

Labor Unions and International Market Share Rivalry: Does Corporatism Matter?

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Abstract

This paper studies the effects of corporatism on national welfare and optimal trade policy under monopoly unionism and efficient contracting. The results are remarkably different for the two models considered. Under free trade, corporatism is welfare augmenting in the monopoly union case while it has no effect on welfare in the efficient contract case. The optimal subsidy is increasing in the degree of corporatism under efficient contracting and independent of the degree of corporatism in the monopoly union case. (JEL: F13, J50)

I. Introduction

The literature on corporatism¹ has for long recognized that a greater degree of centralization in the wage bargaining process generates superior

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macroeconomic performance (see Mancur Olson [1982], Calmfors & Driffill [1988], among others, for a discussion of these issues). Increased international competition due to recent trends of economic integration and trade liberalization has focused attention on the relationship between structures of labor unions and trade policy. The relationship between centralization of wage bargaining and trade policy under imperfect competition has been addressed in the works of Driffill & van der Ploeg [1993a], Rama [1993] and Bandyopadhyay & Bandyopadhyay [1995], (henceforth referred to as B&B). While Driffill & van der Ploeg [1993a] and Rama [1993] focus on models with product differentiation and free entry B&B use a monopoly union framework to analyze the impact of corporatism on optimal trade policy in the context of international market share rivalry.² However, the monopoly union equilibrium is well known to be Pareto inefficient. For Pareto efficiency (in a static world) unions and firms need to negotiate efficient contracts with simultaneous bargaining over wage and employment. In spite of a large volume of theoretical and empirical research, labor economists are far from a consensus on whether the efficient contract model or the monopoly union model is a better description of union behavior.³ Therefore, in this paper, we focus on the differences in implications for strategic trade policy arising out of differences in the assumptions regarding how

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1. Economists have defined "corporatism" in various ways (see Calmfors & Driffill [1988]). In this paper we focus only on two aspects of corporatism – centralization of wage bargaining and the internalization of externalities arising from wage negotiations. For our purpose, Rowthorn's [1991] interpretation is most appropriate by: "*A crucial aspect of the corporatist economies is that wage bargaining is dominated by a small number of powerful agents. Because of their individual power and small number, such agents have an incentive to behave 'strategically', taking explicit account of how their action will affect others and what the resulting feedback to themselves will be.*"
 2. Brander & Spencer [1988] and Mezzetti & Dinopoulos [1991] look at the impact of labor market distortions on strategic trade policy. However, they do not focus on the differences in the wage bargaining structures characterizing different labor unions. Driffill & van der Ploeg [1993b] look at the effect of corporatism on trade policy under perfectly competitive product markets. Rama [1994] analyzes wage and welfare implications of centralized wage bargaining in the absence of government intervention.
 3. See Oswald [1985] for a survey of these issues. Brown & Ashenfelter [1986], MaCurdy & Pencavel [1986] are among the first few papers in a long line of empirical work devoted to resolving this debate.

unions negotiate wage and employment with firms. We first present a simplified version of the B&B model and outline some of the major conclusions that may be drawn from the model. Then an efficient contract model is used to analyze the impact of corporatism on strategic export policy. We outline the differences in the results between the two models of union behavior.

The results of our paper emphasize that the impact of corporatism on labor market distortions and optimal trade policy is crucially dependent on the precise nature of the wage bargaining process. On the other hand, while studying the relationship between centralized wage bargaining and distortionary labor taxation, Summers, Gruber & Vergara [1993] and Alesina & Perotti [1994] find that their results are insensitive to the choice of the particular model of union behavior.

The rest of the paper is organized in three sections. Section II presents a simplified version of the B&B [1995] monopoly union model. Section III presents the efficient contract model. Section IV concludes.

II. The Monopoly Union Model

This section provides a simplified version of the B&B [1995] model and presents its central results and derives some new results. In section III these results are compared to those that obtain under efficient contracting. Two firms (domestic and foreign) are engaged in duopolistic competition in a third country's market. We assume that there is no domestic consumption of the export good. The firms employ the Nash-Cournot assumption regarding their rival's output level. We assume that the labor supply to the domestic firm is controlled by a centralized union. The foreign labor market is assumed to be competitive.⁴ The foreign government is assumed to be passive. We present a three stage model. The government chooses the subsidy in the first stage. The monopoly union chooses the wage in the second stage. Finally, in the third stage of the game, the domestic and the foreign firm maximize profits. We describe below the utility function of the centralized union.

4. B&B derive their results in a more general setting, allowing for parallel wage determination in two unionized firms. Our assumption allows considerable expositional simplicity for the results that are relevant in our context.

A. The Union's Objective Function

In this paper we use the union objective function developed by B&B [1995]. They extend the traditional "utilitarian" union objective function by introducing an index, g , to capture the idea of corporatism.⁵ The index g is allowed to vary between zero (for completely decentralized unions) and one (for completely centralized unions). The idea is that the more encompassing the union the greater is the chance that a dollar of profits generated in the industry in question will go as profit income to one of its members somewhere in the nation. Hence centralized unions will take into account the effect of wages on industry profits, although workers in this industry may not be holding any equities in the industry at all. Similarly, the more encompassing the union the greater is the chance that a dollar in taxes will have to be paid by a union member somewhere in the nation. Hence centralized unions will consider this fact when negotiating wages. Completely decentralized unions ($g = 0$), on the other hand, totally lack perception of these linkages. Therefore they simply maximize the traditional "utilitarian" objective of a weighted average of wage and employment. Assuming that other industries are perfectly competitive earning zero profits, the objective function, V , of the union is:⁶

$$V = wL + (M - L)b + g(\pi - \sum t^i), \quad 0 < g < 1, \quad (1)$$

where w is the wage rate; L denotes the labor supply by the union to this firm; g is an index of the degree of corporatism; M is the union membership in this firm; b denotes the opportunity value of leisure; π is firm profits; and

5. Summers *et al.* [1993], use a similar index but their precise model is different from the one in B&B [1995].

6. Note the following assumptions underlying the derivation of equation (1). Let π^i and t^i be the profit income earned and the tax paid by individual i , respectively. The assumption of perfect competition in all other sectors implies that $\sum \pi^i = \pi$, where the summation is over all individuals in the economy. Hence our utility function is a simplified version of:

$$V = wL + (M - L)b + g(\sum \pi^i - \sum t^i)$$

Notice that equation (1) also assumes that profit incomes and the tax burden are equally distributed across all individuals in the economy.

t^i are taxes paid by individual i . Output of the domestic firm is q and an export subsidy of s per unit of output is financed through lump sum taxation. Hence the government budget constraint dictates:

$$\sum t^i = sq. \quad (2)$$

Therefore the union's objective function becomes:

$$V = wL + (M - L)b + g(\pi - sq). \quad (3)$$

This objective function has been derived by B&B under several simplifying assumptions. The results of this paper can be sensitive to some of these assumptions. For instance, if profits of the industry are not uniformly distributed (in contrast to B&B's assumption) whereas taxes are, then the centralized union will attach different weights to profit and the tax burden. This will of course change the central results in our paper as well as the B&B paper. Also, often union utility functions do not conform to the utilitarian specification used above. Unions may exhibit a Stone-Geary type of preference with either employment or wage orientation. However, in that case, equation (3) cannot be derived from the micro-foundations. Also, as an anonymous referee argues, it is important to define precisely the role of different functional groups in such a model. For instance, who are the profit maximizers, or, in the efficient contract case who does the union bargain with? In section III we discuss how our results may depend on the role of the different functional groups. These are valid concerns with such modeling. The referee also points out many of these concerns are general concerns about this literature and are not limited to this paper. For instance, increasing encompassment is generally viewed as distortion reducing in this literature. As the referee writes, this ignores "agency and incentive problems which might serve to limit the optimal size of functional groups". In spite of such limitations, there is a consensus in the literature that encompassment matters. Our work is an attempt to use a model based on micro-foundations that is suitable for analyzing issues that arise in the context of strategic trade policy. Clearly, better and more robust models need to be devised to adequately handle these issues. But till such models become available, we have to resort to the existing ones, with their limitations.

B. Firm Behavior

This subsection describes the behavior of the domestic and the foreign firm.⁷ Let the production function in the two nations be:⁸

$$q = L \text{ and } q^* = L^*. \quad (4)$$

Hence, the inverse demand function for the good in question is:

$$P = P(L + L^*). \quad (5)$$

The profit of the two firms are:

$$\pi = \{P(L + L^*) - w + s\}L, \quad (6)$$

$$\pi^* = \{P(L + L^*) - b\}L^*. \quad (7)$$

For simplicity we assume that the opportunity value of leisure, b , is the same in the home and the foreign nation. Employing the Nash assumption, the first order conditions of profit maximization for the two firms are:

$$\pi_L = P(\cdot) - w + s + LP'(\cdot) = 0, \quad (8)$$

$$\pi_{L^*}^* = P(\cdot) - b + L^*P'(\cdot) = 0. \quad (9)$$

Equation (8) implicitly defines the domestic firm's Nash reaction function as:

$$L = L(L^*, w, s), \quad dL/dL^* = - [\pi_{LL^*}^*/\pi_{LL}]. \quad (10)$$

Analogously, equation (9) defines the foreign firm's Nash reaction function as:⁹

$$L^* = L^*(L), \quad dL^*/dL = - [\pi_{L^*L}^*/\pi_{L^*L^*}^*]. \quad (11)$$

We make the standard assumptions that the Nash-Cournot reaction func-

7. All foreign variables and parameters are denoted by a “*”.

8. Like Brander and Spencer [1988], Mezzetti and Dinopolous [1991] and B&B [1995] we make the linearity assumption about the production function. B&B note that their central results are not sensitive to this choice. Our results are also not sensitive to this choice (proof available from the authors on request).

9. Note that we are suppressing the parameter b from all implicit function representation of variables, for notational simplicity.

tions are downward sloping and that the Nash-Cournot equilibrium is stable. Therefore, using the second order conditions of profit maximization, we have:

$$\pi_{LL} < 0 \text{ and } \pi_{L^*L} < 0 \text{ and } D = \pi_{LL} \pi_{L^*L^*} - \pi_{L^*L} \pi_{LL^*} > 0. \quad (12)$$

Simultaneous solutions of equations (10) and (11) generate the labor demand functions of the domestic and the foreign firm. They are:

$$L = L(w, s), \quad (13)$$

$$L^* = L^*(w, s). \quad (14)$$

C. Union Behavior

Noting that the domestic union plays leadership vis-a-vis both the domestic and the foreign firm, we have the following first order condition for utility maximization by the domestic union:

$$V_w(w, g, s) = (w - b - sg)L_w + L(1 - g + gP'L_w^*) = 0, \quad (15)$$

$$w = b - L/L_w + g\{s - (L/L_w)(P'L_w^* - 1)\}. \quad (16)$$

The term $[-L/L_w]$ denotes the standard monopoly union wage premium. The third term $[g\{s - (L/L_w)(P'L_w^* - 1)\}]$ represents the effect of corporatism on wage setting. Notice that for $g > 0$, the sign of the third term determines whether the centralized union wage equals, exceeds or is less than the decentralized union wage, irrespective of the degree of corporatism. A completely decentralized union ($g=0$) equates its marginal rate of substitution with the slope of the labor demand curve.

The relationship between the wage and employment levels and the degree of corporatism is outlined below (for given subsidy levels). Using equation (15) and the union's second order condition of utility maximization we know that:

$$dw/dg \geq 0 \text{ as } V_{wg} = -L_w[s - \hat{s}] \geq 0 \text{ as } s \geq \hat{s}, \quad (17)$$

where $\hat{s} = (L/L_w)(P'L_w^* - 1) > 0$. Notice that when $s = \hat{s}$, decentralized unions ($g = 0$) and centralized unions ($g > 0$) set the decentralized wage. Also under

free trade ($s = 0$) we get the conventional result that a higher degree of centralization reduces the wage rate. For an exogenously given subsidy rate s and a downward sloping labor demand curve, the above result immediately implies that:

$$dL/dg \underset{\leq}{\geq} 0 \text{ as } s \underset{\geq}{\leq} \hat{s}. \quad (18)$$

D. The Welfare Effect

Assuming the good in question to be a pure export good, the relevant welfare index is the rent earned by the nation from its export good:

$$W = (P - b)L. \quad (19)$$

Therefore:

$$dW = \{P - b + LP'(1 + dL^*/dL)\}dL. \quad (20)$$

Substituting equation (8) in equation (20) we have:

$$dW/dg = -(dL/dg)[s - \{w - b + LP'(dL^*/dL)\}]. \quad (21)$$

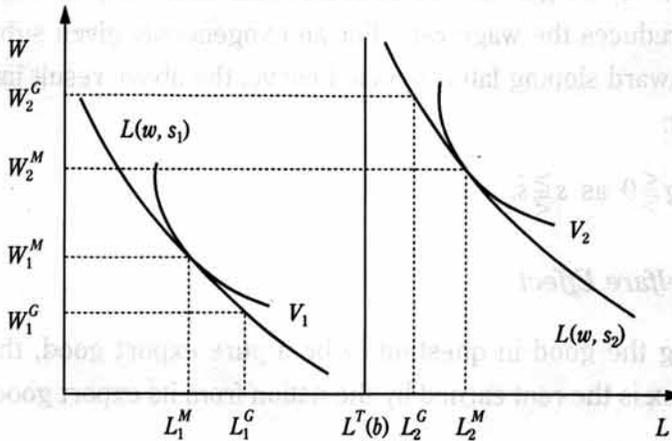
Using equation (16) and the definition of \hat{s} we have:

$$dW/dg = -(dL/dg)(1 - g)(s - \hat{s}). \quad (22)$$

Proposition 1: *Higher degrees of corporatism always lead to higher welfare if the government does not impose an optimal subsidy.*

Proof: Substituting equation (18) in equation (22) yields $dW/dg > 0$ for all $s \neq \hat{s}$. ■

The intuition behind this result is explained by means of Figure 1. $L^T(b)$ is the welfare maximizing employment level under the optimal subsidy \hat{s} (it will be shown later that \hat{s} is indeed the optimal subsidy under the monopoly union model). When the government subsidizes too much ($s_2 > \hat{s}$), the centralized union raises the wage rate (from the decentralized wage W_2^M to the centralized wage W_2^G) to effectively tax the firm and lead it towards the welfare maximizing outcome (note that L_2^G is closer to $L^T(b)$ than L_2^M). If the government fails to subsidize enough ($s_1 < \hat{s}$) the result is analogously a cut in wages (from W_1^M to W_1^G) and an increase in employment (L_1^G is closer to



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|--|------------------------------------|--|
| $L^T(b)$: Welfare maximizing employment Level | $s_1 < \hat{s}$
$s_2 > \hat{s}$ | |
| W_i^M : Decentralized Monopoly Union wage corresponding to subsidy s_i | | $L(w, s_i)$: Labor demand curve for subsidy s_i |
| W_i^G : Centralized Monopoly Union wage corresponding to subsidy s_i | | V_i : Utility level of the decentralized Monopoly Union corresponding to subsidy s_i |
| L_i^M : Decentralized Monopoly Union employment corresponding to subsidy s_i | | V_2 : Utility level of the decentralized Monopoly Union corresponding to subsidy s_2 |
| L_i^G : Centralized Monopoly Union employment corresponding to subsidy s_i | | |

The Effect of Centralization on Welfare for a Monopoly Union

Figure 1

$L^T(b)$ than L_1^M). Hence, in any event the centralized union takes the employment closer to the target level. Therefore welfare rises with the degree of centralization.

The optimal subsidy formula can be derived by using equation (20). As in B&B and Brander and Spencer [1988] the optimal subsidy rate is:

$$s = (w - b) + LP'(dL^*/dL). \tag{23}$$

When this subsidy is in place, B&B has shown that corporatism has no effect on the level of the optimal subsidy, wage rate and the employment level. We see above (proposition 1) that a centralized union adjusts its wage rate to compensate for a sub-optimal subsidy. Thus when an optimal subsidy

is in place, there is no incentive to change the wage rate.

III. The Efficient Contract Model

In this section we assume that the domestic government chooses the subsidy in the first stage. In the second stage the domestic union and the domestic firm negotiate an efficient contract employing the Nash assumption regarding the foreign firm's output level. Similarly, the foreign firm moves in the second stage and employs the Nash assumption regarding the domestic firm's output level.

A. The Efficient Contract

Under the efficient contract both w and L are chosen simultaneously so as to maximize the union's objective function for a given level of firm profits. This yields the efficient contract:¹⁰

$$P(\cdot) + LP'(\cdot) + s(1 - g) = b. \quad (24)$$

Equation (24) equates the marginal gains from employing an additional unit of labor ($P + LP' + s$) to its marginal cost ($b + sg$). A union will internalize only g proportion of the tax that has to be raised to pay for the unit subsidy.

10. As pointed out by an anonymous referee, note that if the union bargains with all non-members in the economy (fraction $(1-g)$ of the population) then the efficient contract curve is independent of g . This is because the non-members will also take into account the tax burden due to subsidization along with their share of profits. A rationale for our assumptions is as follows. Assume that there exists an $N+1$ th. individual whose income is $\gamma\pi$, $\gamma > 0$, with whom the union bargains. Assume that this individual does not supply any labor. If N is large the tax burden of this individual ($1/(N+1)$) will be negligible. In the efficient contract case, the union bargains with this individual to maximize utility subject to a given payoff for this person. The same efficient contract curve obtains as in equation-24 above. This is under the assumption that γ is of a higher order than $(1/N+1)$. Otherwise, the tax burden in the $N+1$ th. person's optimization decision may not be neglected. The monopoly union model goes through if we assume that γ is sufficiently small. Intuitively, it is plausible that the firm is run by a manager who has a proportional claim on gross profits. The manager's income is affected by the tax burden, but in a large economy this effect is small enough to be ignored. Hence the manager seeks to maximize $\gamma\pi$.

Hence the cost of using an additional unit of labor for the union is $(b + sg)$. The efficient contract is independent of the wage rate generating a vertical contract curve (in wage-employment space). The wage rate itself is chosen through bargaining between the union and the firm, and has no real effect on the economy. Equation (24) implicitly defines the domestic employment as:

$$L = L(L^*, s, g). \quad (25)$$

Equation (25) is the domestic firm's Nash-Cournot reaction function in employment space (given s and g). A higher subsidy shifts the efficient contract to the right, thus increasing domestic employment. The efficient contract shifts to the left with increased centralization for all positive subsidy levels. With subsidies in place a more centralized union is more aware of the burden of taxes to finance the subsidy. Hence, they reduce employment.¹¹ For a given subsidy level and a given degree of corporatism equations (11) and (25) determine the Nash equilibrium in employment levels.

B. The Welfare Effect

Using equation (20) we have:

$$dW/dg = \{P - b + LP'(1 + dL^*/dL)\}(dL/dg). \quad (26)$$

Using equations (11), (24) and (25) and invoking the stability condition of the Nash-Cournot equilibrium we can show that dL/dg is negative for all positive subsidy levels. Using equation (24):

$$dW/dg = -(dL/dg)(1-g)(s - \bar{s}); \quad \bar{s} = (dL^*/dL)LP'/(1-g) \quad (27)$$

Equation (24) implies that under free trade the efficient contract is independent of the degree of corporatism. Usually higher degrees of corporatism are associated with greater efficiency and welfare. This indeed was

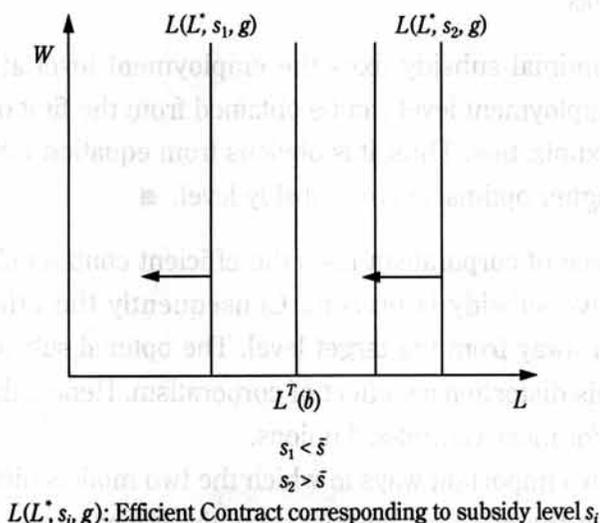
11. In a different context, Summers *et al.* [1993] find that higher g tends to reduce the leftward shift of the contract curve that occurs from higher income taxes. This is because more encompassing unions internalize the benefits of taxes. In our context encompassing unions internalize the tax burden and hence the efficient contract shifts in the opposite direction.

the case in the monopoly union model. Under efficient contracting the union internalizes the effect of its decisions on profits. Therefore greater encompassment leads only to a greater perception of the tax burden. Consequently, corporatism has no real effects under free trade, where the tax burden is zero. The employment and welfare results for an exogenously fixed export subsidy are given below.

Proposition 2: *If an exogenously determined export subsidy is in place, employment falls with increased centralization. However, national welfare may rise or fall depending on the level of the subsidy that is in place.*

Proof: We argued above that a rise in the degree of corporatism lowers the domestic employment level. Equation (27) implies that national welfare rises with the degree of corporatism if the subsidy rate exceeds a critical level \bar{s} . If instead the subsidy rate is below the critical level, national welfare falls. ■

Look at Figure 2. $L^T(b)$ corresponds to subsidy level \bar{s} (which will later be shown to be equal to the optimal subsidy under an efficient contract). For $s_2 > \bar{s}$ the actual employment level exceeds the leadership employment level,



Effect of Centralization on Welfare under Efficient Contracting

Figure 2

$L^T(b)$. Increased corporatism lowers employment and moves it closer to the leadership level, thus augmenting national welfare. However for $s_1 < \bar{s}$, the actual employment level is less than $L^T(b)$. With increased centralization employment falls further, reducing national welfare. Hence, the effect of corporatism on national welfare is critically dependent on the existing level of government intervention. This result contrasts the corresponding welfare result for the monopoly union case. Using equations (20) and (24), the first order condition of welfare maximization yields the optimal subsidy rate as:

$$s = LP'(dL^*/dL)/(1-g) = \bar{s}. \quad (28)$$

The optimal subsidy helps the domestic union and the firm to choose their efficient contract in such a way that the home firm plays leadership vis-a-vis the foreign firm. Notice that unlike Brander & Spencer [1988] and B&B [1995], the optimal subsidy does not have to correct for any domestic labor market distortion due to non-competitive wage setting. This is achieved because the efficient contract is independent of the wage rate and a decentralized union obtains the competitive labor market employment.

Proposition 3: *The optimal subsidy rate increases with the degree of centralization of unions.*

Proof: The optimal subsidy fixes the employment level at a target level $L^T(b)$. This employment level can be obtained from the first order condition of welfare maximization. Thus, it is obvious from equation (28) that a rise in g leads to a higher optimal export subsidy level. ■

As the degree of corporatism rises the efficient contract shifts to the left when a positive subsidy is present. Consequently the efficient contract moves further away from the target level. The optimal subsidy has to compensate for this distortionary effect of corporatism. Hence, the optimal subsidy is larger for more centralized unions.

There are two important ways in which the two models differ. The first of these is that in the efficient contract case, the effect of union demands on profits are internalized by the union (centralized or decentralized). Thus corporatism does not add anything on this count. This explains why under free trade the efficient contract is independent of the degree of corporatism.

In contrast, under monopoly unionism, decentralized unions do not care about profit levels but centralized unions do. Thus even under free trade corporatism has real effects. The second major difference is the sequence of moves in the two models. In the monopoly union model the union moves at an earlier stage than the firm. Thus the union plays leadership with respect to the firm, and is able to confer a competitive advantage to the domestic firm by changing its wage rate. This explains proposition 1. In contrast, in the efficient contract case the union and the firm negotiate wage and employment simultaneously. The union (along with the domestic firm) makes the Nash-Cournot assumption about the foreign firm's output level. Thus the union does not consciously lead the domestic firm towards the target level of employment. Therefore, in this case welfare may not necessarily rise with centralization. This explains why proposition 2 differs from proposition 1. Under the Nash-Cournot assumption, the union sees the government subsidization as only a burden. Thus the efficient contract always shifts to the left as g rises. To compensate for this the government has to subsidize more. This explains proposition 3. In contrast, in the monopoly union case when an optimal subsidy is in place, the union recognizes that the government ensures that the target level of employment is achieved regardless of how it behaves. Therefore the union always behaves like a decentralized monopoly union.

IV. Conclusion

Two popular competing models yield remarkably different results. Whether corporatism has any real implications and whether greater degrees of corporatism are distortion enhancing or distortion reducing, seem to depend on the precise nature of the wage determination process. Our findings also suggest that centralization of wage bargaining has no effect on trade policy or firm behavior in the monopoly union case and the optimal subsidy should be unaffected. In contrast, if the union cooperates with the firm in writing an efficient contract, then the government subsidy increases with the degree of centralization. Hence, government policy is crucially dependent on the wage determination process. Whether a firm faces a monopoly union or writes an efficient contract with the union is ultimately

an empirical question. But in spite of a large body of empirical literature, the debate over whether unions play leadership (monopoly union) or conduct efficient bargains is still not resolved. In a static environment simple wage bargaining does not achieve the efficient outcome. Therefore economists often use the firm's exclusive control over employment as indicative of the presence of a monopoly union. On the other hand if unions have a substantial say over the amount of employment, efficient contract may be a better representation of reality. In reality, union firm interaction is a dynamic process. In a dynamic world the above kind of simple approximation will fail as wage negotiations alone may be able to achieve the efficient outcome (see Espinosa and Rhee [1989]). These issues may be addressed in future work in this area.

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