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United We Stand: Firms and Enterprise Unions in Japan*

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Most Japanese workers in large firms are members of firm-based enterprise unions while workers in the United States, if organized at all, tend to be members of trade or industrial unions. This paper analyzes how differences in union structure and membership can affect firm behavior in a Pareto optimal contracting framework. The findings are that oligopolistic firms with enterprise unions will tend to hire excessive amounts of labor. Furthermore, it is shown that by organizing as an enterprise union and firm, the firm and its employees can be made better off relative to not being organized at all. *J. Japan. Int. Econ.*, March 1994, **8**(1), pp. 53–71. Department of Economics, Harvard University, Cambridge, MA 02138. © 1994 Academic Press, Inc.

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One of the most striking differences between Japanese and U.S. labor markets is that Japanese unions are, for the most part, firm-specific "enterprise unions" while U.S. unions tend to span more than one firm. The relatively nonconfrontational stance of Japanese unions over the last quarter century and their seeming acceptance of the goals of their firms have prompted many scholars to argue that Japanese unions are still in a formative stage and are thus weak relative to their U.S. counterparts.[1] This

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[1] For example, Galenson and Odaka (1976) write, "Enterprise unionism contains elements of strength stemming from its closeness to its constituency, but also serious drawbacks in economic power. A number of factors contribute to the weakness of the labor movement in Japan, but none more fundamentally than this structural feature" (p. 637). Shirai (1983) also voices similar sentiments.

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paper attempts to refute the conventional view of Japanese unions by arguing that their nonconfrontational tactics may arise from the presence of mutually beneficial contracts between enterprise unions and firms that do not exist when a single industrial union negotiates with several firms. Firms with enterprise unions can sign contracts that effectively lower their marginal costs and raise their profits while firms negotiating with an industrial union will generally have incentives to break their contracts.

The standard approach to unions in the labor economics literature is that unions and firms are diametrically opposed to each other. The parameters defined by the production function and product demand functions determine the total revenues available, and the two parties must somehow come to an agreement over how these are to be divided. Econometric evidence on U.S. unions tends to support this concept of how unions operate. Various studies have found that unionized industries in the United States have higher wages, higher capital to labor ratios, and lower profits than similar nonunionized industries (for a summary of these results see Freeman and Medoff, 1981). Furthermore, despite the ambiguous evidence on the impact of unions on productivity, the loud protestations by American business about the inefficiencies that arise from unionization make it clear that although firms and unions may achieve a modus vivendi, the relationship is fundamentally adversarial.

Within this context the Japanese experience with unions is quite striking. Over the last 25 years the number of days lost due to labor disputes has been significantly lower than in the United States despite a higher union density in Japan. Several authors have argued that the relative passivity of Japan's labor movement may be due to the fact that in Japan each company has its own union and these "enterprise unions" are only loosely affiliated with each other (see Table I). Hence, rather than signing contracts with one large industrial union, Japanese management and workers sign firm-level contracts with little outside interference. In fact, Koshiro (1988) documents that in 95% of firm–union negotiations, members of labor federations who are not employees of the firm are not even allowed to be present during contract bargaining. Yet, the connection between enterprise unions and the ability to strike is less clear. When enterprise unions feel threatened, they seem to be able to rally considerable numbers of workers and present a credible threat of disrupting the operations of their respective firms (Shirai, 1983). For example, in the year following the first oil shock, Japanese unions were concerned that the real wages of their workers would decline. The ensuing large number of strikes across the economy designed to prevent layoffs and to stop a deterioration in real wages involved over 3 million workers and caused the loss of almost 8 million working days.

Studies of Japanese unions, influenced in part by Western studies of

TABLE I
BREAKDOWN OF UNION MEMBERSHIP

	1930[a]	1947	1964	1975	1988
Total union members (%)	354,312 (100)	6,268,432 (100)	9,652,350 (100)	12,472,974 (100)	12,157,134 (100)
Enterprise union members	127,463 (36)	5,119,690 (82)	8,819,041 (91)	11,361,378 (91)	11,155,771 (91)
Industrial union members	164,547 (46)	403,120 (6)	476,008 (5)	682,728 (5)	468,490 (4)
Craft union members	24,974 (7)	610,882 (10)	65,607 (1)	169,569 (1)	370,297 (3)
Other union members	37,328 (10)	134,740 (2)	291,694 (3)	259,299 (2)	162,576 (1)

Source. *Rōdō Kumiai Kihon Chōsa 30 Nenshi [30-Year Chronicle of Basic Labor Union Surveys]* and *Nihon no Rōdō Kumiai no Genjō [The State of Labor Unions in Japan]*.

Note. The data is not presented in regular intervals because the survey question regarding type of union membership is only asked occasionally. The percentages do not always add to 100 due to rounding. The reasons for the shift toward enterprise unionism following the Second World War are discussed in more detail in Aoki (1988).

[a]The survey did not break down unions into these four categories before the Second World War. The figures for 1930 were calculated using the data from two tables: one that divided all union members into one-firm (enterprise) union members and all other union members, and one table that divided all union members into craft, industrial, and general union members. The number of industrial union members in 1930 was calculated by subtracting the number of enterprise, craft, and general union members from the total number of union members.

industrial unions, have focused heavily on which sectors are unionized, but have not considered the implications of what types of firms tend to be unionized, i.e., the extremely high unionization rate among workers in large firms in the Japanese economy.[2] In 1988, for example, about 60% of all union members worked in large firms (firms that employed more than 1000 employees), a number that is significantly higher than the percentage of workers who are employed by those firms.[3] Not only do many union members work for large firms, but the unionization rate in these firms is extremely high. In manufacturing, for example, while there were 2.5 million union members working in private sector large firms, there were only 3.2 million workers in the industry overall, implying a unioniza-

[2] Shirai *et. al.* (1986) note the high union density in large firms, but do not draw any conclusions from their analysis.

[3] For reference, in 1983, 19% of nonagricultural employees and 15% of nonagricultural working people (including the self-employed and family workers) worked in firms employing 1000 or more persons.

tion rate of 78%. Since about 20% of workers in these firms are in managerial positions, and are generally not union members, virtually all of the remaining workers in firms in this category must be unionized.[4] In comparison, the unionization rate for smaller firms, those employing 100–499 workers, was seven percentage points below the industry average of 34%, and the unionization rate of even smaller firms is lower still. These numbers suggest that competition between large and small firms in Japan is essentially competition between unionized and nonunionized sets of firms.

Given the vastly different union structures in Japan and the United States, it seems reasonable to ask whether one might expect these differences to lead to different types of bargaining outcomes. Specifically, while industrial unions have the ability to affect the cost structure of all firms in an industry, enterprise unions can only affect employment and wage decisions in their own firm. The choice of which framework to adopt is somewhat problematic. As Oswald (1987) notes, there is no uniformly accepted model of unions in the West. Hence, any comparative framework is likely to involve some abstraction from reality. This paper uses the efficient bargaining model (McDonald and Solow, 1981) as a benchmark because it is one of the leading models in the literature and its flexibility with respect to bargaining structure enables it to highlight the impact that different union structures can have on the bargaining process.

Using the efficient bargaining framework, we find that unless industrial unions place a high premium on employment, they have an incentive to reduce industry employment and output in order to generate monopoly rents that can be distributed to workers. Enterprise unions, however, cannot obtain monopoly rents by virtue of the fact that they can only sign contracts covering only the employees of one firm in the industry. This implies that enterprise unions will try to extract rents by conducting precisely the opposite behavior: expanding the output of the firm in order to generate contractions in output by competing firms. Contracts covering only one firm in an industry will place more emphasis on maintaining high employment levels as a means of transforming labor from a marginal cost into a fixed cost. Since firms with lower marginal costs are likely to produce more in equilibrium, enterprise unions are likely to increase firm production.

The incentive for firms with enterprise unions to use labor as a strategic variable is likely to have an additional implication for the incentive to break contracts. Because enterprise unions in effect provide a commitment mechanism for firms to produce more, it can be shown that there will

[4] The data on union members is from NRKG and the other data is from RTN. To avoid double counting enterprise union and federation members, I used unit labor union data (*Tan-i Kumiai-in Sū*).

always exist an enterprise union contract that will raise the profitability of both the firm and the union. In general, this is not true for the industrial union. In that case, a firm can always be made better off by breaking a contract that is efficient for the union and industry as a whole. This suggests that enterprise union contracts are more "stable" because firms with enterprise unions can always sign a contract that none of the parties would like to break at a later point in time.

The organization of the rest of the paper is as follows. In the next section, we lay out the basic enterprise union model and derive the basic features of the equilibrium. The following section contrasts the enterprise union results with an industrial union model to demonstrate how efficient bargaining in the enterprise union case differs from traditional models. Finally, the last section demonstrates that in the enterprise union case, there always exists a contract that will raise the profitability of both parties.

A Model of Enterprise Union Contracting

Consider a game in which there are m firms with unions and k firms without unions in the industry and assume that production involves both labor and capital inputs. In the first stage, the m unionized firms simultaneously sign wage and employment contracts. In the second stage, all firms see the contracts that were signed in the first stage and then simultaneously make their production decisions. For the m unionized firms, this involves choosing a capital and output level, while the k nonunionized firms must hire labor at the alternative wage, w_a, in addition to choosing production and capital levels. The analysis of the equilibrium can be simplified somewhat by specifying the two forms that the cost function can take. The nonunionized firms will produce output at a cost given by the "unrestricted" cost function

$$H^i(x_i, w_a) \equiv \min_{n_i \kappa_i} \{w_a n_i + r\kappa_i\} \qquad \text{s.t.} f^i(n_i, \kappa_i) = x_i,$$

where κ_i is firms i's capital choice, r is the exogenously given cost of capital, x_i is the firm's output decision, and $f^i(\cdot)$ is firm i's production function.[5] Since the m first movers fix their employment levels in the first stage, when these firms actually have to produce they must treat labor as a

[5] The analysis is not affected if κ and r are considered to be vectors of other factors of production and their prices. Hence, it is irrelevant whether the unions discussed in this and following sections are considered to be industrial unions that cover all of the workers in the industry or craft unions that only cover a subset of the workers.

fixed factor and therefore must produce given a "restricted" cost function defined as

$$C^i(x_i, n_i, w_i) \equiv \min_{\kappa_i}\{w_i n_i + r\kappa_i\} \qquad \text{s.t.} f^i(n_i, \kappa_i) = x_i.$$

The two cost functions, then, are related by the identity

$$H^i(x_i, w_i) \equiv C^i(x_i, \tilde{n}(x_i, w_i), w_i),$$

where $\tilde{n}(x_i, w_i)$ is the cost-minimizing labor factor demand associated with a given wage and output level. Let $R^i(x_i, y_i)$ be firm i's revenue function, and assume that

$$R^i(x_i, y_i) = p(X)x_i, \qquad \text{where } X = \sum_{i=1}^{m+k} x_i \quad \text{and} \quad y_i = X - x_i.$$

Assume that the union's utility function, $U^i(w_i n_i)$, is twice continuously differentiable with $U^i_{w_i} > 0$, $U^i_{n_i} \geq 0$, and negative second derivatives. Firms with unions will maximize profits subject to the constraint

$$U^i(w_i, n_i) = \overline{U}^i,$$

where $\overline{U}^i$ is a constant representing the minimum acceptable level of utility for the union.

Before continuing, a few other assumptions about the production function are needed to ensure the existence and uniqueness of the equilibrium. Let the production function be twice continuously differentiable with positive first partial derivatives and negative second partial derivatives. Furthermore, assume that $f_{\kappa n}$ is positive and that $f^i(n_i, 0), f^i(0, \kappa_i) = 0$. These assumptions are sufficient to demonstrate that the restricted cost function will have the properties:

(i) $\dfrac{\partial C^i}{\partial x_i} > 0$

(ii) $\dfrac{\partial C^i}{\partial n_i} < 0 \qquad \text{for } n_i < \tilde{n}(x_i, w_i)$

(ii′) $\dfrac{\partial C^i}{\partial n_i} > 0 \qquad \text{for } n_i > \tilde{n}(x_i, w_i)$

(iii) $\dfrac{\partial C^i}{\partial w_i} > 0$

(iv) $\dfrac{\partial^2 C^i}{\partial x_i \partial n_i} < 0$

(v) $\dfrac{\partial^2 C^i}{\partial x_i \partial w_i} = 0.$

Inequalities (ii) and (ii') ensure that there is a unique labor demand for every output and wage combination, while inequalities (iv) and (v) guarantee that increasing the amount of labor hired in the first stage will reduce the marginal cost of production, but changing the wage rate will not affect it.[6] In order to work with relatively well-behaved equilibria, assume that the following equations also hold in equilibrium:

$$0 > b_i \equiv R^i_{x_i y_i} > R^i_{x_i x_i} - C^i_{x_i x_i} \equiv a_i \qquad \text{for all } i. \tag{1}$$

[6] All of the propositions except for (iv) follow directly from the assumptions. The proof of (iv) is somewhat more involved. $f^i(n_i, \kappa_i) = x_i$ implies that we can write $\kappa_i = g^i(n_i, x_i)$. The restricted cost function then can be written as

$$C^i(x_i, n_i, w_i) = w_i n_i + r g^i(n_i, x_i).$$

This implies that

$$\frac{\partial^2 C^i}{\partial x_i \partial n_i} = r \frac{\partial^2 g^i}{\partial x_i \partial n_i}.$$

Since the signs of the cross terms must be the same, all we need to find is the sign of the implicit function of capital. Using the chain rule and some rearranging produces

$$\frac{\partial g^i}{\partial x_i} = 1/f^i_\kappa,$$

where f^i_κ is the first partial with respect to capital. Taking the partial with respect to n_i yields

$$r \frac{\partial^2 g^i}{\partial x_i \partial n_i} = \frac{-1}{(f^i_\kappa)^2}\left(\frac{\partial f^i}{\partial \kappa_i^2}\frac{d\kappa_i}{dn_i} + \frac{\partial^2 f^i}{\partial \kappa_i \partial n_i}\right) < 0,$$

since

$$\frac{d\kappa_i}{dn_i} = \frac{-f_n}{f_\kappa} \text{ and } \frac{\partial^2 f^i}{\partial \kappa_i \partial n_i} > 0.$$

Condition (1) is a "stability" condition. Basically it stipulates that a marginal increase in any given firm's output will reduce the marginal profitability of that firm more than a marginal increase in output by the other firms. Furthermore, we will assume that a_i is bounded away from zero and that there exists a ξ such that $p(X) > 0$ for $X \in [0, \xi)$ and $p(X) = 0$ for $X \in [\xi, \infty)$. This, in combination with the other assumptions, is sufficient to guarantee that a unique equilibrium in pure strategies exists (see Gaudet and Salant, 1991).

Using subgame perfection as our solution concept, we can now solve this game by first identifying the Nash equilibrium in the last stage and then using backward induction to solve the entire game. After all contracting is complete, unionized firms will have to maximize profits by solving the maximization problem

$$\max_{x_i}\{R^i(x_i, y_i) - C^i(x_i, n_i, w_i)\},$$

where n_i and w_i are determined by the contract with the union. Non-unionized firms will solve the maximization problem

$$\max_{x_i}\{R^i(x_i, y_i) - H^i(x_i, w_a)\}.$$

This implies that (2) must bind in equilibrium:

$$R^i_{x_i} - C^i_{x_i} = 0 \quad \text{for all } i = 1 \text{ to } m; R^j_{x_j} - H^j_{x_j} = 0 \quad \text{for all } j = m + 1 \text{ to } k. \tag{2}$$

In other words, all firms in the final stage will take the wage and employment contracts signed by the unionized firms as given and set marginal revenue equal to marginal cost.

Since each firm with an enterprise union must maximize profits subject to the union's utility level, the equations in (2) can help identify how a firm with an enterprise union will make its hiring decisions. Following Dixit (1986), we totally differentiate (2), yielding

$$(R^i_{x_i x_i} - C^i_{x_i x_i})\,dx_i + R^i_{x_i y_i} \sum_{j \neq i} dx_j - C^i_{x_i n_i}\,dn_i = 0.$$

Substituting in Eq. (1) yields

$$a_i dx_i + b_i \sum_{j \neq i} dx_j = C^i_{x_i n_i}\,dn_i \equiv \mu_i\,dn_i, \tag{3}$$

where $\mu_i < 0$.

Now we are ready to identify how contractual changes in hiring will affect the output of various firms. Simple substitutions reveal that

$$\frac{dx_i}{dn_i} = \frac{\mu_i}{(a_i - b_i)}\left(1 - \frac{b_i}{\Delta(a_i - b_i)}\right) \tag{4}$$

$$\frac{dx_j}{dn_i} = \frac{-b_j\mu_i}{(a_j - b_j)(a_i - b_i)}, \qquad \text{where } \Delta = 1 + \sum_{i=1}^{m+k} \frac{b_i}{(a_i - b_i)} > 1. \tag{5}$$

These equations imply that increases in employment by any given firm will tend to raise the output of that firm and lower the output of the other firms. In other words, if we were working in a two-firm model and one firm increased its commitment to hire labor in the first stage, that would shift its best response curve to the right.

To identify the first-order conditions, we first totally differentiate a unionized firm's profit function;

$$d\pi^i = (R^i_{x_i} - C^i_{x_i})dx_i + R^i_{x_j}\left(\sum_{j\neq i} dx_j\right) - C^i_{n_i}dn_i - C^i_{w_i}dw_i.$$

Dividing through by dn_i and noting that the first term must equal zero in equilibrium yields

$$\frac{d\pi^i}{dn_i} = R^i_{x_i}\left(\sum_{j\neq i}\frac{dx_j}{dn_i}\right) - C^i_{n_i} + C^i_{w_i}\frac{dw_i}{dn_i}.$$

In order to identify how the firm uses capital and labor, we need to know the sign of $C^i_{n_i}$. Since we know that in equilibrium the union must be indifferent between trade-offs between wages and employment we can write dw_i/dn_i as

$$\frac{dw_i}{dn_i} = -\frac{U^i_{n_i}}{U^i_{w_i}}.$$

Substituting this and Eq. (5) into the condition for optimizing with respect to labor inputs produces

$$\frac{d\pi^i}{dn_i} = R^i_{x_i}\left(\sum_{j\neq i}\frac{dx_j}{dn_i}\right) - C^i_{n_i} + C^i_{w_i}\frac{U^i_{n_i}}{U^i_{w_i}} = 0. \tag{6}$$

This last equation is quite significant for understanding how the presence of an enterprise union will affect a firm's hiring decision. Since the summation term and the last term must be positive, the only way that the firm can maximize its profits is by also making $C^i_{n_i}$ positive. The implication, therefore, is that the firm must hire more than the cost-minimizing level of labor given its output level.

When a firm signs a contract that guarantees employment to a certain number of workers, it effectively transforms its labor force from a marginal cost into a fixed cost and enables the firm to produce more output in equilibrium. Since the degree to which the best response curve shifts depends on how low the firm can drive its marginal cost curve, the firm will tend to use excessive amounts of labor as a means of increasing the productivity of the variable factor, capital. As the firm's capital to labor ratio falls, the marginal cost of additional output falls, and the firm can credibly threaten to produce more output in the production stage.[7]

By hiring "excessive" levels of labor, the firm increases its fixed costs but lowers its marginal costs in the production stage, thereby gaining an advantage over its competition. Thus, an outside observer would find unionized firms not producing efficiently and hiring more than the cost-minimizing amount of labor, but occupying a greater share of the market than one would expect given the firm's cost structure. Furthermore, Eqs. (4) and (5) suggest a basic reason for why enterprise unions have not been able to unify to a greater degree. Since increases in employment at any given firm help that union but hurt the other unions by reducing the total amount of available rents, the members of enterprise unions would tend to see their company's performance as more important to their welfare than the overall success of the labor movement.

Industrial Unions and Enterprise Unions Compared

How do the results of the enterprise union section compare with a similar model of an industrial union? In this section, a model is developed that describes the outcome of efficient bargaining between several firms

[7] It is reasonable to question why, if firms can gain from committing not to fire workers, firms do not simply bypass the union and make the committment independently. While this is certainly possible, the fact that the Japanese legal system makes it rather difficult to sue, probably makes the usage of enterprise unions attractive as a means of enforcing agreements between labor and management. Furthermore, because the results of labor negotiations in large firms are widely publicized, these negotiations can be used as a mechanism to inform other firms of their commitments. Similarly, since a commitment not to fire workers by a small firm would most likely go unnoticed, the advantages for small producers of using this strategy are reduced.

in an industry and an industrial union. Once again, we assume the same timing of the game. In the first stage, the firms and union sign wage and employment contracts and in the second stage production decisions are made. Assume that the firms and the union will not sign a contract that gives any firm a cost advantage through lower wages or through giving firms differential access to employment (i.e., $w_i = w$ and $n_i = n$ for all i). Similarly, assume that each firm in the industry has the same cost function.[8] With m firms in the industry, the set of equations describing the equilibrium can be written in matrix form as

$$\begin{pmatrix} a_1 & b_1 & \cdots & b_1 \\ b_2 & a_2 & \cdots & b_2 \\ \vdots & \vdots & & \vdots \\ b_m & \cdots & b_m & a_m \end{pmatrix} \begin{pmatrix} dx_1 \\ dx_2 \\ \vdots \\ dx_m \end{pmatrix} = \begin{pmatrix} \mu_1 dn \\ \vdots \\ \mu_m dn \end{pmatrix}$$

Since the Gaudet–Salant conditions hold and the cost functions are the same, the equilibrium must be symmetric and unique and we can drop the subscripts. In this case Eqs. (4) and (5) can be written as

$$\frac{dx}{dn} = \frac{\mu}{a + (m - 1)b} > 0.$$

This last equation simply indicates that as the union supplies more labor to each firm in the industry, each firm's output rises. Similarly, Eq. (6) now becomes

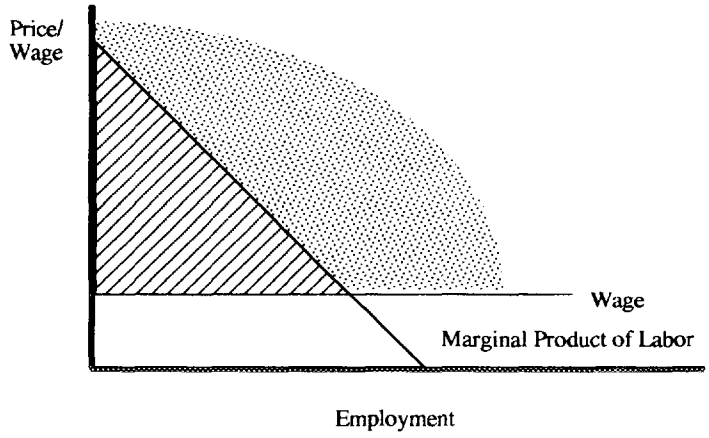
$$\frac{d\pi^i}{dn} = (m - 1)R^i_{y_i}\frac{dx}{dn} - C_n + C_w[U_n/U_w] = 0 \tag{7}$$

or

$$\frac{U_n}{U_w} = \frac{C_n}{C_w} - (m - 1)\frac{R^i_{y_i}}{C^i_{w_i}}\frac{dx}{dn}. \tag{7'}$$

In the case in which $m = 1$, this equation simply restates the familiar efficient bargaining condition relating the marginal rates of substitution between the firm's various inputs and the union's objective function. Note

[8] To understand how various cost functions can affect firm bargaining in an industry with several firms, see Williamson (1968).



that if there are two or more firms in the industry, however, the first term in Eq. (7) becomes negative and the sign of C_n ceases to be determinate; its sign depends on the relative magnitude of the first and third terms. While efficient bargaining in the familiar monopoly union case implies that the firm will use more than the cost-minimizing level of labor at the union wage, if there are more firms in the equilibrium, this result ceases to hold.

The reason why firms that bargain efficiently with an industrial union might hire less than the cost-minimizing number of workers stems from the ability of the union to effectively cartelize the industry by restricting the available work force. If the number of workers that each firm can hire is limited, however, then these firms will tend to compete by using more capital-intensive production technologies. Since raising the supply of workers to the industry tends to lower firm profits because it causes industry output to rise, the union will try to restrict the supply of workers to each firm in order to extract rents through the wage bill. Depending on the size of this effect, it is possible that the firms in the industry may end up producing with a higher capital to labor ratio than that which would arise if the firms were simply competing without a union.

Figure 1 demonstrates how contracts between an industrial union and a single firm will differ from those between an industrial union and several firms. Any contract that lies along the marginal product of labor curve (the labor demand curve) will have the feature that $C_n = 0$. In other words, these contracts share the feature that the marginal product of labor equals the wage. In traditional Pareto optimal bargaining models, there

is only one firm in the industry, and the contract between the firm and the union will lie somewhere in the dotted region. With more firms in the equilibrium and Pareto optimal bargaining over wages and employment, firms will try to compete by using capital-intensive production processes since their hiring decisions are constrained by the union. In order to prevent the erosion of available rents through competition, the union has an incentive to restrict employment, and if this effect is large enough, then the firm and the union will sign contracts to the left of the labor demand curve.

Unions and Profits

One of the results of traditional Pareto optimal bargaining models of unions is that the firm would be better off without a union than with a union. That conclusion is not necessarily true for efficient contracting in a world with several firms. Since an industrial union is likely to reduce the output of all the firms in the sector, it is possible to show that industry profits may actually rise due to the cartelization power of the union. For example, if the production technology only involves labor inputs and the contract sets the wage equal to the alternative wage, it is easy to construct examples where the output level of the industry maximizes joint profits. This sort of contract is not stable in the sense that given the contractual hires of the other firms in the equilibrium, any unionized firm would earn higher profits by not abiding by the contract if the other firms followed the contract. As this section demonstrates, the incentive to break contracts, which characterizes agreements with industrial unions, does not necessarily characterize agreements with enterprise unions. Rather, the ability of the enterprise union to force the firm to commit to hiring workers can enable the firm to commit to a given output level and thereby raise its profitability while at the same time raising the welfare of the workers.

To begin the analysis, consider a version of the game in which in the first stage each firm simultaneously chooses whether to have an enterprise union and contract for labor or not to have an enterprise union and wait until the second stage to hire inputs. If the firm decides to have an enterprise union then the firm will hire $n_i^1 > 0$ workers in the first stage and pay each worker $w_i \geq w_a$. If the firm opts not to have a union, then it sets n_i^1 equal to zero. In the second stage, all first-stage decisions become common knowledge and then unionized firms pick κ_i and x_i levels such that their production functions are satisfied, and similarly nonunionized firms pick n_i^2, κ_i, and x_i levels.

If we denote the vector of second-stage output decisions of the other firms by $x^{-i}(n_i^1, n_{-i}^1)$, firm i's profits can then be written as

$$\pi^i(w_i, n_i^1, n_i^2; x^{\sim i}(n_i^1, n_{\sim i}^1)).$$

Furthermore, if firms that hire in the first stage do not hire in the second stage, then for any firm either n_i^1 or n_i^2 must equal zero. Let $n_a(n_i^1)$ be firm i's optimal second stage hire if it does not commit to hire any workers in the first stage. Now that the structure of the game has been laid out, it is straightforward to prove the following:

PROPOSITION 1. *In the enterprise union case, for each firm and union i, there exists at least one efficient contract (w_e, n_e^1) such that both the firm and the union benefit from unionization; i.e.,*

$$\pi^i(w_e, n_e^1, 0; x^{\sim i}(n_e^1, n_{\sim i}^1)) > \pi^i(w_a, 0, n_a(n_{\sim i}^1); x^{\sim i}(0, n_{\sim i}^1))$$

and

$$U^i(w_e, n_e) > U^i(w_a, n_a(n_{\sim i}^1))).$$

Proof. In order to simplify the notation, for a given vector $n_{\sim i}^1$, let $n_a(n_{\sim i}^1) = n_a$. By construction,

$$\pi^i(w_a, n_a, 0; x^{\sim i}(n_a, n_{\sim i}^1)) = \pi^i(w_a, 0, n_a; x^{\sim i}(0, n_{\sim i}^1)).$$

Since n_a is the cost-minimizing hiring level, if firm i hires n_a workers in the first stage then $C_{n_i}^i = 0$. But in any contracting equilibrium, $C_{n_i}^i > 0$. Therefore it cannot be an equilibrium for a first-stage firm to hire n_a workers. If we denote the optimal first-stage hiring level as n_c^1, then

$$\pi^i(w_a, n_c^1, 0); x^{\sim i}(n_c^1, n_{\sim i}^1)) > \pi^i(w_a, 0, n_a; x^{\sim i}(0, n_{\sim i}^1)).$$

Since profits are continuous and decreasing in w_i and the inequality is strict, there must exist a $w_c > w_a$ such that

$$\pi^i(w_c, n_c^1, 0); x^{\sim i}(n_c^1, n_{\sim i}^1)) > \pi^i(w_a, 0, n_a; x^{\sim i}(0, n_{\sim i}^1)).$$

Profit maximization requires that the second derivative of the profit function with respect to hiring must be negative, but this also means that $n_c^1 > n_a$ and that union utility must also be higher than what it would be if the firm did not sign the contract. This contract is not necessarily efficient. Hence, there must exist an efficient contract (w_e, n_e^1) that generates at least as high a payoff for both players. ■

This proposition suggests a reason for why unionism in Japan seems to

be more successful and less acrimonious than that in many other countries. With enterprise unionism, there will always exist a contract between a firm and an enterprise union that will not only raise the profits of the firm but also will raise the wages of the employees. In other words, it can be an equilibrium for firms to unilaterally choose to have enterprise unions if the firm believes that the union will not demand too much. Efficient contracting in the enterprise union case can have very different implications than that in the monopoly union model of McDonald and Solow. In the latter model, wage and employment contracts are efficient relative to simple wage contracts but are not efficient in the sense that the firm is worse off relative to not signing a contract at all. In the enterprise union case, both the workers and the firm should recognize that they are not playing a zero sum game and that their interests are complementary to some degree.[9]

This difference is not due to the fact that in the classic efficient bargaining model there is only one firm and one union, but in the enterprise union case there are many firms. Even in the industrial union case with many firms, firms will have the incentive to break contracts with their unions. To see this, suppose that in the first stage the union offers the firms an efficient contract (w_e, n_e) with $w_e \geq w_a$, and the firms simultaneously chose whether or not to adopt it. Assume that those firms that choose not to adopt the contract are allowed to hire as much labor as they want at the alternative wage and to produce in the second stage. It is straightforward to show that there are no contracts that would be chosen by all firms which would raise their profitability. First note that any contract covering all firms that raises the profitability of the firms relative to a no-contract world must involve a contraction in output and therefore less hiring than if all firms hired and produced in the second stage. However, if $m - 1$ firms all agree to contract for fewer workers and therefore produce less output, the m^{th} firm is going to be better off by hiring more workers and therefore producing more than the unionized firms. Hence, firms will always have incentives to break contracts with industrial unions.

Furthermore, this result also implies that bargaining over employment and wages in industries with competing firms is likely to be more complex than bargaining in the enterprise union case. If a union local has an objective function similar to that of an enterprise union, then the fact that Eq. (6) differs from Eq. (7) implies that an optimal contract for an industrial union would not be an optimal contract for a local. In other words, the industrial union leadership would not be able to trust the leadership of any local in any bargaining decision. This suggests a theoretical justification for why U.S. unions and firms seem to place more emphasis on wage bar-

[9] See Aoki (1984) for a more detailed treatment of this notion.

gaining than on employment negotiations. Since wage-employment contracts that are efficient for the union and firms will not be efficient for the firms and locals, a union would find it virtually impossible to negotiate an efficient contract that would please all of its constituents.

It is important to realize, however, that our proposition does not say anything about whether enterprise unions or more traditional unions would be better for either firms or workers. A contract with an industrial union that significantly raised the wage level might very well raise the wage level sufficiently high so that workers would be better off (but firms worse off) signing that contract than an enterprise union contract that raised the welfare of both participants. The importance of our proposition is that it indicates that firms with enterprise unions have an option available to them that is absent in the traditional industrial union case. An enterprise union and a firm will always be able to sign efficient contracts that make both parties better off relative to not signing the contract, but there does not exist an efficient industrial union contract that would be chosen by all firms and would raise the profits of all firms.

Conclusion

The analysis of this paper suggests that the united front of workers and managers in large Japanese firms, which has often been described by observers of the Japanese labor market, may be more the result of traditional optimizing behavior than of a weak Japanese labor movement. The model demonstrates that if workers form an enterprise union that fights for job security and does not raise the wage too much, then both the workers and the firm can be made better off than if the firm had no union. Pareto optimal contracts in the case of Japanese enterprise unions, then, take on a very different meaning from the Pareto optimal contracts that can be adopted by industrial unions. Unlike in the industrial union case, where union–firm contracts are not Pareto comparable to a no-contract world, in the enterprise union case the union and firm can sign contracts that improve the welfare of both parties.

The willingness of Japanese unions to prevent layoffs can give Japanese firms a tremendous strategic advantage over other firms that have more flexible employment policies. By providing the firm with a credible threat of market domination even in the face of higher per unit costs, the enterprise union makes the firm more profitable. Thus, the sense of unity between workers and employers in Japan may, to a large extent, reflect an understanding of the relationship between the union's insistence on no layoffs and the firm's enhanced profitability. In contrast, the fact that an industrial union cannot sign a contract that is both efficient for all the

workers in the industry as a whole as well as for each of the firms, suggests that this type of labor relation will tend to be degenerate.

There are several important caveats, however, to remember in assessing the conclusions of this analysis. First, the mere existence of a contract that improves the welfare of both the firm and the union does not imply that enterprise unionism is inherently superior to industrial unionism. If there is no movement toward enterprise unionism in the West, it may be because either firms or industrial unions feel that they are unilaterally better off by negotiating within that framework than by negotiating within the enterprise union framework. An industrial union that forces a firm to accept a high wage, knowing full well that this will mean a smaller labor force, may be strictly better off signing that contract than signing a contract that makes both the firm and the union better off relative to no contract at all.

Second, one should also bear in mind that the argument made in the paper is one of extent. "Permanent employment" does not exist in large Japanese firms, but workers in these firms do have significantly longer job tenure rates than workers in U.S. firms of comparable size, and the presence of enterprise unions may contribute to this tendency. Since 56% of U.S. workers in firms employing over 1000 people are covered by single-employer contracts (Koike, 1988, p. 236), it is quite possible that some of these U.S. single-employer contracts share features with enterprise union contracts in Japan, thereby contributing to higher tenure rates in large versus small firms in the United States as well. Still, with enterprise unions negotiating an even larger share of contracts in Japan, there still exists a theoretical justification for a differential in job tenure rates between large firms in the United States and in Japan. This difference in labor–management organization may help explain why firms in Japan seem to operate under a system of "Japanese-style management," which seems to violate the cost-minimizing dictums of Western management practices, but still aggressively carves out new markets.

Finally, it seems reasonable to conclude that as foreign trade gradually reduces the share of workers controlled by U.S. industrial unions, they will increasingly place more emphasis on job security and behave more similarly to enterprise unions. Since the decision of whether to try to use job security strategically against other firms depends on whether the union can control the workers in the industry, as this ability drops in the face of international competition, U.S. unions may begin to behave more like enterprise unions. Hence it may be possible that U.S. labor will begin to emulate Japanese labor practices not because they are intrinsically superior, but rather because conditions in the U.S. economy have become closer to those present in Japan.

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