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Torben Iversen

Introduction

It is well known that high international financial capital mobility undermines monetary policy autonomy when exchange rates are fixed.¹ Even in semifixed exchange rate systems of the sort currently adhered to by most OECD countries, high capital mobility implies that independent and inflationary monetary policies are made more costly through interest-rate risk premiums.² However, gauging the economic and institutional consequences of increased financial capital mobility is not possible without a model of the way monetary regimes interact with nationally specific institutions.³ In this article I advance and test such a model.

For this purpose I bring together two related literatures—new classical economics and neocorporatism—that have evolved separately since the breakdown of the Keynesian-neoclassical synthesis in the 1970s. The first literature took off from the rational expectations critique of the notion of an exploitable trade-off between inflation and unemployment (the “Phillips curve”).⁴ It advances two main theses. The first thesis holds that if people rationally anticipate monetary policies, governments cannot affect real behavior. The second holds that if democratic governments care about unemployment, as most presumably do, policy discretion will produce higher inflation than is socially optimal.⁵ An important theme in this literature is therefore

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1. Frieden 1991.
2. See Scharpf 1991; and Helleiner 1994.
3. See Garrett and Lange 1995; and Iversen, Pontusson, and Soskice forthcoming.
4. See Sargent and Wallace 1975; and Lucas 1972 and 1976.
5. Barro and Gordon 1983a.

the benefits of delegating monetary policy authority to an inflation-averse central bank.⁶ The second literature has retained a focus on real behavior and outcomes, especially unemployment, by concentrating on the role of unions and incomes policies. With the point of departure in Philippe Schmitter's revival of the concept of corporatism, and gradually incorporating insights from game theory and especially the work of Mancur Olson, this literature underscores the importance of collective wage-bargaining arrangements and union–government relations for overcoming collective action problems and furthering economic performance.⁷

The neocorporatist literature has helped to pinpoint institutional and political mechanisms—especially centralization and government social guarantees—that could affect real outcomes such as unemployment, but the inattention in this literature to monetary policies and rational expectations poses a problem. In particular, it seems inconceivable that large and powerful unions would *not* let their real wage behavior be influenced by the anticipated effects of such behavior on monetary policies. And if expectations are not allowed to vary with changes in monetary policies, then expectations are no longer rational, as forcefully argued by Robert Lucas.⁸ Yet the problem cuts both ways, since if unions *do* adapt their real wage behavior in anticipation of monetary policy responses, such policies must have consequences not only for inflation but also for unemployment. This suggests that monetary policies are important for real outcomes after all, and that the two literatures need each other.

Both schools of thought have sidestepped these issues by, simply put, taking everything for granted that is essential to the other. In contrast, this article brings the two literatures together through a game-theoretic model where unions set wages, and the central bank sets prices. This synthesizing model leads to novel theoretical and empirical insights. First, the structure of bargaining and the accommodation of the monetary regime are shown to *jointly* determine the equilibrium level of unemployment, *even when all players are assumed to have rational expectations*. Contrary to the claim in new classical economics, monetary regimes are therefore important for explaining unemployment performance.⁹ Second, the relationship between centralization of bargaining and unemployment is contingent on the type of monetary regime, and, consequently, no uniform relationship exists between bargaining structure and

6. See, for example, Woolley 1984; Rogoff 1985; Cukierman 1992; Grilli, Masciandaro, and Tabellini 1991; and Alesina and Summers 1993.

7. For the concept of corporatism, see Schmitter 1974; for the importance of group organization, see Olson 1965 and 1982. Representative work in the neocorporatist tradition includes Przeworski and Wallerstein 1982; Lange 1984; Cameron 1984; Crouch 1985; Calmfors and Driffill 1988; and Alvarez, Garrett, and Lange 1991.

8. Lucas 1976.

9. This is my most important and controversial claim. I am not merely saying that bargaining structure matters for unemployment, even when the behavior of the monetary authority is taken into account. Nor am I simply saying that monetary policy may have transitory effects on unemployment due to uncertainty or miscalculations. I am saying that even with rational expectations and complete information, the accommodating or nonaccommodating character of the monetary regime has permanent effects on the equilibrium level of unemployment.

performance, as widely assumed in the neocorporatist literature.¹⁰ Finally, since the model contains two low-unemployment equilibria with different distributive consequences, monetary regimes and bargaining structures are politically contested. This contestation is conditioned by the international economy because one of these equilibria is particularly vulnerable to high financial capital mobility.

The article is divided into five sections. The first section is a brief discussion of four political economy perspectives on the causes of unemployment and inflation. The second section presents the theoretical model, and the third tests the model on time-series data for fifteen OECD countries. The fourth section suggests the implications of the argument for institutional design; and the conclusion pinpoints some of the theoretical and policy implications of the argument, especially in relation to the planned European Central Bank.

Four Perspectives on the Political Economy of Performance

A particularly influential model of the relationship between bargaining institutions and macroeconomic performance is Lars Calmfors and John Driffill's application of Mancur Olson's theory of collective action. Using the capacity of firms and unions to externalize the costs of wage militancy as the key mechanism, Calmfors and Driffill posit a hump-shaped relationship between the centralization of wage bargaining and unemployment.¹¹ Thus, when bargaining is decentralized, externalization capacity is low due to competitive product markets; but as centralization increases, the price elasticity of demand falls, and the capacity for externalization improves. This encourages militancy and raises unemployment. As centralization proceeds even further, the costs of inflation and unemployment are increasingly internalized and the incentive for militancy falls. High centralization is therefore characterized by low militancy and unemployment—a result that is widely supported in the neocorporatist literature.¹²

However, the Calmfors-Driffill model assumes that prices are a function of wages and accords no role to monetary policy. In contrast, monetary policy is seen to *determine* prices in the central bank independence literature. In Robert Barro and David Gordon's influential model of price setting, for example, firms negotiate nominal wage contracts with their employees, but the general price level is set by the monetary authority.¹³ It is true that there are no employment effects of monetary policies in this model—because any incentive by the monetary authority to inflate will ratio-

10. For example, the idea of a hump-shaped relationship between centralization and unemployment—as proposed by Lars Calmfors and John Driffill—only holds for a particular type of monetary regime. See Calmfors and Driffill 1988.

11. *Ibid.*

12. See Cameron 1984; Lange 1984; Golden 1993; and Moene and Wallerstein 1993. Some controversy exists over Calmfors and Driffill's suggestion that decentralized systems offer high potential for wage restraint. The issue will be addressed later.

13. Barro and Gordon 1983a.

nally be anticipated by firms who set their prices accordingly—but this result assumes that wage-price decisions are made at the firm level where individual wage contracts have no effect on the general price level. If wages (and, by implication, prices) are set above the firm level, agreements will have at least *some* effect on the general price level, and monetary policies will consequently influence the capacity of unions and employers to externalize wage costs.¹⁴ From Calmfors and Driffill's own model we know that the capacity for externalization is important for real-wage behavior and unemployment.

A third (emerging) literature, which may be called the distributive politics approach, draws attention to a different mechanism linking collective wage bargaining to monetary policies. This argument starts from the notion that union behavior in collective bargaining, in addition to wages and employment, is motivated by preferences over the *distribution* of wages. In the presence of “wage drift” (that is, wage increases exceeding bargained rates), such distributive preferences shape not only the structure of wage demands but also overall wage claims. Specifically, because solidaristic wage policies systematically reduce the relative wages of high-paid workers—when market forces would not—wage drift tends to favor better-paid workers. Anticipating this, confederal union leaders try to counteract the inequalizing effects of drift by raising bargained wages and thus increasing nominal wage pressure.¹⁵ Since the strength of this effect is rising with the wage heterogeneity of groups subjected to the same agreement, centralized and “encompassing” bargaining will be associated with higher nominal wage pressure.

This conclusion stands in apparent contrast to the neocorporatist emphasis on the dampening effects of centralization on wage militancy. Yet whether the two logics produce different *real* outcomes depends on the accommodating or nonaccommodating stance of the monetary authority. Only if policies are nonaccommodating will nominal wage pressure automatically be translated into higher *real*-wage pressure and unemployment. The distributive politics model thus (once again) highlights the need for an *interactive* model of collective bargaining and monetary policies.

Some recent work in political economy seeks to address this need. Peter Lange and Geoffrey Garrett, though not explicitly concerned with monetary policies, imply that a commitment to full employment is beneficial in centralized bargaining systems (because it induces farsighted union strategies) but not in decentralized systems (because unions lack the organizational capacity for coordinated restraint).¹⁶ By contrast, Peter Hall and Robert Franzese suggest that commitment to low inflation is more likely to deter militant behavior when wage bargaining is coordinated than when it is not,¹⁷ whereas Alex Cukierman argues that such a commitment removes

14. The mechanism is the effect that wage agreements have on the real money supply when monetary policies are not fully accommodating. More on this later.

15. See Hibbs and Locking 1996; Calmfors 1993.

16. Lange and Garrett 1985; see also Alvarez, Garrett, and Lange 1991.

17. See Hall 1993; and Franzese 1994. See also Streeck 1994; and Garrett and Way 1995.

the incentive for encompassing unions to act restrained.¹⁸ Others argue that nonaccommodating policies produce superior outcomes for intermediately centralized systems, but not otherwise, regardless of the bargaining system,¹⁹ and still others conclude that monetary policies do not matter for real outcomes regardless of the bargaining system.²⁰ In other words, it is possible to find support in the literature for just about any view on the relationship among monetary regimes, wage bargaining, and economic outcomes.

Part of the reason for this state of affairs, in my view, is that the arguments are only loosely connected to the theoretically well-grounded, though incomplete, noninteractive models. Thus, either there is no attempt to apply the dynamic game approach used in the new classical literature,²¹ or the main insights of this literature are ignored by dispensing with rational expectations²² or by assuming that actors are inherently concerned with nominal variables.²³ Likewise, only few analysts directly exploit the logic of the Calmfors-Driffill model, and the role of solidaristic wage policies is always completely ignored. In the following I propose and test a synthesizing model that systematically integrates the rational expectations model of monetary policy with the bargaining models of wage setting. The upshot of the model is that nonaccommodating monetary regimes (in the form of an independent central bank, for example) produce inferior employment performance in highly centralized systems and superior performance in intermediately centralized systems but have little or no effect in decentralized systems. To the extent that internationalizing capital markets reduces the capacity of governments to pursue accommodating monetary policies, the model implies that highly centralized and solidaristic forms of wage bargaining may have become unsustainable.

The Model

I begin the discussion by defining the players and their objective functions. I then specify the union–monetary authority interaction in a dynamic two-stage game and, finally, discuss the theoretical and empirical implications.

Actors and Utility Functions

Following the strategy of Calmfors and Driffill, unions are setting nominal wages subject to the constraint that such wages affect the attainment of other union goals, here employment and wage equality.²⁴ Employer organizations are not irrelevant to

18. Cukierman 1997.

19. Iversen 1998.

20. Bleaney 1996.

21. In Bleaney's model, for example, the monetary authority is not making its policy *contingent* on unions' wage decisions. Bleaney 1996.

22. Hall and Franzese 1998.

23. Cukierman 1997.

24. As shown by Calmfors and Driffill, it is possible to employ a bargaining model to determine wages without altering the relationship between centralization and wage behavior. Calmfors and Driffill 1988.

the model, since the level at which bargaining takes place, and the effectiveness with which agreements are implemented, is a function of *both* employer and union organization. However, to stay as close as possible to the Calmfors-Driffill setup, the theoretical discussion focuses on union behavior.

The three main concerns of unions—real wages, unemployment, and wage equality—are described in the following welfare function for any union i (which may represent a federation of unions):

$$W_i = \alpha(w_i - \pi) - (1 - \alpha)U_i\bar{U} - \beta(r^i - r^e)^2$$

where w_i is the percentage increase in nominal wage, π is the percentage increase in consumer prices, U_i is the unemployment rate among the members of union i , \bar{U} is the average unemployment rate, r^i is the ideally sought ratio of wage increases between low-wage workers and high-wage workers, and r^e is the actual ratio of wage increases expected from a particular wage settlement. The equation says that welfare is increasing with real wage increases ($w_i - \pi$) but falling with unemployment and any discrepancies between ideal and anticipated actual wage equality. The parameters α and β are the weights unions put on different objectives.

It should be noted that the particular specification of the effect of unemployment on the welfare of unions deviates from Calmfors and Driffill. Thus, it is implied here, more realistically in my view, that the severity of unemployment among union members depends on the overall unemployment rate. Even though unions may not inherently care about unemployment among members of other unions, the higher the rate of average unemployment, the greater the competition for scarce jobs, and the longer the expected length of an unemployment spell. In other words, because unions can only affect unemployment among their own members, there is an externality from unions pursuing unemployment-generating wage strategies.²⁵

The employment and inflation consequences of wage-price pressure depend on the degree to which such pressure is accommodated by expansive monetary policies. As implied by rational expectations theory, since private wage and price setters can predict the monetary authority's policy responses, they will rationally adjust their behavior in the anticipation of a particular policy response—in equilibrium, fulfilling their expectations. The wage behavior of unions, therefore, cannot be analyzed *in principle* without attention to the policy intentions of monetary policymakers. These intentions are incorporated into the model through the following welfare function (W_m) for the monetary authority:

$$W_m = -\iota\pi^2 - (1 - \iota)\bar{U}^2$$

25. This argument is reflected in some of the economic literature. For example, Layard, Nickell, and Jackman argue that there is a negative externality from decentralized bargaining because "in firm-level bargaining the bargainers take the general level of unemployment for given—ignoring the fact that their own actions will affect the jobs open to others"; Layard, Nickell, and Jackman 1991. The authors also note that the costs of unemployment benefits are an externality that will be increasingly internalized with centralization (through taxes).

where π and \bar{U} are the inflation rate and average unemployment rate as before, and $\iota = [0,1]$ is the weight placed on maintaining price stability as opposed to low unemployment. For simplicity, one may think of ι as the authority vested in an independent central bank charged with inflation control, but the equation obviously does not preclude that similar goals can be accomplished through alternative institutional mechanisms.

A Two-Stage Game of the Union–Monetary Authority Interaction

Following the strategy of Barro and Gordon, the union–monetary authority interaction can now be modeled as a two-stage game with complete information.²⁶ First unions choose a nominal wage increase after which the monetary authority decides on an inflation rate. Because unions know the objective function of the monetary authority, they will rationally take into account the effect of their own wage behavior on the price behavior of the monetary authority. Outcomes are measured in terms of inflation, unemployment, and wage relativities.

In the model, the inflation rate is set by the monetary authority through its control over the money supply, but the monetary authority will let its choice be influenced by the price effects of unions' wage demands (because these affect unemployment). To see this it is useful to assume that aggregate wage increases are accommodated by the monetary authority, and to then distinguish between a *relative* and an *absolute* price effect. The relative price effect is *the increase in prices for products made by firms within the bargaining area of union i* , and it depends on the market power of firms within that bargaining area to pass on higher wage costs.²⁷ Assuming (with Calmfors and Driffill) that there is a given number of sectors in the economy, that unions amalgamate within sectors producing close substitutes, and that such amalgamation takes place between pairs of unions of equal size, the capacity of union i to externalize wage costs is positively related to the level of centralization, since the price elasticity of product demand declines as more firms are subjected to the same wage agreement:

$$\pi_i^r = c w_i \quad (1)$$

where π_i^r is the relative price effect, and $c = 1/n$ is the degree of centralization (with n representing the number of equally sized unions in the economy). If the number of unions is very large, c will approximate 0, and unions will face nearly perfectly competitive product markets with no possibility for price increases; when c equals 1, all wage increases will be completely passed on to prices (still assuming an accommodating monetary authority). Since unions are assumed to be equally sized, if the

26. Barro and Gordon 1983a. Strictly speaking, the present game is a two-stage game with complete but *imperfect* information, since unions make simultaneous moves in the first stage.

27. All references to wage increases are net of productivity increases.

average wage increase in any other bargaining area is denoted w_0 , then the relative price effect in any other bargaining area (π_0^r) is similarly

$$\pi_0^r = cw_0$$

The effect of a wage increase in the bargaining area of union i on *aggregate* prices is obviously smaller than the relative price effect, since the latter only applies to the segment of the market covered by the agreement in that bargaining area. More precisely, the aggregate price effect is a share of the relative effect where the weight is proportional to the degree of centralization:²⁸

$$\pi_i^a = ccw_i = c^2w_i \quad (2)$$

Similarly, the aggregate price effect of wage increases in other bargaining areas is proportional to the share of the labor market covered by unions in these bargaining areas:

$$\pi_0^a = (1 - c)cw_0 \quad (3)$$

Now allow the monetary authority to choose any rate of inflation in response to the wage decisions of unions. It has to do so subject to the constraint that its choice affects the rate of unemployment—a matter of at least some concern to the monetary authority. In order to determine the choice of the monetary authority, we therefore need to look at the consequences for unemployment. The simplest approach is to examine what happens if the inflation rate is set *below* the price increases implied by the wage demands of unions. In this *disequilibrium scenario* the rise in wage costs will outpace price increases, profits will be squeezed, and layoffs and unemployment will be the consequence. Analogously, any wage increases *within* a bargaining area that exceed the rate of *relative* price increases will reduce profits and increase unemployment. In both cases, the cause of higher unemployment is that firms face rising real wage costs.²⁹

Following this logic, the change in unemployment among the members of union i can be written as a simple additive function of the difference between the aggregate price effect and the actual rate of inflation (the first bracketed term) plus the difference between the union-specific wage increase and the relative price effect (the sec-

28. To see this, note that when the relative price effect is π_i^r , the aggregate price effect is simply the sum of all relative price increases divided by the number of bargaining areas: $1/n \sum \pi_i^r$, which is equivalent to $c\pi_i^r + (1 - c)\pi_0^r$. Since $\pi_i^r = cw_i$, the aggregate effect can be written as $c^2w_i + (1 - c)\pi_0^r$. The *marginal* effect on the aggregate price level of a wage increase by union i is then $\delta\pi/\delta w_i' = c^2w_i + (1 - c)\pi_0^r = c^2$.

29. I underscore that these are disequilibrium results. The equilibrium outcomes are derived below.

ond bracketed term):

$$\Delta U_i = f([\pi_i^a + \pi_0^a - \pi] + [w_i - \pi_i^r])$$

The first term measures changes in aggregate demand (through the real money supply), and the second term measures changes in sector-specific demand (determined by relative real wage costs).³⁰ The particular specification of the function f is not important for our purposes as long as it is positive. For presentational ease, I simply assume that it is a point-by-point relationship, which implies—substituting in the expressions for π_i^a , π_0^a , π_i^r and collecting terms—that

$$\Delta U_i = w_i(c^2 - c + 1) + w_0c(1 - c) - \pi$$

In a completely analogous fashion, the increase in *aggregate* unemployment ($\Delta \bar{U}$) is given by the following *weighted* average:

$$\Delta \bar{U}_i = [\pi_i^a + \pi_0^a - \pi] + c[w_i - \pi_i^r] + (1 - c)[w_0 - \pi_0^r], \quad (4)$$

which (substituting in the values for π_i^a , π_0^a , π_i^r , π_0^r) is equivalent to:

$$\Delta \bar{U} = cw_i + (1 - c)w_0 - \pi. \quad (5)$$

In equilibrium, unions will behave identically ($w_i = w_0$), and the mean increase in unemployment is then simply the difference between equilibrium wage growth (w^*) and price growth (π):

$$\Delta \bar{U} = w^* - \pi. \quad (6)$$

As noted earlier, real wages (net of productivity increases) can only be rising faster than inflation in a disequilibrium scenario. At some point, the demands from unions for higher wages must be equal to the ability of employers to raise prices. When this equilibrium is reached, unemployment is stable ($\Delta U = 0$), and the sum of the aggregate price effects exactly matches the inflation rate chosen by the monetary authority. In new classical economics this equilibrium is called the natural rate of unemployment, whereas in neo-Keynesian economics it is called the competing claims equilibrium rate of unemployment.³¹

This equilibrium rate is what we are ultimately interested in knowing, and for that purpose we first solve for the subgame-perfect outcome in the *second* stage of the game by determining the optimal inflation rate chosen by the monetary authority.

30. If relative prices are constant, this is effectively a quantity theory of money equation, with fixed velocity of money and π proportional to the change in the money supply.

31. Carlin and Soskice 1992.

Specifically, the monetary authority is faced with the following maximization problem:

$$\text{Max}W_m(\pi) = -\iota\pi^2 - (1 - \iota)(\bar{U} + \Delta\bar{U})^2 \quad (7)$$

where U is the existing average rate of unemployment.

Substituting the expression for $\Delta\bar{U}$ from Eq. (5) into Eq. (7) and setting the partial derivative with respect to π equal to 0 yield the following maximizing condition for $\pi(\pi^*)$:

$$\pi^*(w_i) = (1 - \iota)[\bar{U} + cw_i + (1 - c)w_0] \quad (8)$$

Not surprisingly, the monetary authority chooses a higher level of inflation when wage increases are high, because this “cushions” the adverse impact on employment. Crucially, however, it is less prone to do so the more it cares about inflation (as measured by ι).

The next question, therefore, is what wage rate unions will demand given that they anticipate the monetary authority will choose $\pi^*(w_i)$. We find this rate by solving the maximization problem of union i in the *first* stage of the game:

$$\text{Max}W_i(w_i) = \alpha(w_i - \pi^*) - (1 - \alpha)(U_i + \Delta U_i)(\bar{U} + \Delta\bar{U}) - \beta(r^i - r^e)^2 \quad (9)$$

Before we can do this, however, it is necessary to specify the relationship between wage demands and wage relativities (the last term in Eq. 9). The reason is that the pursuit of egalitarian goals can cause unions to raise their nominal wage demands (as argued in the distributive politics approach).

To see why, assume (as before) that unions amalgamate in pairs and that they represent the interests of the median voter in their membership. The internal bargaining process at any level of centralization can now be conceived of as a series of two-player bargaining games between a low- and a high-wage union. If each union seeks to maximize its share of the wage increase, the outcome of these games can be expected to conform to the Nash solution, which is a simple 50–50 split (that is, both high- and low-wage members get the same absolute increase).³² The Nash solution is theoretically attractive because it is compatible with selfish union behavior (share maximization) yet does not preclude that some unions pay heed to a norm of fairness (equal division). In addition, the solution is realistic since bargained wage increases are often in the form of flat-rate increments. Symbolically, the ideal wage relativity of any union is thus

$$r^j = r_b = 1 \quad (10)$$

32. This result also conforms to Rubinstein bargaining theory when unions do not differ either in their time preferences or in their capacity to make the first offer (see Osborne and Rubinstein 1991).

where r_b is the bargained wage increase for the median member in the low-wage union relative to the bargained wage increase for the median member in the high-wage union.

As often noted, however, the distribution of wage increases at the end of a contract period rarely corresponds to what the union desired *ex ante*. The reason is that many workers will benefit from noncontractual wage increases—called drift—that are granted during the contract period by individual employers, usually without any threat of strike action. One can think of such drift as the attempt by the “market” (or groups in strong bargaining positions) to override the terms of the collective agreement by securing additional raises to those whose wages are held back in the collective bargaining process.³³ The expected wage ratio, r^e , is therefore a weighted average of the relative distribution of the bargained wage increase (r_b) and the relative distribution of wage drift (r_d):

$$r^e \equiv \frac{w_i r_b + w_d r_d}{w_i + w_d} = \frac{w_i + w_d r_d}{w_i + w_d} \quad (11)$$

As centralization increases, better-paid workers will also increase their share of wage drift, since the *effects* of solidaristic policies on the wage structure are rising with the wage-spread of workers subjected to the same agreement. Indeed, this implication is well corroborated by empirical studies that have found centralization to be strongly and positively associated with wage compression.³⁴ In symbolic terms, if $c \rightarrow 0$, then bargaining is carried out by a large number of unions whose members have very similar wages. Solidaristic wage policies will consequently have little effect on overall wage relativities, and drift will be evenly distributed on average (that is, $r_d \rightarrow 1$). As centralization increases, $c \rightarrow 1$, the heterogeneity of membership rises, and the effect of solidaristic policies on the wage structure goes up. Drift will therefore increasingly benefit high-wage workers—in the limit *only* high-wage workers (that is, $r_d \rightarrow 0$). Although it does not matter much for the results exactly how r_d declines with centralization, a nonlinear function such as $r_d = 1 - c^2$ is *a priori* preferable, since the effect of centralization on wage dispersion becomes more pronounced at higher levels of centralization.³⁵

33. See Flanagan, Soskice, and Ulman 1983, chap. 11; and Hibbs and Locking 1996.

34. See Freeman 1988; Rowthorn 1992; Pontusson forthcoming; and Iversen 1996.

35. For example, in an economy with sixteen unions and median wages of 1, 2, 3, . . . , and 16 respectively, the standard deviation of a 10 percent wage increase would be 0.46 in a decentralized bargaining system ($c = 0.06$), 0.40 in an intermediately centralized system ($c = 0.5$), and 0 in a completely centralized system ($c = 1$) (all getting the same flat-rate increase). Thus, dispersion decreases more rapidly at higher levels of centralization; approximately at the rate of $s * (1 - c^3)$, where s is the standard deviation. Yet this probably underestimates the speed with which dispersion declines at low levels of centralization, because it assumes that amalgamation only takes place between unions that are the closest in terms of income.

We can now specify the last term in the union’s utility function by inserting the expression for r_d into Eq. (11) and subtracting the result from Eq. (10):

$$r^i - r^e = c^2 \left(1 - \frac{w_i}{w_i + w_d} \right) \approx c^2 \left(1 - \frac{w_i}{\hat{w}_i + w_d} \right) \tag{12}$$

The approximation substitutes \hat{w}_i for w_i , where the former is the wage increase the union would demand in the absence of solidaristic wage policies ($\beta = 0$). This shortcut is for convenience; it has no influence on the substantive results.³⁶

The important implication of Eq. (12) is that equality-oriented union leaders acting with foresight can counteract unwarranted inequalizing effects from wage drift by raising wage claims in the collective bargaining process (as w_i goes up, $r^i - r^e$ gets closer to 0). Furthermore, the incentive to do so rises with centralization, since wage drift will increasingly benefit high-wage workers.³⁷ This conclusion follows whether wage drift is independent of, or negatively related to, bargained increases.³⁸ For simplicity, I assume that drift only occurs up to a constant threshold above which centralized enforcement mechanisms become effective.³⁹

We are now ready to return to the union’s maximization problem in Eq. (9). The (utility-maximizing) wage demand (w_i^*) is determined by substituting the expressions for $r^i - r^e$, ΔU_i , $\Delta \bar{U}$, and π^* into Eq. (9) and setting the partial derivative equal to 0. Assuming that all other unions behave identically in equilibrium (that is, that $w_0^* = w_i^*$), the welfare-maximizing wage increase of any union (w^*) is given by:⁴⁰

$$w^* = \frac{\alpha(1 - c + \alpha) - (1 - \alpha)\bar{U}(c^2 - 2\alpha c + 1) + \beta \frac{2c^4}{\hat{w} + w_d}}{(1 - \alpha)(c^2 - 2c + 2\alpha c + 1) + \beta \frac{2c^4}{(\hat{w} + w_d)^2}} \tag{13}$$

36. The only requirement is that $w_i < \hat{w}_i + w_d$, which is the case in all examples used later. In fact, the logic and results would be the same if \hat{w}_i were substituted with a constant.

37. It may be argued that high-wage unions can dissipate such nominal wage pressure by agreeing to more radical bargained redistribution (that is, by choosing a $r_b > 1$), but the Nash solution is clearly more realistic. First, since wage drift is not contractually agreed to, and since it occurs in the future, it represents a risky prospect for union members, whereas bargained increases are certain. Granting that most people are risk-averse when it comes to their personal income, the median union member would rationally prefer to maximize his or her share of the bargained increase. Second, since union members do not possess the same information and foresight as their leaders, they cannot easily assess the quality of their bargaining representatives *except* by their ability to secure a maximal share of the collective wage gain. I am grateful to Peter Lange for helping me to clarify these issues.

38. Implicitly, however, it must be assumed that drift does not fully offset centralized wage increases, since otherwise bargaining structure would be irrelevant for outcomes.

39. This follows the approach in Moene and Wallerstein 1993, 102–103. A more complicated formulation is presented in Hibbs and Locking 1996, but with very similar implications.

40. The result was computed by hand and checked with the mathematical software program Maple V, rel. 3 (Brooks/Cole).

Finally, the level of unemployment can be found using Eq. (6), which says that the average increase in unemployment is simply the difference between wage growth and price growth. Furthermore, we know that in equilibrium this difference must be equal to 0:

$$\Delta \bar{U}^* = w^* - \pi^* = 0$$

Substituting in the equilibrium values for w^* in Eq. (13) and π^* in Eq. (8), and rearranging, we get the following expression for the equilibrium rate of unemployment (U^*):

$$\bar{U}^* = \frac{\alpha(1 - c + c\iota) + \beta \frac{2c^4}{\hat{w} + w_d}}{(1 - \alpha)(c^2 - 2c + 2c\iota + 1) + \beta \frac{2(1 - \iota)c^4}{\iota(\hat{w} + w_d)^2}} \quad (14)$$

The easiest way to present the implications of this result is to consider the effects on unemployment of centralization for two different types of monetary regimes (see Figure 1). For $c = 0$, unemployment is exclusively a function of the weight unions place on real wages as opposed to employment (α). As expected from a new classical perspective, monetary policies are irrelevant for real outcomes. Yet, when we move away from the decentralized extreme, money affects real outcomes in ways that are unanticipated by both new classical and neocorporatist theory. Thus, if the monetary regime is accommodating ($\iota \rightarrow 0$), unions are encouraged to use their indirect power in product markets to push up wages to the detriment of overall employment and welfare. The consequence is *worse* unemployment performance than in either of the extreme cases, creating the “hump” predicted by Calmfors and Driffill.

The conclusion is different, however, when the monetary regime is nonaccommodating ($\iota \rightarrow 1$). *The reason is that when some players are not atomistic, each can have an effect on the real money supply. Given the size of the union, the more nonaccommodating the monetary authority is, the more sizable this effect will be, and the greater the incentive for the union to be restrained.* Or, phrased in terms of Calmfors and Driffill’s logic, if the monetary authority is nonaccommodating, higher wages can no longer be externalized to the same extent, and this will deter militant union behavior. The collective action problem facing unions in intermediately centralized systems—which can lead to excessive wage demands and unemployment—is thus “solved” (or at least dissipated) by an agent that is deliberately nonaccommodating to union objectives. This crucial (and perhaps surprising) result is overlooked in all existing models of union behavior (such as Calmfors and Driffill’s application of

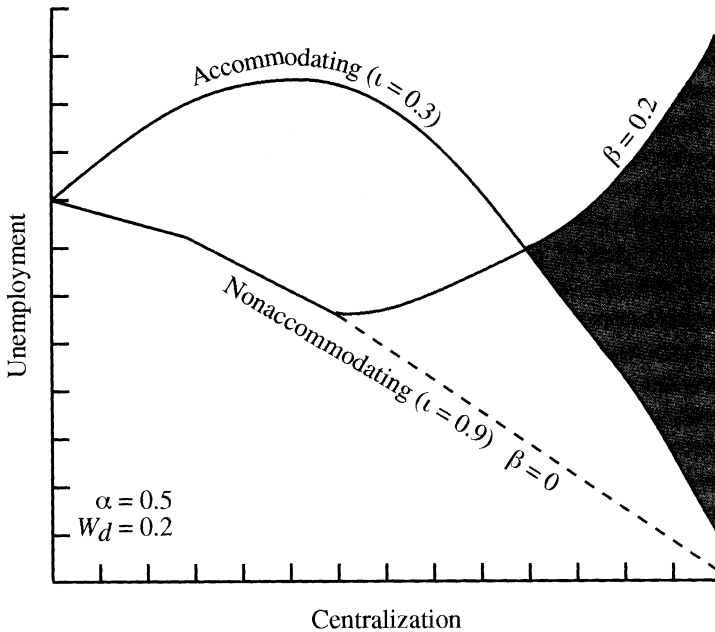


FIGURE 1. *The estimated effect of centralization of bargaining on unemployment depending on the restrictiveness of the monetary regime (the light-shaded area indicates a net employment gain from having a nonaccommodating monetary regime; the dark-shaded area indicates a net employment loss)*

Olson's theory) because they fail to consider the conditioning effects of monetary policies on interunion interactions.

The beneficial deterrence effects of a conservative monetary regime dissipate at high levels of centralization because unions progressively internalize the externalities of militancy. In fact, at high levels of centralization, nonaccommodation can turn into a liability if unions—in addition to real wages and unemployment—are concerned with wage distribution ($\beta > 0$). The reason is that nonaccommodating monetary policies now run up against attempts by unions to forge politically acceptable, and often inflationary, compromises between high- and low-paid members. Since the wage-restraining effects of nonaccommodation fall with centralization, while the inflationary effects of solidaristic wage policies rise, at some point of centralization monetary accommodation will produce better employment outcomes than nonaccommodation.⁴¹ In contrast to intermediately centralized bargaining systems, at high levels of centralization, nonaccommodation will jeopardize the ability of unions to solve their internal collective action problem.

41. The point at which this occurs is theoretically indeterminate.

It is important to underscore, however, that what causes the curve to bend upward is *not* that solidarism becomes more prevalent with centralization—a misconception that I have frequently encountered—but that solidarism is applied to the wages of progressively more heterogeneous groups of wage earners. It is also important to reiterate that wage solidarism in the model is always traded against other goals such as employment. Hence, wage compression will be less pronounced in a centralized system when the monetary regime is nonaccommodating than when it is accommodating, but unemployment will simultaneously be higher. On this point, what differentiates the present model from the garden-variety encompassment argument (where centralization always implies better performance) is that it explicitly recognizes the distributive preferences of unions. How much these will influence the real-wage behavior of a centralized union, and thus unemployment, depends not only on how nonaccommodating the monetary authority is but also on the particular weight that unions place on their distributive goals compared to other goals. In the end, therefore, the effect of wage solidarism is an empirical matter.

Testing the Model

The model I propose is relevant for explaining unemployment, inflation, and wage equality, and it has a number of behavioral implications for the strategies of unions and monetary authorities. In this article I focus on the macro-level hypotheses for unemployment, using time-series data for fifteen OECD countries grouped into five time periods from 1973 to 1993.⁴²

Operationalizations

The character of the monetary regime (represented by ι in the theoretical model) refers to the “conservatism” of the monetary authority. There are essentially two ways to measure such conservatism. The first is to focus on the independence of the central bank. For example, Alberto Alesina and Lawrence Summers conceive of central bank independence as equivalent to “delegating monetary policy to an agent whose preferences are more inflation averse than the society’s preferences.”⁴³ Similarly, Vittorio Grilli, Donato Masciandaro, and Guido Tabellini explain that although “independence to choose the final goals can be defined without reference to the contents of such goals . . . we identify independence with autonomy to pursue the

42. The countries are Austria, Belgium, Britain, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, Switzerland, and the United States. The time periods are four-year intervals, except for one five-year period (1989–93). The periodization was prompted partly by the high degree of temporal stability in the monetary regime variable and partly by the uncertainty about the lag structure between change in bargaining institutions and outcomes. As it turns out, the reported results are actually very similar for the annual data, but the lagged dependent variable is close to exhibiting unit roots.

43. Alesina and Summers 1993, 157. They attribute this conception to Rogoff 1985; and to Barro and Gordon 1983a.

goal of low inflation.”⁴⁴ Alex Cukierman arrives at a very similar conception: “Central banks are more conservative than political authorities in the sense that they attribute relatively more importance to the goal of price stability”.⁴⁵ Since none of the indexes developed by these authors is a priori preferable to another, I have created a *composite CBI index*, which is the average (after standardization) of the three most commonly used measurements.⁴⁶ The index varies between 0 (low independence) and 1 (high independence).⁴⁷

One problem with using this index is that independence is neither a necessary nor a sufficient condition for commitment to a conservative monetary policy. Governments in small economies often use membership in international exchange rate arrangements to “anchor” monetary policies,⁴⁸ and governments that are secure in power may be able to create a reputation for “toughness”.⁴⁹ Conversely, the policy intentions of a dependent bank may be defeated through a combination of expansionary fiscal policies, exhortation, and political threats. For all these reasons, the central bank independence index should be combined with indicators that pay greater attention to actual policies. A particularly sensitive policy indicator is the relative movement of exchange rates.⁵⁰ The reason is that credible domestic commitments to a nonaccommodating strategy will raise the medium- to long-run confidence in the currency, whereas the reverse is true if domestic economic policies are perceived to be accommodating. A continuous commitment to anti-inflationary policies will therefore reveal itself in the form of a strong and (relatively) appreciating currency.⁵¹

The drawbacks of using currency movements as a proxy for monetary policy commitments are that (1) they are very sensitive to short-term speculative factors, and (2) they tend to “exaggerate” monetary policy changes.⁵² The first problem can be remedied by averaging over periods that exhibit relatively stable appreciation or depreciation. Using this logic, a *hard currency index* was created based on the relative growth in nominal effective exchange rates. Like the CBI index, it varies between 0 (reflecting a relatively depreciating currency) and 1 (reflecting a relatively appreciating currency).⁵³ The second problem can be addressed by combining the hard currency index with the index for central bank independence. While the first may am-

44. Grilli, Masciandaro, and Tabellini 1991, 367.

45. Cukierman 1992, 355.

46. The indexes were developed by Bade and Parkin 1982; Grilli, Masciandaro, and Tabellini 1991; and Cukierman 1992.

47. The index was created by first normalizing the three indexes to vary between 0 and 1 and then computing the mean for each country. In the case of Finland, only Cukierman reports a score that was used as the sole basis for the index value. A similar procedure was used for Austria, which is not coded by Bade and Parkin.

48. Frieden 1991.

49. Backus and Driffill 1985; and Barro and Gordon 1983b.

50. Dornbusch 1976.

51. Iversen 1998.

52. Dornbusch 1976.

53. The index is based on data for nominal effective exchange rates in IMF, various years. The exact procedure for constructing the index is explained in Iversen 1998.

plify changes in policy regimes, the latter almost certainly underestimates such changes. Even the Cukierman index, which is supposed to be sensitive to changes in central bank constitutions, shows virtually no change for the fifteen countries included in this study. It is simply inconceivable that underlying policy commitments have been equally stable. The combined index, a simple average called *I*, strikes a reasonable balance that can be considered a good proxy for ι in the theoretical model.⁵⁴

Turning to the measurement of wage bargaining centralization, recall that the theoretical definition is simply $1/n$ (one divided by the number of equally-sized unions). In reality, bargaining often takes place at several different levels simultaneously, and unions are of varying size. Consequently, most discussions of bargaining institutions and union organization incorporate two separate dimensions: one for the *centralization of bargaining authority*, the other for the *concentration of union membership*. In empirical studies these dimensions are then transformed into a composite index of centralization. For example, Philippe Schmitter has constructed an index based on the power and the number of union confederations.⁵⁵ Calmfors and Driffill have likewise developed an index that combines an assessment of bargaining authority with union concentration across different bargaining levels.⁵⁶ Yet another index, proposed by David Cameron, measures the “organizational strength” of labor rather than centralization per se (although two of the variables in this index are indicators of centralization).⁵⁷

Even if we focus on the indexes that are narrowly concerned with centralization, they share some key weaknesses. First, as pointed out by David Soskice,⁵⁸ with particular reference to the Calmfors-Driffill index, there is no (or only a superficial) attempt to include the organization of employers as an element in the index, even though centralization is necessarily a function of the organization of both labor and capital.⁵⁹ This issue is particularly salient to the exact coding of Japan and Switzerland. The second problem is that the indexes are rather impressionistic, causing obvious problems of intercoder reliability. To some extent this is a problem that cannot be avoided, especially in relation to the centralization of bargaining authority variable, but it is also conceptual, since there is never an attempt to sort out the relationship

54. The results of using the CBI index alone are reported in Iversen forthcoming, chap. 4. The cross-country correlation between the CBI index and the combined *I* index is 0.96. Most of the discrepancy is due to Japan, which, according to the hard-currency index and most observers, has followed a monetarist strategy since the mid-1970s yet scores low on most central bank independence indexes. For the institutional key to restrictive monetary policies, see Hutchison, Ito, and Cargil forthcoming, chap. 8; and Lincoln 1988, 179.

55. Schmitter 1981.

56. Calmfors and Driffill 1988.

57. Cameron 1984. In some studies, a third variable is included that measures the degree of coordination between bargaining units at different levels. However, if such coordination is informal and based purely on reciprocity it is not an *institutional* variable and should therefore be excluded from an index of organizational centralization.

58. Soskice 1990.

59. This critique does not apply to Crouch 1993, who *does* rate the organizational strength of business. However, Crouch does not develop a composite index of centralization.

between centralization and concentration. This problem allows different authors to place greater emphasis on one variable over the other.⁶⁰ The third weakness is that existing indexes are completely insensitive to changes over time. This is a problem that is becoming increasingly acute due to the considerable change in the structure of some national bargaining systems.

The measure of centralization of bargaining used in this study—which is called C —avoids these problems and stays very close to the theoretical definition. Specifically, the operational definition of centralization is $\sum w_j p_{ij}^2$, where w_j is the weight accorded to each bargaining level j ($\sum w_j = 1$), and p_{ij} is the share of workers covered by union (or federation) i at level j .⁶¹ Thus, if all bargaining power is concentrated at the peak level, and if a single confederation represents all workers, then $C = 1$; if authority is decentralized and membership very dispersed, then C approximates 0. The measure is equivalent to the theoretical definition when bargaining is restricted to a single level and unions are of equal size, but it is constructed here to take into account the actually observed diversity of bargaining systems, which typically involve several bargaining levels as well as unions of different size. The actual calculation of the index is based on national data on the distribution of union membership (at both the confederal and industry level) and on an assessment of individual bargaining rounds according to the locus of bargaining and the authority wielded at three different levels: the national, the sectoral (or industry), and the local. This procedure yields interval-scale time-series data for C that are highly germane for the theoretical conception of centralization. The only problem is that differences between systems at the decentralized end of the scale tend to be very small, even though such differences may be salient for outcomes.⁶² To distinguish more clearly between decentralized systems, and simultaneously preserve differences between intermediately centralized and highly centralized systems, I used a square-root transformation of C in the empirical analysis.⁶³

The construction of the index is described in detail in the appendix, which also shows the correlations between the mean values of the index and other measures of centralization. These correlations are all high (between 0.87 and 0.91), the main disagreement being over the exact classification of Austria. Although bargaining is exclusively occurring at the industry and local levels in this country, the authority to initiate bargaining and enforce agreements is concentrated at the peak level. However, since the model only applies when actual bargaining is taking place, the coding of Austria here reflects the preeminent level of bargaining (the industry level), rather than the preeminent level of authority.⁶⁴ There is also some disagreement about Switzerland and Japan, which are not treated as completely decentralized as is commonly

60. Golden 1993.

61. The weighing of p by itself (p^2) ensures that a very uneven distribution of members (that is, where a few unions dominate) leads to a lower N than if the unions were equal in size.

62. Card and Freeman 1993.

63. For presentational ease I will continue to refer to the transformed variable as C .

64. Still, Austria is the fourth most centralized system according to the index.

TABLE 1. *Unemployment rates in fifteen OECD countries depending on the centralization of wage bargaining and the conservatism of the monetary regime, 1973–93*

| <i>Conservatism of monetary regime</i> | <i>Centralization of wage bargaining</i> | | | |
|----------------------------------------|------------------------------------------|---------------------|-------------|-----------------|
| | <i>Low</i> | <i>Intermediate</i> | <i>High</i> | <i>Low-High</i> |
| Low | 8.0 (12) | 6.9 (12) | 3.8 (13) | 4.2 (37) |
| High | 7.9 (10) | 3.6 (25) | 7.1 (3) | 0.8 (38) |
| Low-High | 0.1 (22) | 3.3 (37) | −3.3 (16) | |

Sources: For dependent variable, *OECD Economic Outlook* (various years); for independent variables, see text and appendix.

Note: Data were grouped into five four-year intervals for each country. Entries refer to standardized rates, with number of observations (*N*) in parentheses. The figures have been corrected for period differences in unemployment.

done in the literature. To ensure that the results are not biased by this coding, I report the results of sensitivity tests that included or excluded any (or all) of these cases.

Findings

Table 1 is a simple cross-tabulation of the centralization and monetary regime variables using unemployment as the dependent variable.⁶⁵ The monetary regime variable was grouped into two categories with an equal number of observations, and the centralization variable was divided into three classes: a decentralized category where firm and plant-level bargaining dominate, an intermediately centralized category with most bargaining taking place at the industry or sectoral level, and a centralized category with an important role for peak-level bargaining between encompassing organizations of labor and capital. The latter category is, not surprisingly, the smallest, and the analysis is hampered by the fact that only three observations (two from Denmark and one from the Netherlands) are above the median in terms of the conservatism of the monetary regime. Still, the table gives a good preview of the econometric results to follow.

The most interesting part of the table is the bottom row, which shows the difference in unemployment rates between cases with “liberal” and “conservative” monetary regimes. Note that for low levels of centralization, the employment gain from having a restrictive regime is negligible, whereas for intermediately centralized bar-

65. The unemployment data is from *OECD Economic Outlook* (various years) and consists of standardized unemployment rates except for Austria, Denmark, and Switzerland, where only unstandardized rates are available. Figures for Germany refer to western Germany.

gaining systems the gain is very substantial (3.3 percent or about 1.25 standard deviations). The magnitude of effect is similar for highly centralized systems, but here a restrictive regime is associated with a net employment *loss*. This is consistent with the hypothesis that at some point of centralization the gains from having an effective monetary deterrent are outweighed by the losses from the inability (or unwillingness) of the monetary authority to facilitate intraconfederal distributive compromises through accommodating policies. In centralized systems where the monetary authorities have been willing to play this role—Norway and Sweden are exemplary cases until recently—employment performance has been very good. Conversely, in centralized systems where monetary authorities have been committed to very restrictive policy regimes—Denmark and the Netherlands in the early to mid-1980s are cases in point—intense distributional conflicts and high unemployment have ensued.

The data presented in Table 1 support the neocorporatist idea that a highly organized labor market is a necessary condition for full employment, and they undermine the neoliberal suggestion that a free labor market operating in a stable monetary environment is the most efficient institutional setup. On the other hand, the new classical penchant for independent central banks seems to resonate well with some of the evidence, even if the reasons are poorly specified within the new classical framework. Especially for the intermediately centralized category, a restrictive monetary regime seems to be conducive to good employment performance. Countries such as Switzerland, Austria, and Germany in the 1980s are cases in point, whereas the abysmal employment performance of countries such as Belgium and Italy (and Sweden after the recent breakdown of peak-level bargaining) warns of the potential costs of accommodating policies. On this background, the preoccupation in the neocorporatist literature with peak-level solutions to macroeconomic problems appears excessive, although it *is* a necessary condition for combining full employment with wage equality.

The conclusions from this simple descriptive analysis can be corroborated and elaborated through pooled cross-sectional time-series analysis. Following the most recent approach to this type of analysis, I use ordinary least squares (OLS) regression with lagged dependent variables and panel-corrected standard errors.⁶⁶ Thus, the basic regression model for the simple Calmfors-Driffill argument, omitting all controls, is

$$U_{i,t} \equiv a_i + b_1^+ C_{i,t} + b_2^- C_{i,t}^2 + b_5 I_{i,t-1} + b_6 U_{i,t-1} + e_{it} \quad (15)$$

where $U_{i,t}$ is the unemployment rate for country i at period t , and $e_{i,t}$ is an error term. The predicted direction of the effect of different variables are indicated with +/- signs above the b -coefficients. Thus, if the Calmfors-Driffill model is correct, b_1

66. Beck and Katz 1995.

should be positive and b_2 negative since this would imply a hump-shaped relationship.⁶⁷ The effect of $I(b_5)$ should be negligible according to the money neutrality thesis.

The present argument, however, gives reason for skepticism about the predictive power of the model in Eq. (15). The reason is that the relationship can be either hump-shaped or U-shaped depending on the character of the monetary regime. To allow for this possibility, I use the following transformation of Eq. (15) into a nonlinear interactive model:

$$U_{i,t} = a_i + (b_1^+ C_{i,t} + \bar{b}_2 C_{i,t}^2)(k - I_{i,t}) + b_5 I_{i,t} + b_6 U_{i,t-1} + e_{it} \tag{16}$$

where k is some positive number that depends on the scale of the monetary regime index (I), as well as the particular form of the interaction between central bank independence and bargaining structure. Compared to the simple Calmfors-Driffill model, the idea is that when the monetary regime becomes more restrictive (higher I), the deleterious inflation effects of intermediately centralized bargaining systems (the hump) decreases. Since I varies between 0 and 1, the relationship between C and U is hump-shaped for all $I < k$ (when the parameters for C and C^2 remain positive and negative, respectively), but U-shaped for all $I > k$ (when the parameters for C and C^2 turn negative and positive, respectively). This is best seen by multiplying through with $(k - I)$, and shifting the predicted signs accordingly:

$$\begin{aligned} U_{i,t} &= a_i + b_1^+ k C_{i,t} + \bar{b}_2 k C_{i,t}^2 - b_1^+ C_{i,t} I_{i,t} - \bar{b}_2 C_{i,t}^2 I_{i,t} + b_5 I_{i,t} + b_6 U_{i,t-1} + e_{it} \tag{17} \\ &= a_i + b_1' C_{i,t} + \bar{b}_2' k C_{i,t}^2 + \bar{b}_3 C_{i,t} I_{i,t} + b_4 C_{i,t}^2 I_{i,t} + b_5 I_{i,t} + b_6 U_{i,t-1} + e_{it} \end{aligned}$$

The second line of Eq. (17) simply substitutes b_1' and b_4' for $b_1 k$ and $b_2 k$, and b_3 and b_4 for $-b_1$ and $-b_2$. The resulting form of the model can be estimated directly with the predictions given by the $+/-$ signs in the second line of Eq. (17).

The analysis includes a number of control variables that have a potentially confounding effect on the results. The variables, including a brief discussion of their predicted effects, are as follows:

Density refers to union density rates measured by the reported membership of all unions as a percentage of the total number of wage earners in employment.⁶⁸ There is

67. To see this, note that the slope of the function is $\delta U / \delta C = b_1 + 2b_2 C$. If C is very small ($C \rightarrow 0$), the slope is positive, which requires b_1 to be positive; if C is high, the slope of the hump-shaped curve would be negative, which requires b_2 to be negative.

68. Visser 1996.

no agreement on this idea, but most economic theories imply that higher unionization rates exert upward pressures on unemployment and inflation.

Trade is defined as exports plus imports as a percentage of gross domestic product (GDP).⁶⁹ One argument here is that openness has a dampening effect on unemployment because of the disciplining effects of trade exposure.⁷⁰ A contrary argument is that competition from low-wage countries either reduces wages or raises unemployment among low-skilled workers.⁷¹

Exmar is the average annual percentage growth in a country's export markets.⁷² The simple logic here is that high rates of growth in a country's main export markets are expected to have a dampening effect on unemployment.

LR is an index of the partisan left-right "center of gravity." The index was developed by Thomas Cusack and is calculated by using (1) Francis Castles and Peter Mair's coding of parties' placement on a left-right scale, weighted by (2) the decimal share of votes, parliamentary seats, and cabinet portfolios.⁷³ The index can vary from 1 (extreme left) to 4 (extreme right), although most observations are much closer to the mean.⁷⁴ Following Douglas Hibbs, the prediction is that the stronger the left, the lower the level of unemployment.⁷⁵

UnOECD is simply the OECD average of the dependent variable for any given time period. It is designed to remove any international diffusion effects from a general change in unemployment. The expectation, of course, is that higher average levels of the dependent variable will raise the level of unemployment.

The results of the regression analysis are reported in Table 2. The result for the simple Calmfors-Driffill model is shown in column 1. In this form the effects of centralization on unemployment are not only insignificantly different from 0 but also carry the wrong signs. If anything, the overall relationship between centralization and unemployment is monotonically declining, although the results are too weak to permit clear conclusions. This "negative" finding, which is corroborated in a new study by the OECD, is entirely consistent with the theoretical argument.⁷⁶ There is simply no reason that centralization *by itself* should be related to unemployment, except perhaps in the sense that fragmented systems are more prone to create unemployment (which is what the data suggests). In the nonlinear interactive models, by contrast, the parameters for the centralization variables and their interactions with central bank independence all have the predicted signs and are statistically significant at a .05 level or better (with the exception of *C* and *I*, where strong results are not expected).

69. IMF, *International Financial Statistics Yearbook* (various years).

70. See Danthine and Hunt 1994; and Rama 1994.

71. Wood 1994.

72. OECD, *Economic Outlook* (various years).

73. Castles and Mair 1984.

74. The data are presented in Cusack 1997 and were generously supplied by the author.

75. Hibbs 1977.

76. OECD 1997.

TABLE 2. OLS estimates of the effects of institutional variables on unemployment (pooled cross-sectional time series, 1973–93)

| Regression estimates and standard errors | | | | | |
|------------------------------------------|----------------|-------------------------|----------------------|----------------------|------------------------------------------------|
| Nonlinear interaction model | | | | | |
| Variable | Predicted sign | Calmfors-Driffill Model | Full model | Reduced model | Full model (excl. Austria, Japan, Switzerland) |
| Intercept | | 2.65 (2.14) | -0.76 (2.42) | -0.52 (2.24) | -0.86 (2.54) |
| $C_{i,t}$ | + | -5.92 (5.87) | 10.14 (13.66) | 7.74 (6.78) | 7.62 (12.79) |
| $C_{i,t}^2$ | - | 2.21 (7.98) | -41.00** (19.68) | -37.62*** (11.53) | -44.17** (19.72) |
| $C_{i,t} * I_{i,t}$ | - | — | -56.71** (27.06) | -51.12*** (11.78) | -54.87* (28.73) |
| $C_{i,t}^2 * I_{i,t}$ | + | — | 144.10*** (46.06) | 136.11*** (31.47) | 155.49*** (55.93) |
| $I_{i,t}$ | ? | -1.51* (0.88) | 0.89 (3.99) | — | 0.28 (3.86) |
| $Un_{i,t-1}$ | | 0.70*** (0.08) | 0.60*** (0.08) | 0.60*** (0.08) | 0.40*** (0.10) |
| $UnOECD_t$ | | 0.06 (0.20) | 0.16 (0.19) | 0.16 (0.18) | 0.51** (0.22) |
| $Exmar_{i,t}$ | | -0.19 (0.12) | -0.20* (0.11) | -0.20* (0.10) | -0.13 (0.11) |
| $Trade_{i,t}$ | | 0.01 (0.01) | 0.01* (0.01) | 0.01* (0.01) | 0.02** (0.01) |
| $LR_{i,t}$ | | 0.31 (0.57) | 1.16* (0.66) | 1.19* (0.64) | 0.97 (0.85) |
| $Density_{i,t}$ | | 0.02 (0.02) | 0.02 (0.01) | 0.02 (0.01) | 0.02 (0.01) |
| N | | 75 | 75 | 75 | 60 |
| Adj. R^2 | | 0.75 | 0.80 | 0.80 | 0.79 |

Note: $C_{i,t}$ = centralization; $I_{i,t}$ = hard money index; $Un_{i,t-1}$ = lagged dependent variable; $UnOECD_t$ = average OECD unemployment at time t ; $Exmar_{i,t}$ = growth in country i 's export markets at time t ; $Trade_{i,t}$ = trade as a percentage of GDP; $LR_{i,t}$ = left–right index; $Density_{i,t}$ = union density rates. *** $p < .01$ (significance levels are based on panel-corrected standard errors).

** $p < .05$.

* $p < .10$.

The analysis suffers somewhat from strong collinearity between the independent variables.⁷⁷ But there is a simple remedy for the problem since it turns out that I , as expected from the money neutrality thesis, has no (or only a very marginal) effect on unemployment. The model is therefore substantively the same if we exclude I from

77. For example, R^2 is 0.96 when I is regressed on C , C^2 , CI , and C^2I simultaneously.

the regression (see column 3). Note that the coefficients are almost identical, but that the standard errors on the theoretical variables are now very small with t -scores in the 3–4 range ($p < .002$).

It is also noteworthy that the results are insensitive to the inclusion or exclusion of any particular country. This is especially important in the cases of Austria, Switzerland, and Japan where there is some disagreement about their exact classification on the institutional variables (as already noted). In fact, the results do not change much even if we exclude all three countries simultaneously, which is shown in the last column of Table 2. Clearly, the findings are not driven by the influence of a few controversial cases.

Figure 2 graphs the relationship between centralization and unemployment for two “typical” values on the monetary regime variable (defined as a single standard deviation above and below the mean).⁷⁸ Note that centralization has a dampening effect on unemployment in the case of an accommodating monetary regime, but that the relationship is U-shaped for a nonaccommodating regime so that both decentralized and peak-level bargaining is associated with high unemployment. The combination of these results implies a net employment gain from central bank independence for intermediately centralized cases (the light-shaded area in Figure 2), but a net loss for highly centralized cases (the dark-shaded area). These findings are exactly as predicted by the model, and the similarity between the predicted and estimated relationships (Figures 1 and 2, respectively) leaves little doubt about the close match between theory and evidence.

The only notable difference between prediction and evidence is the absence of a “hump” on the curve for accommodating regimes, which suggests that even governments with relatively dependent banks are quite concerned with inflation—an implication that is hardly surprising considering the sample of cases (all developed OECD countries) and the time period (post-1973). The relatively high unemployment figures at the decentralized extreme also suggest that collective action problems are rather severe in fragmented systems. This lends some support to those who argue that the relationship between centralization and unemployment is linear rather than hump-shaped,⁷⁹ but neither relationship generalizes to situations where the macroeconomic regime is restrictive.

The estimated relationships in Figure 2 assume that all control variables are held at their mean value, but the effects of these variables are interesting in their own right. Referring to the regression results for the full model in Table 2, trade turns out to be weakly associated with higher unemployment, whereas growth in export markets is associated with lower unemployment. Since export markets are expanding faster than domestic markets (that is, trade is growing as a share of GDP), the average net effect from trade (across time and countries) is in fact a small *reduction* in unemploy-

78. The curves are the estimated equilibrium levels of unemployment for different levels of centralization (restricted to the range of actually observed values).

79. For a review of this debate, see Golden 1993.

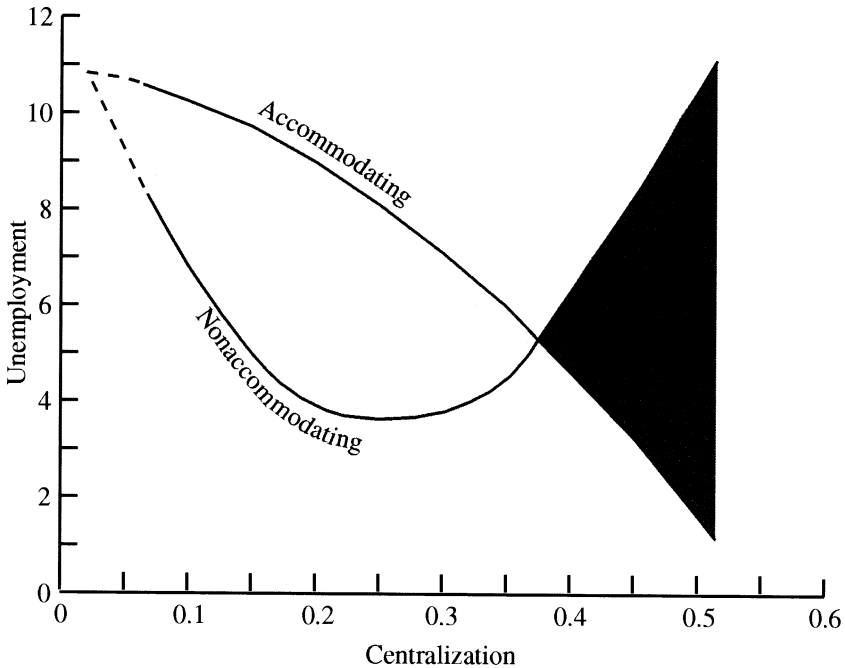


FIGURE 2. *The estimated effect of centralization of bargaining on unemployment depending on the restrictiveness of the monetary regime (the curves show the predicted level of unemployment for central banks whose independence is one standard deviation above or below the mean; predictions are based on the results for the full model in Table 2. The light-shaded area indicates a net employment gain from having an independent central bank; the dark-shaded area indicates a net employment loss; the dashed lines imply extrapolation)*

ment. Protectionism, in other words, does not appear to be an effective tool in the fight against unemployment.⁸⁰ Turning to the role of union density rates, there is a small (though statistically insignificant) unemployment-augmenting effect of unionization. However, the data does not lend much credence to the neoliberal notion that free (or “flexible”) labor markets combined with a conservative monetary regime are a recipe for full employment. To the contrary, if union density rates and wage bargaining centralization are both assumed to be 0, while the monetary regime is maximally conservative ($I = 1$), the regression results imply unemployment rates *above* the average (about 3 percent). If, in addition, we assume a right-wing political environment, we have to add another percentage point.

80. Although this assumes retaliation to unilateral trade restrictions (otherwise it would be possible for a country to reduce imports while benefiting from growing export markets).

Overall, the results do not indicate strong partisan effects,⁸¹ but this does not mean that partisanship is unimportant. Rather, it implies that partisan governments matter primarily because of the role they play in institutional (re-)design. For example, we would expect that left governments are more favorable to centralized bargaining and flexibly accommodating monetary regimes than right governments. Yet institutional reform is infrequent and presupposes support from well-organized societal actors, especially in the area of wage bargaining. Most of the time partisan governments will shy away from initiating difficult and risky institutional reforms and will instead adapt their policies to whatever “works” in a given institutional environment. The next section elaborates this idea and presents evidence that wage bargaining systems and monetary regimes tend to exhibit equilibrium properties over time.

Institutional Design

Considering the amount of research on the consequences of central bank independence, it is surprising how few insights have been generated into causes of cross-national variance in independence. Instead, the new classical literature presents us with a puzzle: if there are benefits to having an independent bank but no apparent costs, why do we see so much institutional variance?⁸² By contrast, if monetary policies have real effects that vary systematically across bargaining systems—as argued in this article—then there is good reason to expect monetary regimes to also vary systematically. In particular, while governments may seek to retain policy flexibility in decentralized systems—where the costs of accommodation are small—in intermediately centralized systems sociotropic voting would furnish governments of all stripes with a strong electoral incentive to adopt restrictive regimes. Similarly, in highly centralized bargaining systems, all governments would have a strong incentive to adopt flexibly accommodating regimes.

The institutional design argument also pertains to bargaining centralization. In neocorporatist theory, centralization is explained as an attempt to control wage costs, but the present analysis highlights the possibility that conservative monetary regimes permit cost-control *without* centralization. This is important because bargaining systems are not distributively neutral. Centralized bargaining typically involves intrusive restrictions on employers’ discretion over firm-internal wage structures, and it usually strengthens the bargaining power of low-wage workers relative to high-wage workers. Institutional design is therefore a political game that involves distributive

81. The same is the case if the partisanship variable is used in a conditional form that depends on the centralization of the bargaining system (as suggested by Lange and Garrett 1985).

82. For example, Grilli, Masciandaro, and Tabellini have argued that “having an independent central bank is almost like having a free lunch; there are benefits but no apparent costs in terms of economic performance.” Grilli, Masciandaro, and Tabellini 1991.

struggles between partisan governments and sectoral interests of employers and workers. Clearly, such institutional contestation can result in temporary “disequilibria” and high unemployment, but over time we should expect stable coalitions to be formed behind either centralized bargaining with an accommodating regime or intermediately centralized bargaining with a nonaccommodating regime.

The data in Table 3 lend support to this hypothesis. The table shows two different measures of how often particular combinations of bargaining systems and currency regimes are observed over the 1973–93 period. I have used the hard-currency index as a measure of the monetary regime because it is particularly sensitive to policy changes and therefore gives the best indication of the extent to which governments actively seek to maintain macroeconomic policies in “equilibrium” with the bargaining system. The first row of the table lists the number of years that a particular combination is observed (subject to the constraint that at least two consecutive years fall into the same category).⁸³ Note that among intermediately centralized and highly centralized systems—where the theoretical predictions are clearest—currency regimes have the predicted orientation close to 90 percent of the time.

The second row of the table shows the results when observations are defined in terms of “regimes.” A regime refers to a string of annual observations that contains more than five consecutive years in the same category (and was not broken by a string lasting more than five years). Half a decade seemed like a reasonable period of time for winning coalitions to form behind particular institutional setups. Stable regimes should therefore only be observed in the “equilibrium” cells. This expectation is confirmed since there are no observations in the off-diagonal cells (for intermediately and highly centralized systems). Sooner or later, it appears, either governments or private collective actors adapt their behavior to one of the “equilibrium” outcomes.

These results obviously do not say anything about whether monetary regimes are more likely to adapt to the bargaining systems, or vice versa, and there is in fact no reason to presume that the causal arrow runs in one direction only. Clearly, the analysis of such dynamics presuppose detailed historical case studies—a task that is beyond the limits of this article.⁸⁴ However, by specifying the consequences of political-economic institutions for outcomes that affect the interest realization of political-economic agents, the proposed model provides important building blocks for a theory of institutional design. Comparative political economy has long sought to understand

83. Bargaining systems are divided using the same divisions as in Table 1. The time constraint was imposed because a small deviation in the level of bargaining for one or two years probably does not constitute a significant change in the bargaining system.

84. There is at least some scattered evidence that the dynamic predictions of the model are correct. For example, Fritz Scharpf has shown that the German experimentation with centralized coordination during the Concerted Action period (1967–77) was accompanied by politicization of monetary policies and even a challenge to the independent constitution of the central bank. See Scharpf 1991, chaps. 9, 10. Likewise, when national peak-level bargaining disintegrated first in Denmark and then in Sweden, political and economic pressures mounted either to alter the monetary regime in a nonaccommodating direction or to resurrect centralized bargaining. See Iversen 1996.

TABLE 3. *The incidence of bargaining systems and currency regimes across fifteen OECD countries, 1973–93*

| Currency regime | Centralization of wage bargaining | | | Sum |
|----------------------|-----------------------------------|-----------------------|----------------------|-----|
| | Low | Intermediate | High | |
| Soft | | | | |
| Years ^a | 79 (85) | 19 ^c (13) | 66 (88) ^d | 164 |
| Regimes ^b | 4 | 0 | 4 ^d | 8 |
| Hard | | | | |
| Years | 18 (15) | 124 (87) ^d | 9 ^c (12) | 151 |
| Regimes | 1 | 7 ^d | 0 | 8 |
| Sum | 97 | 143 | 75 | |
| | 5 | 7 | 4 | |

Sources: See text and appendix.

^a“Years” refers to the number of consecutive yearly observations in each category (more than two years must be consecutive).

^b“Regime” refers to the number of instances where a country exhibits a particular institutional combination for more than five consecutive years (if the series is “broken” for less than five years, the entire period is counted as a single observation).

^cObservations are from Belgium (1981–84), Britain (1975–77), Denmark (1980–82), Finland (1980–82), Italy (1976–78), and Sweden (1990–93).

^dCurrency regimes with the predicted orientation.

^eObservations are from Belgium (1973–75), Denmark (1983–85), and the Netherlands (1982–84).

the possible trade-offs among unemployment, inequality, and inflation and to link such trade-offs to partisan politics. The present analysis contributes to this effort by specifying how the trade-offs are shaped by the interaction between monetary regimes and bargaining institutions, and it points to the possibility for systematically tying partisan preferences over economic outcomes to the politics of designing these institutions.

The model is also important for understanding the domestic institutional consequences of changes in the global economy—what Peter Gourevitch has dubbed “second-image reversed” explanations.⁸⁵ If increased international capital mobility has made it more costly for governments to pursue inflationary monetary policies—as widely argued in the IPE literature—then capital mobility clearly presents a challenge to domestic political economies that are characterized by centralized bargaining institutions and accommodating monetary regimes. In this sense, at least, globalization may have played an important role in the recent collapse of centralized bargaining in Denmark first and then in Sweden.

85. Gourevitch 1978.

Conclusions

Since the late 1970s most advanced industrialized democracies have adopted restrictive monetary regimes, some in response to external economic pressures. According to standard economic theory, this rise of monetarism has had negligible effects on real economic variables but has everywhere helped to reduce inflation. This article presents an alternative view. Once we take into account the wage-setting context in which monetary policies are made, the conservatism of the monetary regime can have important effects on both unemployment and income distribution. The key is the role that monetary policies play in the coordination of union wage strategies. Thus, in intermediately centralized systems, restrictive monetary policies can facilitate the solution of collective action problems by reducing the capacity of unions to externalize the costs of militancy. In centralized systems, by contrast, the capacity of unions to exercise self-restraint can be jeopardized by a conservative monetary policy that clashes with union internal compromises over distribution. Only in decentralized systems, where unions are too small to influence aggregate prices, do monetary policies fail to have any real effects. These dynamics are also overlooked in neocorporatist theory because, as a mirror image of new classical economics, this approach neglects the role of the monetary context in which wage bargaining takes place.

One of the most obvious policy implications of the synthesizing model is that the planned European Monetary Union may have deleterious consequences for unemployment. Regardless of the constitution and policies of the European Central Bank, it will not be able to generate the kind of intimate strategic interplay between wage and monetary policies that is required to produce superior employment outcomes. Instead, a European central bank will undermine institutional arrangements in the member countries that currently facilitate such a virtuous interplay. The reason is simple, but not obvious: any enlargement of a currency area, even if the inflation commitment remains exactly the same, will generate a *de facto* decentralization of the wage bargaining system. Since well-organized labor markets are a necessary condition for high employment performance, such decentralization is a sufficient condition for creating chronically high levels of unemployment.

The lesson for countries that currently exhibit coordinated wage bargaining in an appropriate macroeconomic institutional setting would therefore appear to be to stay outside the projected monetary union. For countries seeking to institute more deflationary monetary regimes, the lesson would appear to be that they are better off doing so through *internal* institutional solutions (in the form of more independent central banks, for example) than through a European-wide solution (in the form of a single currency). But these choices may already have been undermined by the creation of a *de facto* European currency area, anchored to the German Mark, which has raised the reputation costs of pursuing independent policies. In this sense the growing effectiveness of the European Monetary System during the 1980s and early 1990s may already have produced the decentralization effect implied by the model, which in turn

may explain some of the rise in the European equilibrium rate of unemployment over the 1980s.

If this is true, as seems plausible, the best possibilities for cutting high European unemployment rates lie either in the formation of an effective European-wide coordination of wage bargaining or in the creation of a less-restrictive European monetary regime. The first possibility would counteract the process of decentralization that results from currency area enlargement; the second possibility would reduce the real wage and unemployment effects of (inflationary) solidaristic wage policies that are not liable to change with monetary integration.

Appendix: Calculating Centralization of Wage Bargaining

The operational definition of centralization, C , is $(\sum w_j p_{ij}^2)^{1/2}$, where w_j is the weight accorded to each bargaining level j ($\sum w_j = 1$), and p_{ij} is the share of workers covered by union (or federation) i at level j . Information about the concentration of union membership at each level of bargaining (p_{ij}) was obtained from Jelle Visser,⁸⁶ and (for the most part) the following national statistical sources (various years): ÖGB, *Tatigkeitsbericht* (Austria); Danmarks Statistik, *Statistisk Årbog*, *Statistisches Jahrbuch* (Germany); Statistisk Sentralbyrå, *Statistisk Årbok* (Norway); Statistiska Centralbyrån, *Statistisk Årsbok* (Sweden); Suomen Tilastollinen Vuosikirja (Finland); Japan Labor Bulletin (Japan); Sociale Maandstatistiek (continued in *Sociaal-economische Maandstatistiek*) (Netherlands); and Bundesamt für Statistik, *Statistisches Jahrbuch* (Switzerland).⁸⁷ The weights (w_j)—listed in Table A1—depend on (1) the predominant level(s) at which bargaining takes place, and (2) the enforceability of bargaining agreements. The weights were assigned to every bargaining round in each country over the twenty-one-year period from 1973 to 1993. Only three levels of bargaining were used in the classification: peak-level bargaining, sector- or industry-level bargaining, and firm- or plant-level bargaining.

The degree of enforceability refers to the capacity of bargaining agents to implement their agreements. Enforceable agreements presuppose that bargaining agents control most strike and lockout funds and can impose fines for noncompliance (particularly important on the employer side). Nonenforceable agreements are those in which the bargaining agents lack credible threats of sanctions (included here are several instances of “incomes policies”⁸⁸). In some borderline cases, noted in the table, bargaining agents exercised partial enforcement capacity.

86. Visser 1989.

87. Union membership figures in Belgium are not recorded in any official statistics. At the confederal level figures for some years are reported in Bain 1988, 159; figures for other years have been estimated by interpolation. Considering the relative stability of fragmentation at this level, this poses no serious problems. Figures at the industry–sector level are based on information about the number of affiliated unions and the membership in unions with more than 100,000 members in 1985 (see Hutsebaut 1987). For unions with less than 100,000 members, it has been assumed that membership is evenly distributed

88. Flanagan, Soskice, and Ulman 1983.

In carrying out the coding, the monthly monitoring of bargaining in the *European Industrial Relations Review* (EIRR) was an invaluable source for information. I have also greatly benefited from the data collected for the collaborative National Science Foundation project on centralization by Miriam Golden, Michael Wallerstein, and Peter Lange.⁸⁹ This information has been supplemented with descriptions of particular national bargaining systems.⁹⁰ In the case of Japan (which is not covered by the EIRR), the classification is based on work by David Soskice, Taishiro Shirai, and news reports in the *Japan Labor Bulletin*.⁹¹

If some bargaining took place at the local level, $1/N$ is assumed not to be significantly different from 0. With two decimals for the centralization index, and assuming equally sized local unions, this assumption is satisfied whenever $n > 200$ at the lowest bargaining level (since $1/(n > 200)$ is less than .005), which is always the case.

Data on the number of industry- or sector-level agreements, and the number of workers involved, is spotty for countries where the predominant levels of bargaining are the plant and firm levels (Britain, Canada, France, Italy, and the United States).⁹² Instead, I have simply assigned centralization (C) scores (before the square-root transformation) to these countries—*except* for years where some centralized bargaining did occur—as follows: .005 (the United States and Canada), .01 (France), .015 (Britain), and .02 (Italy). This recognizes that these systems are not completely decentralized yet codes them as less centralized than any of the systems in which industry (or peak-level) bargaining predominates (the minimum centralization score for the latter—before square-root transformation—is about .05). The empirical results are very robust to changes in this procedure *as long as* the centralization scores for the fragmented bargaining systems are below those in which industry- and/or peak-level bargaining predominates.

Based on *average* centralization scores over the entire 1973–93 period, the ranking of countries according to degree of centralization is as follows (with the mean centralization score in parentheses): (1) Norway (.538), (2) Sweden (.487), (3) Denmark (.459), (4) Austria (.431), (5) Finland (.421), (6) Netherlands (.375), (7) Germany (.337), (8) Belgium (.321), (9) Japan (.254), (10) Switzerland (.250), (11) Italy (.179), (12) Britain (.177), (13) France (.121), (14) Canada (.071), (15) United States (.071).

The rank-order correlations with existing indexes of centralization are .87, .89, and .91⁹³

89. Golden and Wallerstein 1995.

90. See Markovits 1986; Due, Madsen, Jensen, and Petersen 1994; Crouch 1993; Golden and Wallerstein 1995; Flanagan, Soskice, and Ulman 1983; Windmuller 1987; Baglioni and Crouch 1991; and Ferner and Hyman 1992.

91. See Soskice 1990; and Shirai 1987.

92. Golden and Wallerstein 1995, 33.

93. Indexes are Cameron 1984; Schmitter 1981; and Calmfors and Driffill 1988, respectively.

TABLE A1. Classification scheme for centralization of authority

| <i>Weight</i> | <i>Definition</i> |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Centralized | |
| 0.9, 0, 0.1 | National associations monopolize wage bargaining, and agreements are enforceable. Lower-level bargaining is banned (Norway, 1988–89). |
| 0.8, 0, 0.2 | National associations monopolize bargaining, and agreements are enforceable. Local bargaining is permitted subject to a peace clause (Belgium, 1973–75; Denmark, 1973–79, 1985; Norway, 1973, 1976–80, 1983, 1985, 1990–93; Netherlands, 1973; Sweden, 1973–82, 1983, ^a 1985, ^a 1986, 1989 ^a). |
| Intermediately centralized | |
| 0.5, 0.3, 0.2 (0.5, 0, 0.5) ^c | National associations negotiate central agreements with some capacity for enforceability, but industry-level organizations retain the right to bargain separate agreements without adherence to a peace clause (Finland, 1974–79, 1981, 1984, 1986, ^b 1987, 1989–93; Netherlands, 1982–84; Japan, 1973–93 ^c). |
| 0.1, 0.7, 0.2 | National associations and/or the government set nonenforceable targets for lower-level bargaining, but industry-level organizations retain rights to bargain enforceable agreements. Local bargaining is permitted subject to a peace clause (Austria, 1973–93; Belgium, 1977, 1981–85, 1989–93; Denmark, 1983, 1987, 1989, 1991, 1993; Finland, 1973, 1980, 1983, 1988; Germany, 1973–77; Netherlands, 1974–81, ^{de} 1985–93; Norway, 1974, 1982, 1984; Sweden, 1984, 1988, 1991–93). |
| 0, 0.8, 0.2 | Industry-level organizations monopolize bargaining and strike-lockout decisions, and agreements are enforceable. Local bargaining is permitted subject to a peace clause (Belgium, 1979, 1987; Denmark, 1981; Germany, 1978–93; Norway, 1986; Switzerland, 1973–93). |
| Decentralized | |
| 0.1, 0, 0.9 | National associations and the government set nonenforceable targets for plant-level bargaining, but local organizations retain rights to bargain and to call strikes or lockouts (Britain, 1974–78; Italy, 1976–78; France, 1981–84). |
| 0, 0.1, 0.9 | Plant- and firm-level bargaining predominates with some elements of industry-level bargaining (United States, 1973–93; Canada, 1973–95; Italy, 1973–75, 1979–93; France, 1973–80, 1985–95; Britain, 1979–93). |

^aIn these instances bargaining is simultaneously carried out by peak-level organizations and by industry organizations depending on the bargaining area. For simplicity all bargaining is considered to take place at the peak level, and the calculation of the centralization score takes into account the coincidence of industry- and peak-level agreements. The exceptional bargaining rounds are for 1983, 1985, and 1989 when separate agreements were concluded in the metalworking sector.

^bEarly in the year, wage agreements were reached at the sectoral level, but they were superseded by a centralized agreement later in the year.

^cThe Japanese system is unique because the industry–sectoral level plays no role in the bargaining process. The weight for the intermediate level is therefore *de facto* zero. In 1987 the four major confederations—Sohyo, Shinsanbetsu, Churitsuroren, and Domei—merged to form a single confederation, Rengo. This greatly increased the centralization of the Japanese system.

^dIn 1976 the two main federations, NVV and CNV (and its member unions), merged to form the Dutch Federation of Trade Unions (FNV).

^eIn 1979 the white-collar union MHP was formed.

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