

Welfare Costs and Employment Under Trade Unionism

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Introduction

In these days, considerable doubts are cast upon the effects of Japanese trade unionism on wages, fringe benefits, and employment. The fall in the unionization rate observed in almost every industrial sector of our country is often attributed to the decline of trade unions' bargaining power.

In the United States, significant positive effects of trade unionism on wages, salaries, and fringes have been clarified by a number of empirical studies including Freeman & Medoff [5] and Kwoka [6]. However, this is not the case with our country. The recent study of Tachibanaki [4] demonstrates that although trade unions provide workers with a "voice", the "voice" itself does not necessarily lead to higher wages. Tachibanaki hypothesizes that wage differentials between union and nonunion firms are insignificant as wage increases attained by union firms tend to be immediately spilled over to all other firms in the same sector.

The difficulties in isolating the pure effects of trade unionism on wages are likely to create the impression that Japanese trade unions have already lost their functions. It is undeniable that the role of trade unions have considerably changed. The increase of part-time workers, the decrease of regular employees, drastic changes in the industrial structure, and the spread of individualistic thoughts have undoubtedly exercised negative effects on trade unionism. However, this does not mean that Japanese trade unions nowadays exert no influences on the economic position of workers. The trade union's direct effects on wage increase may be modest. However, raising wages is not the sole objective of trade unions. More and more Japanese people have come to value the nonpecuniary aspects of working conditions. That is to say, the demand for welfare systems and facilities at the expense of firms is on increase. Some of the firms' welfare programs such as health and employment insurance systems are legally mandated. Others such as paid vacations, maternity and childcare leave, pensions, cultural and recreational facilities, and employee shareholding plans are within each establishment's discretion. It is up to each firm to decide the amount of non-compulsory welfare expenses as well as wages. In such a situation, one of the trade union's roles is to choose the best

combination of money wages, welfare costs, and employment within a firm. At least, trade union could influence the proportion of welfare costs to money wages. The purpose of this paper is to test the hypothesis that trade unions have positive effects on the ratios of welfare costs and employment to wages.

For most of the empirical studies on trade union behaviour, wage is an endogenous variable determined by labour-management negotiations. Our analysis makes contrast to those of predecessors in that wage is treated as an exogenous variable. A union decides the optimal amount of welfare costs and employment subject to the constraints of the firm's labour demand function and the welfare cost function. The assumption that money wages are exogenously given is not so unrealistic, considering that trade union's effects on wages are found to be negligible. The basic framework of our model is that of the monopoly union approach developed in Western countries. Whether or not this theory is appropriate to describe the labour-management relationship of our country is open to question. The empirical performance of the theoretical model itself cannot be directly tested by our analysis. Despite these shortcomings, our empirical results reveal that trade unions have significant positive effects on the proportions of equilibrium welfare expenses and employment to money wages. That is to say, union firms pay more welfare costs and hire more employees than nonunion firms in proportion to money wages.

The remainder of this paper is organized in the following way. Section 1 posits a model which describes how welfare costs and employment are jointly determined within a firm. Section 2 applies this model to the sample gathered by the Social and Economic Congress of Japan and the last section concludes our study.

1. The Model

The model outlined here is concerned with the joint determination of welfare costs and employment in a single labour market. The specification of the trade union objective function is associated with the works of Dertozous & Pencavel [5], Pehkonen [8] and Pencavel [9] but has the following features. First, wages are assumed to be exogenously determined. Second, the sum of welfare costs borne by the firm is included in the objective function as an argument.

Suppose that a trade union's objective function defined over wages, welfare costs, and employment is specified as follows.

$$U = (\ln W_i - \ln \omega)^{\lambda} (\ln Z_i - z)^{\mu} (\ln L_i)^{\nu} \quad (1)$$

where W_i stands for the average wage received by employees of the i -th firm, ω is the minimum wage paid outside the firm, Z_i is the welfare costs borne by the i -th firm, z is the minimum level of welfare costs observed elsewhere, L_i is the number of regular employees in the i -th firm. The objective function (1) is assumed

to be well-behaved, i.e., the parameters λ , μ and ν can be rewritten as follows.

$$\lambda=1/(1+\alpha+\beta), \mu=\alpha/(1+\alpha+\beta), \nu=\beta/(1+\alpha+\beta)$$

where $\alpha, \beta > 0$

The values of α and β represent the relative weight attached to welfare expenses and employment in the union's objectives. The union maximizes (1) subject to the firm's labour demand function (2) and the welfare cost function (3).

$$\ln L_i = a + b_1 \ln W_i + b_2 \ln Y_i + e_{1i} \quad (2) \quad (\text{Note 1})$$

$$\ln Z_i = c + d_1 \ln W_i + d_2 \ln Y_i + e_{2i} \quad (3)$$

where Y_i is the output of the i -th firm, e_{1i} and e_{2i} are error terms. The parameters b_1 , b_2 , d_1 , and d_2 are expected to be in the ranges $b_1 < 0$, $b_2 > 0$, $d_1 < 0$, and $d_2 > 0$, as an increase in money wages induces employers to reduce both welfare costs and employment, and an output increase leads to additional welfare costs and employment. The first-order conditions for a maximum of (1) subject to (2) and (3) are as equations (4) and (5).

$$\ln Z_i - \ln z = \gamma (\ln W_i - \ln \omega) + u_{1i} \quad (4)$$

$$\ln L_i = \delta (\ln W_i - \ln \omega) + u_{2i} \quad (5)$$

where $\gamma = -\alpha d_1$ $\delta = -\beta b_1$

The parameters γ and δ stand for the optimum proportions of "supernumerary" welfare costs and employment to "supernumerary" wages respectively. Both u_{1i} and u_{2i} are error terms.

As equations (2) and (3) cannot be exactly identified, we cannot obtain consistent estimates for the parameters α , β , a , b_1 , b_2 , c , d_1 , and d_2 . However, the main objective of our analysis is not to get econometrically desirable estimates, but to clarify the role of trade unions in the determination of welfare costs and employment. That is to say, our purpose is to measure the union effects on the two parameters γ and δ . The next section will test whether these parameters are significantly affected by trade unionism or not.

(Note 1)

If we eliminate $\ln Y_i$ from these two equations, we get

$$\ln L_i = c + (b_2/d_2) \ln Z_i - (b_1 d_2 - b_2 d_1)/d_2 \cdot \ln W_i \quad (A)$$

If $b_1d_2 = b_2d_1$, then the equation (A) becomes a straight line on the L-Z plane, and the optimal solution for W_i is not available. However, this is not the case with our analysis as shown in the next section. If $b_1d_2 \neq b_2d_1$, then (A) represents a plane in the W-Z-L space and the optimal solutions for W_i , Z_i and L_i are obtained where the curved surface (1) intersects the plane (A).

2. Empirical Analysis

This section estimates the effects of trade unionism on the determination of wages, welfare costs, and employment. The data are taken from the sample gathered by the Committee on Welfare Policy of the Social and Economic Congress of Japan (Shakai Keizai Kokumin Kaigi) of about 1,800 firms to which the 1991 questionnaire was mailed, replies were received from 185 firms. The respondents were composed of 97 manufacturing firms, 67 nonmanufacturing firms, and 11 firms which gave no answers about the industrial sectors they belong to. The variables include average monthly wages, number of regular employees, composition of work force, welfare costs both compulsory and non-compulsory, sales in the fiscal year 1989, and the union status. The non-compulsory welfare programs held by the sample firms consist of pensions, paid vacations over a week, maternity, childcare and nursing leave, company houses, financial support given to employees buying their own houses, employee shareholding plans, recreational facilities, clubs and property accumulation savings contracts.

As for the manufacturing sector, the ratio of unorganized firms is so small (only 4%) that the statistical analysis of the union effect on welfare costs and employment cannot be made. We concentrate on nonmanufacturing firms, of which 14 (21%) have no trade unions.

First, we apply the labour demand function (2) and the welfare cost function (3) to the data of nonmanufacturing firms.

$$\ln L_i = a + b_1 \ln W_i + b_2 \ln Y_i + e_{1i} \quad (2)$$

$$\ln Z_i = c + d_1 \ln W_i + d_2 \ln Y_i + e_{2i} \quad (3)$$

L_i is the number of regular employees in the i -th firm, W_i is the average wage per employee in the fiscal year 1989, Z_i is the total welfare expenses borne by the i -th firm in the same period, and Y_i is the sales. e_{1i} and e_{2i} are disturbance terms. Statistically significant and theoretically consistent estimates are obtained as shown in Table 1.

Table 1. Labour Demand Function and Welfare Cost Function

$$\ln Li = a + b_1 \ln Wi + b_2 \ln Yi + e_{1i}$$

$$\ln Zi = c + d_1 \ln Wi + d_2 \ln Yi + e_{2i}$$

Dependent variable	Parameter estimate			\bar{R}^2
	\hat{a}	\hat{b}_1	\hat{b}_2	
lnLi	2.3847	-2.7783	0.7095	0.7752
	(3.200)**	(-5.891)**	(12.628)**	
lnZi	-1.4602	-1.7459	0.8521	0.6695
	(-1.205)	(-2.338)*	(9.543)**	

Figures in parentheses are t-values.

* : Significant at the 5% level in a two-tailed test.

** : Significant at the 1% level in a two-tailed test.

Next, we estimate the effects of trade unionism on the wage-fringe-employment outcomes. For this purpose, the equilibrium conditions (4) and (5) derived in the previous section are rewritten as follows.

$$\ln Zi - \ln z = \gamma_0 (\ln Wi - \ln \omega) + \gamma_1 (\ln Wi - \ln \omega) \cdot (\text{UNION})_i + u_{1i} \quad (4)'$$

$$\ln Li = \delta_0 (\ln Wi - \ln \omega) + \delta_1 (\ln Wi - \ln \omega) \cdot (\text{UNION})_i + u_{2i} \quad (5)'$$

(UNION)_i is the dichotomous variable equal to one if the i-th firm has a union and zero otherwise. z and ω are the minimum values of Wi and Zi found in the nonmanufacturing sector. u_{1i} and u_{2i} are disturbance terms. The null hypothesis to be tested is $\gamma_1 = \delta_1 = 0$.

We fit the equations (4)' and (5)' to the 67 nonmanufacturing firms. The OLS results are as presented in Table 2.

Table 2. Union Effects on Welfare Costs and Employment

$$\ln Zi - \ln z = \gamma_0 (\ln Wi - \ln \omega) + \gamma_1 (\ln Wi - \ln \omega) \cdot (\text{UNION})_i + u_{1i}$$

$$\ln Li = \delta_0 (\ln Wi - \ln \omega) + \delta_1 (\ln Wi - \ln \omega) \cdot (\text{UNION})_i + u_{2i}$$

Dependent variable	Parameter estimate		\bar{R}^2
	$\hat{\gamma}_0$	$\hat{\gamma}_1$	
lnZi - lnz	6.5036	6.4746	0.8067
	(3.879)*	(3.361)*	
lnLi	6.2498	5.5560	0.7806
	(3.872)*	(3.020)*	

Figures in parentheses are t-values.

*: Significant at the 1% level in a one-tailed test.

Fig. 1

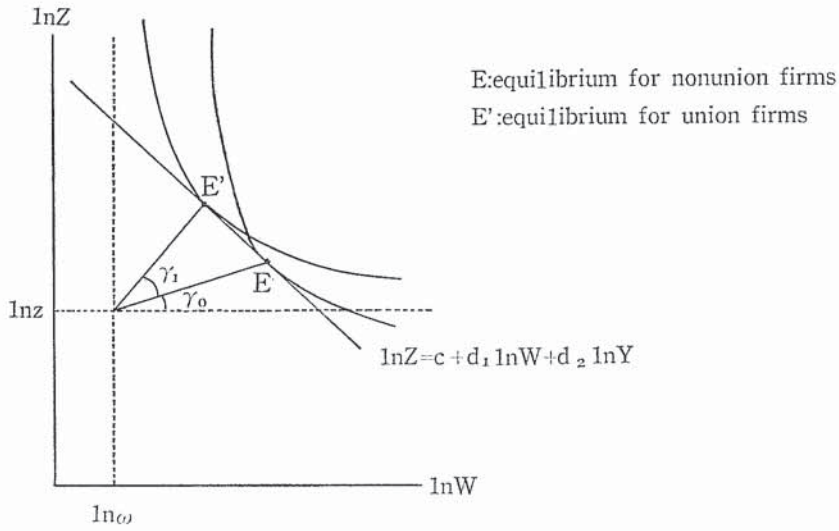


Fig. 2

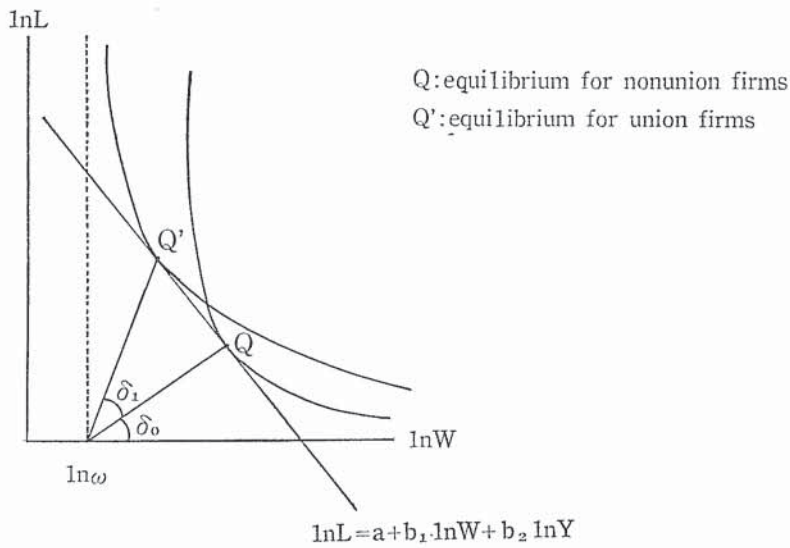


Table 2 shows that trade unions have significant positive effects on the proportions of welfare costs and employment to money wages. The estimated coefficients imply that for union firms, the optimal ratio of the logarithm of supernumerary welfare costs to the logarithm of supernumerary wages is about 13, which is almost twice as much as that of nonunion firms. The optimal employment-wage ratio is 6.25 for unorganized firms and about 12 for organized firms. The null hypothesis

that the estimated coefficients are identical for both union and nonunion firms is rejected by the F-test at the 5 percent level.

Fig.1 and Fig.2 compare the equilibrium conditions for union firms with those for nonunion firms. In Fig.1, the optimum points for union and nonunion firms are E and E' respectively. In Fig.2, the corresponding points are Q and Q'.

To sum up, union firms bear more welfare costs and hire more employees than nonunion firms in proportion to money wages as far as the 1991 data collected by the Social and Economic Congress of Japan are concerned. The hypothesis that trade unions have no influences on fringe-wage ratios and employment-wage outcomes is rejected by the statistical test.

3. Concluding remarks

The purpose of this study was to examine whether trade unions have significant positive effects on the determination of welfare costs and employment. In our analysis, money wages were assumed to be given, as unions' pure effects on wages had already become negligible in our country.

In the empirical analysis, a Stone-Geary type objective function into which welfare costs as well as wages and employment enter multiplicatively was used. The trade union was assumed to maximize the utility subject to two kinds of constraints; one was the conventional labour demand function and the other was the welfare cost function which presumed the negative relationship between wages and welfare expenses. The equilibrium ratios of welfare costs and employment to money wages derived from the optimal monopoly union behavior. We applied the model to the cross-sectional data that had been gathered by Social and Economic Congress of Japan.

The regression results revealed that the ratios of welfare costs and employment to wages were significantly higher for union firms than for nonunion counterparts. That is to say, our statistical results were consistent with the view that union firms attach more weight on welfare costs and employment than nonunion firms do.

Our experiment was a small one, and we cannot generalize the results obtained here. However, our findings suggest that Japanese trade unions can still have beneficial effects on the quality of life in the workplace and employment. The decline of the union density may bring about undesirable effects on both nonpecuniary aspects of working conditions and employment in the future considering that the unions' effects on them are significant at present.

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