separating men from women, taking a look at the result of estimate for men first. It must be noted that companies with labor unions are large companies, and there is also the possibility that effects of labor unions may differ by the size of company. Therefore, in order to accurately distinguish the effects attributable to size from the effects attributable to labor unions, the estimate is also made including a cross term of company size dummies and labor union dummy. The average wage of men only amounts to 7,059.8 thousand yen with labor union and 5,222.6 thousand yen without. In any case, the labor union dummy is statistically significant and the average wage is 11 to 20 percent higher at companies with labor union.[2]

For women, the average wage amounts to 3,580 thousand yen with labor union and 3,660 thousand yen without. In any case, the labor union dummy is not statistically significant and does not show effects of labor unions for women.[3]

Unlike the analysis of the data obtained in the 1990s, the effects of labor

[2] The result remain the same when adding the cross terms of age, service years, labor union dummy and size dummy. As for the income, also pointed out by Tsuru (2002), the annual income of those who changed their job in the last 12 months may not correspond to the annual income of the current job. To exclude this possibility, analysis was performed excluding those who changed their job in the last 12 months, but the labor union dummy showed statistically significant positive figures.

[3] It must be noted that the number of the sample of women is not large enough when seeing the result.

unions on wage are observed for men.

2.2 Effects on Employment Adjustment

2.2.1 Analysis of Employment Adjustment Speed between Companies With and Without Labor Unions

Noda (1998, 2002) conducted research on the effects of labor unions on employment adjustment. The partial adjustment model and deficit adjustment model are used in this research. Let us examine the partial adjustment model first. Due to the time required to notify dismissal or the time and cost required for entering/leaving employment, actual employment does not immediately reach the optimal employment that achieves the maximum profit. Therefore, the actual increase/decrease rate of employment can be considered as the partial adjustment model that adjusts the disparity with the maximum increase/decrease rate of employment over several periods.

$$\ln L_t - \ln L_{t-1} = \lambda (\ln L^*_t - \ln L_{t-1}) \quad (1)$$

In the above formula, L_t is the number of employees of the current period, L_{t-1} is the number of employees of the previous period and L^*_t is the optimum number of employees of the current period. λ takes a value between 0 and 1 as the employment adjustment coefficient. When λ is 1, the actual employment corresponds to the optimum employment for the current period. The smaller the value of λ, the more time it takes to adjust to the optimum employment. In this case, the adjustment coefficient is fixed and the employment adjustment occurs in a continuous basis. In this report, annual data is used and therefore the adjustment coefficient of 0.5 requires two years of adjustment to achieve the optimum employment. The larger the adjustment coefficient, the easier it is to vary the employment. On the other hand, the smaller the adjustment coefficient, the more difficult it is to vary the employment, implying that employment is stable. If employment is more stable in companies with labor unions, companies with labor unions should show a smaller adjustment coefficient compared with companies without labor unions.

Next, let us see the deficit adjustment model. From the viewpoint of the adjustment cost, employment adjustment is performed without dismissal or voluntary retirement during periods of surplus or a slight deficit. This is because the personnel cutback, including dismissal and voluntary retirement, is associated with a lump-sum fixed cost, such as a large negotiation cost,

deterioration in employees' morale, reduction in firm-specific skills, and deterioration in company image. On the other hand, let us assume that employment adjustment is performed with dismissal and voluntary retirement during the period of a large deficit. Here, we assume that dismissal occurs during the period *t* due to the large deficit in the period *t*. At this point, using PR_t for the profit of the period *t*, and *K* for the deficit, which represents the criteria of large-scale personnel cutback, such as dismissal, voluntary retirement, the following employment adjustment function is obtained. Where λ_1 is the adjustment coefficient for the normal period and λ_2 is the adjustment coefficient during the period of deficit.

$$\begin{aligned} \ln L_t - \ln L_{t-1} &= \lambda_1 (\ln L^*_t - \ln L_{t-1}) \qquad PR_t \geq K \\ &= \lambda_2 (\ln L^*_t - \ln L_{t-1}) \qquad PR_t < K \end{aligned} \tag{2}$$

Here, the following shows the optimal number of employees *L**, which is the employment that maximizes profit of the company.

$$\ln L^*_t = a_1 + a_2 \ln Out + a_3 \ln Wage/P \tag{3}$$

The formula (2) shows that the speed of employment adjustment is faster during a period of large deficit since employment adjustment is performed with dismissal and voluntary retirement. While employment adjustment is not continuous and occurs slowly during the periods of profit or slight deficit, the rate of adjustment increases in the period of large deficit since dismissal and voluntary retirement are used. When λ_1 is equal to λ_2 in the formula (2), the formula (1) is deduced.

For the estimate of the actual deficit model, assuming that the adjustment coefficient is affected by the deficit, the deficit dummy (*Akaji*) is used as follows.

$$\lambda = \lambda_1 + (\lambda_2 - \lambda_1) * Akaji \tag{4}$$

The formula (1) is substituted with (4) and (3) above for the estimate. λ_1 represents the adjustment coefficient of the normal period, and $\lambda_2 - \lambda_1$ represents the increment of the adjustment coefficient during the deficit period, making the adjustment coefficient of the deficit period λ_2 (= $\lambda_1 + (\lambda_2 - \lambda_1)$). Where *Out* is the production volume, *Wage* is the wage and *P* is the price of the product. Noda (1998, 2002) estimates these models using information about unlisted companies. Information about unlisted companies is used since

listed companies have a higher rate of unionization, as it is described later, and this information is not appropriate for examining the disparity between companies with and without labor unions.

In his research, Noda (1998) estimates the partial adjustment model with and without labor union and by the size of company. For medium size of companies with 300 employees or more, the adjustment speed is slower for companies with labor unions, indicating that it is more difficult to perform personnel cutback for companies with labor union than those without, and confirming the effects of labor union on employment security.

Noda (2002) makes further analysis on the employment adjustment and effects of labor unions. Koike (1983) and Muramatsu (1986) confirm the empirical rule that "a large scale personnel cutback is performed after a period of a large deficit or after two periods of deficit." Suruga (1997) and Komaki (1998) formulated this empirical rule as a deficit adjustment model to verify the empirical rule using data organized for each company. Noda (2002) estimates the deficit adjustment model with and without labor union and by the size of company. The result is shown in Table 2. The deficit adjustment model fits companies of medium size with 300 employees or more, confirming that the adjustment speed is slower for companies with labor unions in normal periods but it is faster during the periods of deficit. This analysis confirms effects of

Table 2. Result of estimate of deficit adjustment model by company size

	Medium		Small	
	With labor union	Without labor union	With labor union	Without labor union
λ_1	0.179**	0.332**	0.352**	0.330**
	(2.263)	(6.462)	(6.263)	(5.660)
$\lambda_2 - \lambda$	0.148**	0.151	0.039	0.099
	(2.276)	(1.105)	(0.946)	(1.276)
a_2	0.347**	0.458**	0.220**	0.442**
	(3.099)	(8.004)	(4.097)	(12.11)
a_3	0.028	-0.275*	-0.247**	-0.620**
	(0.089)	(1.680)	(2.406)	(6.959)
$AdjR^2$	0.206	0.308	0.342	0.463

Source: Noda (2002).

Note: The figure in parenthesis is the t value. One asterisk (*) indicates 10 percent and two asterisks (**) indicate 5 percent statistically significant.

labor unions on employment security since they prevent the companies from cutting back on personnel until their business reaches the critical status of deficit.[4]

Assuming that effects of labor unions on employment security are confirmed in all these researches, economic effects of labor unions "cannot be denied." However, these researches are based on information obtained in the first half of the 1990s and before. Then, is it possible to also see effects of labor union on employment security when employment conditions deteriorated in the second half of the 1990s? Let us examine this question.

The 1990s is often described as the "lost decade." From the viewpoint of the economic cycle, two periods of recession occurred in the decade: the first half of the recession after the collapse of bubble economy (1992-1994) and the second half of the recession associated with financial crisis (1997-1999). As for the employment status, unemployment rapidly increased, particularly after the financial crisis that took place in the period from 1997 to 1998, reaching the five-percent mark in 2001 and reaching 5.4 percent in 2002.

Next, let us examine changes of effects of labor union on employment security during the period in which employment conditions deteriorated. Noda (1998, 2002), as mentioned above, analyzes effects of labor unions for the first half of the recession. Here, let us analyze effects of labor unions on employment security, by performing a similar analysis for the period from 1996 to 2000 including the second half of the recession.

In this paper, the model is estimated using the panel data created from the *Nikkei: Annual Corporation Reports (Unlisted)* published by Nihon Keizai Shimbun. Most of the listed companies have labor unions. The "Unlisted" version mainly consists of small and medium companies, showing a relatively good separation between companies with and without labor union, and it is effective to analyze effects of labor unions. The estimate is made for the period of five years from 1996 to 2000. *Wage* represents the average wage and *P* represents the GDP deflator by industry. *Out* represents the revenue substantiated by the industry-base GDP deflator.

A panel data is created for the companies that present all data for the period of the estimate. The company can be deemed a good company when it has been continuously put in the Nikkei's Annual Corporation Reports for a long period

[4] A fixed-effect model was used for the estimate.

of time even if it is not listed on the stock exchange. Therefore, our samples may be biased in terms of quality of company.[5] According to Koike (1983) and Muramatsu (1986), the occurrence of dismissal due to deficit varies widely. In our analysis, the deficit dummy is used when deficit occurs even for one period, assuming that employment adjustment occurs in the subsequent period. The estimate is the estimate of GMM.

The value of adjustment coefficient is shown in Table 3. Let us compare the speed of adjustment between companies with and without labor unions. The adjustment coefficient for the normal period is 0.680 for companies with labor union and 0.948 for companies without labor union, indicating that the adjustment speed is slower with the companies with labor union. For the deficit period, the adjustment speed is not statistically significant, both with and without.

Let us analyze based on the size of business: companies with 300 employees or more (medium) and less than 300 (small). For the medium size companies, companies with labor unions rate 0.541 in the normal period and 0.782 in the deficit period, while companies without labor unions rate 0.869 in the normal period and no change in the deficit period. Thus, the adjustment speed is slower for companies with labor union. Medium size companies show a large disparity in the adjustment speed between companies with and without in the normal period. Also, the deficit adjustment model fits only those companies with labor unions.

On the other hand, small companies with labor unions rate 0.799 in the normal period and no change in the deficit period. Companies without labor unions rate 0.951 in the normal period and no change in the deficit period, indicating that the adjustment speed is slower with companies with labor unions.

The speed of employment adjustment differs also between companies with and without labor unions also when examined by the size of company, indicating that it is slower with companies with labor unions for all sizes. Moreover, the deficit adjustment model fits only the companies with labor unions, as was observed by Noda (2002).

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[5] "Annual Corporation Reports" lists different companies every year and not many companies are listed every year for a long period of time. Therefore, companies that are examined in this report substantially differ from those analyzed by Noda (1998, 2002). Also, the analysis should ideally be made by industry but we were not able to gain a sufficient number of samples.

Table 3. Adjustment coefficient by company size and period

Adjustment coefficient (1996 - 2000)

	Total for size		Medium companies		Small companies	
	With labor union	Without labor union	With labor union	Without labor union	With labor union	Without labor union
λ_1	0.680	0.948	0.541	0.869	0.799	0.951
	(5.281)	(9.902)	(5.197)	(9.134)	(4.875)	(4.208)
$\lambda_2-\lambda_1$	×	×	0.241	×	×	×
			(1.670)			

Adjustment coefficient (1996 - 1997)

	Medium companies		Small companies	
	With labor union	Without labor union	With labor union	Without labor union
λ_1	0.720	0.746	0.706	0.840
	(5.307)	(3.936)	(4.725)	(6.263)
$\lambda_2-\lambda_1$	×	×	×	×

Adjustment coefficient (1998 - 2000)

	Medium companies		Small companies	
	With labor union	Without labor union	With labor union	Without labor union
λ_1	0.313	0.929	0.581	0.946
	(2.411)	(2.251)	(2.113)	(9.434)
$\lambda_2-\lambda\lambda_1$	0.330	×	0.985	×
	(2.144)		(2.248)	

Note: The upper row indicates the adjustment coefficient and the figure in parenthesis is the t value. The × mark indicates that the figure is not statistically significant.

Next, let us examine changes of the adjustment speed before and after the worsening of employment due to the financial crisis and other factors. The estimate is made for two periods: the period from 1996 to 1997 and the period from 1998 to 2000. Table 3 indicates that the adjustment speed does not change much for the medium size companies in the first half. For small companies, the adjustment speed is slower for the companies with labor unions.

In the second half of the period when the employment status deteriorated, medium companies with labor unions show the change of the adjustment speed

from 0.720 to 0.313, and an increase from no rise to 0.330 in the deficit period—slower than the first half of the period. Companies without labor unions increased the adjustment speed to 0.929. For small companies with labor unions, the adjustment speed slowed down from 0.706 to 0.581 in the normal period while it speeded up in the deficit period. Companies without labor unions increased from 0.840 to 0.946. On comparing companies with and without labor unions in the normal period, there is a large disparity. Also, companies with labor unions increased the adjustment speed in the deficit period.

Medium companies in the period from 1996 to 1997 do not show much difference between with and without labor union, while the disparity enlarges in the period 1998 to 2000. It seems that small companies also increased the disparity between with and without labor union in this period, compared with the normal period.

A general overview by period indicates that medium companies with labor unions show the slowest adjustment speed, presenting a noticeable disparity in the period from 1998 to 2000. It can be said that medium companies with labor unions had relatively stable employment environments compared with other companies. Furthermore, during the period in which the employment conditions deteriorated, the adjustment speed disparity enlarged between with and without labor union. Moreover, notably, the deficit adjustment model fits companies of any size. This indicates that companies with labor unions are not able to perform a large personnel cutback until they have a deficit, which is consistent with the result found by Noda (2002).

2.2.2 Personnel Cutback, Labor-management Consultation, Participation in Management

The above observation confirms that labor unions have the effects of slowing down the employment adjustment speed and that companies with labor unions provide more stable employment than those without. Then, what effects exactly do labor unions have on personnel cutbacks, such as dismissal and voluntary retirement?

Based on the information obtained from the questionnaire survey conducted on labor unions in 1999, Noda (2006) analyzed the influence of labor-management consultation and daily activities of participation in management on dismissal and voluntary retirement. Table 4 shows the result of the analysis.

Explanatory variables are used, by converting the power of voice by labor

Table 4. Factors determining personnel cutback (Influence of participation in management by employees)

	Large companies		Small and medium companies	
	(1)	(2)	(1)	(2)
Deficit dummy	0.195 (0.023)	0.082 (0.921)	0.216 (0.043)	0.404 (0.412)
Reduction, closure, introduction of business establishments	-0.071 (0.090)	-0.214 (0.027)	-0.003 (0.945)	0.008 (0.933)
Personnel plan	0.062 (0.105)	0.170 (0.240)	0.031 (0.562)	-0.006 (0.949)
Business plan	0.030 (0.326)	-0.215 (0.049)	0.006 (0.870)	-0.057 (0.019)
Voice to management strategies	0.113 (0.201)	0.577 (0.080)	0.077 (0.511)	0.645 (0.019)
Informal meetings	-0.155 (0.071)	-0.606 (0.044)	-0.099 (0.344)	-0.156 (0.447)
Disclosure of confidential information	0.031 (0.756)	0.371 (0.240)	-0.114 (0.313)	-0.340 (0.161)
Reduction, closure, introduction of business establishments * Deficit dummy		0.263 (0.020)		-0.127 (0.259)
Personnel plan * Deficit dummy		-0.110 (0.461)		0.127 (0.327)
Business plan * Deficit dummy		0.254 (0.030)		0.019 (0.646)
Voice to management strategies * Deficit dummy		-0.751 (0.032)		-0.701 (0.019)
Informal meetings * Deficit dummy Dummy		0.463 (0.069)		0.032 (0.883)
Disclosure of confidential information * Deficit dummy		-0.256 (0.403)		0.224 (0.408)
Log likelihood	-56.67	-36.74	-69.58	-63.82

Source: Noda (2006).
Note: The upper row indicates the marginal effect and the figure in parenthesis is the P value.

union in the labor-management consultation and the daily activities of participation in management. Also, an current deficit dummy is used for the companies that experienced current deficit once or more in the period from 1995 to 1999. Explained variable is the dummy variable indicating the presence of suggestion for dismissal or voluntary retirement in the period from

1995 to 1999 (1 = suggested, 0 = not suggested).[6]

The questionnaire survey included questions on the actual level of the power of voice by the labor union in terms of "reduction, closure, and introduction of business establishments," "business plan (launching new businesses, closing existing businesses)," and "personnel plan." Respondents were asked to select from five levels: "the labor union merely receives an explanation from the management after the action is taken," "the labor union receives explanation from the management before the action is taken," "the labor union may express its opinion or reply to the action," "the labor union may express its opinion and amend the action," and "the labor union is consulted before any action is taken," and the answers were scored from five to one in the order of the power of the voice. The higher the score, the more powerful the voice of the labor union, thus the more advanced in participation in management.

Also, there are dummies such as "voice to the management strategies," "informal meetings of labor-management top executives," and "disclosure of confidential management information to the labor union top members," with assigning "1" to positive answers and "0" to negative answers.

According to the estimate with the probit model, large companies with 1,000 employees or more show negative figures for "reduction, closure, and introduction of business establishments," "business plan" and "informal meetings of labor-management top executives," while the cross term for these variables and current deficit dummy show a positive figure. In other words, the probability of personnel cutback is reduced when labor unions have more power of voice to business plans, such as reduction, closure or introduction of business establishments, or when they have informal meetings between labor-management top executives, while the probability of personnel cutback is increased when current deficit occurs. This result indicates that the attitude of labor unions towards personnel cutbacks turns over depending on whether or not the current deficit occurs, and it seems that the result is consistent with the

[6] The questionnaire used here is *90 nendai no Rodosha Sanka nikansuru Chosa* [The survey on participation of workers in the 1990s] conducted by the RENGO RIALS. The survey included a question asking whether or not a suggestion was made, instead of asking whether or not they had voluntary retirement or dismissal. According to the survey, when a suggestion for employment adjustment is made there is a high probability of the action being taken, even when a modification is made. Therefore, when a suggestion for voluntary retirement or dismissal is made, it is understood that the action is performed even when the suggestion was modified.

deficit adjustment model discussed above. Japanese labor unions are against personnel cutbacks until the company goes into deficit, maintaining a low probability of action, while they take the more practical attitude by collaborating with the company when there is a deficit that poses a risk for the survival of the company.

However, for small and medium companies with less than 1,000 employees, the deficit dummy is a positive figure with statistic significance, while no statistically significant influence is found with the variables for the voice and participation in management, indicating that there is no effect on the voice and participation.

3. Explanation of Results

Effects of labor unions have been examined from two aspects, wage and employment adjustment. Let us now look at the results obtained from empirical research.

For effects on wages, a wage disparity was found between companies with and without labor unions for men. As pointed out by Tanaka (2002) in his research, there is a wage disparity between companies with and without labor unions. This result can lead to a conclusion that effects of labor union appear in particular during a period of prolonged recession in an extremely difficult economic environment. In other words, it can be said that effects of labor unions appear under conditions when working conditions are apt to deteriorate. It is understood that labor unions strongly resist deterioration of working conditions.

There was no disparity in wages between with and without labor unions, probably because Tsuru performed his analysis in 1992, one year after Tanaka (2002) pointed out in 1991 that the disparity was minimized between companies with and without labor unions. Comparison of Tsuru's result with the data obtained after 2000 indicates that effects of labor unions on wages vary depending on the change in the economic environment.

As for employment adjustment, examination by the size of company leads to the following observation: For all company sizes, there is a disparity in the adjustment speed between companies with and without labor unions, and for medium size companies, the deficit adjustment model fits companies with labor unions.

In terms of different periods, the adjustment speed is slower with companies with labor unions for any company size. The disparity in the adjustment speed

is small between with and without labor unions in the period from 1996 and 1997; however, the disparity between with and without labor unions expanded for all sizes in the period from 1998 to 2000 compared with the period before. The adjustment speed is slower for medium size companies with labor unions, generating a noticeably large disparity with other companies. It can be said that the employment environment was relatively stable for medium size companies with labor unions.

There was a disparity in the adjustment speed between with and without labor unions up to 2000, and employment was the most stable with medium size companies with labor unions. From this result, it is difficult to say that there has been a large change in the effects of labor unions on security of employment for employees. The estimate of the adjustment speed by different period confirms that the disparity between companies with and without labor unions grows when the employment condition deteriorates. This disparity is rather large with medium size companies. It indicates that labor union provides more effects on employment when employment conditions deteriorate. Therefore, effects of labor unions on employment security were still present in 2000.

Moreover, the deficit adjustment model fits companies with labor unions for any size in 1998 and later, indicating that it is difficult for companies with labor unions to perform personnel cutback on a large scale such as dismissal and voluntary retirement until they have a deficit and confirming the effects of labor unions on employment security.

Also, according to the analysis made by Noda (2006) on participation in management, labor-management consultation and dismissal, voice of employees and participation in management prevent dismissal, but the probability of dismissal increases in the period of deficit, indicating that it is difficult to cut back on personnel until the company has a deficit.

Comparison of the employment adjustment speeds indicates that it is difficult to say that conventional practice of employment has changed substantially for companies with labor unions, in particular those companies with labor unions with 300 employees or more. The media talk about "collapse of the life-time employment system," giving the impression that regular employees are frequently dismissed and that employment security has been lost, but in reality that is not the case. It is likely that no change has occurred to the conventional method of employment adjustment, in which a variety of

measures are taken to prevent dismissal according to the conventional rule of long-term employment, and in cases when the situation cannot be handled personnel cutback may take place on a large scale in the form of voluntary retirement.

Rather, the problem is the fact that there is a large disparity in the adjustment speed between companies with and without labor unions in 1998 and later, and that the disparity is enlarging between medium size companies with labor unions and other companies. It indicates that only a portion of workers receive benefits of employment security. Companies without labor unions do not show effects on employment security and small companies with labor unions show limited effects.

Consequently, effects of labor unions on employment security are valid only for regular employees in large or medium size companies, and other workers do not receive benefits.

4. Conclusion

Economic effects of labor unions are examined above, with attention to the effects on wages and employment security. Effects on wages are confirmed for men. Effects of labor unions on wages vary substantially depending on the economic environment. Labor unions resist the worsening of working conditions when the economic environment deteriorates.

As for the employment adjustment, there is a disparity in the adjustment speeds between companies with and without labor unions and the disparity enlarged after the financial crisis of 1997. The disparity is noticeable particularly with medium size companies. The disparity in the employment adjustment speed appears more noticeably when the employment conditions deteriorate, and this implies that labor unions provide more apparent effects on employment security under such conditions. It can be said that the effects of labor unions on employment security are still present. The problem is the disparity in the employment adjustment speed between companies with and without labor unions, and that the disparity in the adjustment speed is enlarging between the medium size companies with labor unions and other companies, particularly in 1998 on.

In addition to those discussed in this paper, there are a variety of other effects of labor unions. For example, in terms of employment adjustment, we must consider the extent to which labor unions achieved satisfaction for union

members or solid conditions, including conditions of voluntary retirement or assistance for re-employment at the time of personnel cutback. Mere examination of the adjustment speed is not sufficient to evaluate these effects of labor unions. These points should be discussed further on another occasion.

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