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WHY SMALLER COUNTRIES ARE MORE HIGHLY ORGANIZED,

by

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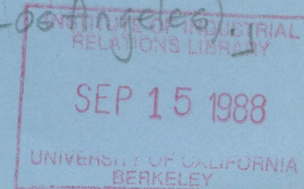
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**Union Growth from the Unions' Perspective:  
Why Smaller Countries Are More Highly Organized**

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**February 1988**

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## Abstract

This paper presents an explanation of cross-national differences in unionization rates among advanced industrial societies. Union growth is considered from the point of view of unions who must decide on the amount of resources to be allocated to recruiting new members. The benefits of higher levels of union density are balanced against the costs of organizing. The optimal level of unionization is shown to depend, among other things, on the size of the work force. The conclusion is tested with cross-national data on union density in the late 1970s.

## 1. Introduction

Few features of economic, social or political life in industrialized democracies differ as much as the relative size of the trade union movement. The current density of union membership in the labor force ranges over almost the entire spectrum from close to 90 per cent of wage and salary workers in Sweden to under 20 per cent in the United States today [Troy and Sheflin, 1985]. The level of unionization varies far more than other characteristics of the labor force such as the sectoral distribution of the workers, the share of wages in GNP, current rates of unemployment or even the size of the public employment. Unionization rates vary more than other forms of popular mobilization such as electoral turnout or the share of the vote received by parties bearing socialist, social democratic or labor labels.

The economic effects of high levels of unionization are ambiguous. On the one hand, the unions' capacity to raise wages and improve working conditions through collective bargaining depends on the proportion of the work force the unions have organized. Unions with greater control over the supply of labor can threaten firms with more damaging strikes. On the other hand, unions which encompass a larger share of the labor force have stronger incentives to take account of the impact of negotiated wages and benefits on aggregate economic performance [Olson 1982]. A union which covers only a small fraction of an industry's work force, for example, can gain wage increases at the expense of employment among non-union members provided that the members have specialized skills not readily available elsewhere. In contrast, an industrial union covering the entire work force would be concerned with employment in all job categories. Bigger unions are not necessarily more militant unions [Cameron 1984].



The political consequences of high levels of unionization are more straightforward. There is general agreement that, ceteris paribus, union movements which represent a large share of voters are better able to influence policy. Union density is often used, either alone or in combination with measures of union centralization and unity, as an indicator of union power in cross-national comparisons of employment and welfare policy [Korpi 1983; Korpi and Shalev 1979, 1980; Stephens 1980; Cameron 1978, 1984; Hicks and Swank 1984a, 1984b; Hicks 1987]. In addition, high levels of unionization are positively associated with the electoral support received by socialist, social democratic or labor parties [Korpi 1983, Shalev and Korpi 1980, Stephens 1980, Przeworski and Sprague 1986].<sup>1</sup> Union density is clearly an important, albeit not the only, determinant of union strength in both the market and the political arena.

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Table One About Here

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Table One presents union membership as a percentage of potential members (defined as all wage and salary earners plus the unemployed) in advanced industrial societies in the late 1970s.<sup>2</sup> The distribution of

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<sup>1</sup> The direction of causality is unclear. This question is discussed at length below.

<sup>2</sup> Collecting data on union density is fraught with difficulties [Bain and Price 1980: Ch. 1]. Membership figures are provided by the unions with the inevitable result that their reliability varies from country to country. Union members are defined to be the people listed on the unions' membership rolls. This is generally close to but larger than the number of people who pay union dues: apprentices, unemployed and retired workers are often exempted from the payment of dues and all unions allow members to be in arrears for a period of time before being struck from the list. In France, however, the proportion of workers on the membership rolls who pay dues is probably around ten per cent [Adam 1983]. Unions may have an incentive to inflate their membership figures to impress employers or the government or

Table One

Union Membership as a Percentage of Potential Union Members  
in Advanced Industrial Democracies in the late 1970s<sup>a</sup>

Country	Year	Density
Sweden <sup>b</sup>	1979	82.4
Israel <sup>c</sup>	1979	80.0
Iceland	1975	74.3
Finland	1980	73.3
Belgium	1977	71.9
Denmark	1980	69.8
Ireland	1978	68.1
Austria	1977	65.6
New Zealand	1979	59.4
Norway	1979	58.9
Australia	1979	51.4
Italy	1978	50.6
United Kingdom	1976	48.0
Germany	1979	39.6
Netherlands	1979	37.7
Switzerland	1979	35.4
Canada	1980	31.2
Japan	1979	31.0
France	1979	28.2
United States	1978	24.5

Notes: Data sources are listed in the appendix. Union density in Luxembourg in 1978 was over 60 per cent [Coldrick and Jones 1979]. How much over is impossible to say as membership data for two of the three large labor organizations outside the main confederations are unavailable.

- (a) Potential union members are defined to be all wage and salary earners plus the unemployed.
- (b) Bain and Price [1980: 143] report a significantly higher unionization rate for Sweden of 92.9 in 1977. Bain and Price note that their figure for Sweden includes retired union members which they estimate to comprise between three and eight per cent of the total [139].
- (c) Dividing membership in the Histadrut by total wage and salary earners plus the unemployed results in a unionization rates of around 150 per cent. Coldrick and Jones [1979: 1179] estimate that 85 per cent of wage earners are members of the Histadrut while the estimate of the U.S. Department of Labor [1980: 145] is between 75 and 80 per cent. The figure of 80 per cent seems a suitable compromise.

unionization rates was surprisingly uniform between the extremes of Sweden and Israel on the one hand and the United States on the other. In particular, while the United States was at the low end of the spectrum, it is hardly in a class of its own. The unionization rates in France, Japan and Canada were only slightly higher.

Cross-national differences in union density have increased since the mid 1950s, with unionization steadily declining in countries at the low end of the spectrum such as the United States and Japan while continually growing in countries at the high end such as Sweden and Denmark [Bain and Price 1980, Troy and Sheflin 1985]. Yet the relative positions of countries for which time series data exist have not changed much in the past three decades. The variation of union density across countries in the postwar period is far more dramatic than the variation over time within any country for which data are available.

While there has been little work which attempts to explain cross-national differences in union density, there is a large and interesting empirical literature on the dynamics of union growth.<sup>3</sup> In fact Samuel Gompers was one of its first theorists. In 1904 he presented his theory as

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to increase their representation in the national union confederation. However, unions also have an incentive to deflate their membership figures in order to reduce the dues owed the confederation. Membership figures often include retired workers who maintain their membership and thus overstate the proportion of the work force that is unionized. At the same time, membership figures are often understated in that members of unions not affiliated with the major union confederations are excluded. In sum, there appears to be no clear bias in union membership figures, just a lot of measurement error. An additional difficulty in comparing union density figures stems from differences in the definition of the denominator. For this reason we collected figures for union membership, not union density, and divided by a measure of the potential membership size obtained from OECD data.

<sup>3</sup> This discussion of the literature on union growth is drawn from a more extensive historical and critical survey by Adam Przeworski [1984].

follows:

From the formation of the first bona fide trade union movement in modern times, it has grown with each era of industrial activity and receded to some degree with each industrial depression, but with each recurring period of depression it has receded to a lesser degree than its immediate predecessors [cited in Lorwin 1933: 233].

This business cycle hypothesis was taken up by John Commons and his associates at the University of Wisconsin [1911; 1918] and seemingly confirmed in empirical studies by Barnett [1916] and Weyworth [1917]. During periods of high demand for goods and tight labor markets, the reasoning went, rising prices eroded real wages prompting workers to join unions in defense of their real income while the greater effectiveness of strikes lowered the resistance of employers.

In the 1920s, however, the business cycle hypothesis suffered major damage by the failure of unions to grow. When unions began to rebound in the depths of the Great Depression, the pro-cyclical hypothesis appeared decisively refuted.<sup>4</sup> Dunlop [1949] inaugurated a new phase of the discussion with an argument that union growth occurs either in periods of war when demand is particularly high and labor in particularly short supply, or in periods of "fundamental unrest" when the organization of unions "represented a basic dissatisfaction with the performance of the economic system and the society in general" [191]. In the early 1950s, Bernstein

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<sup>4</sup> Of the unions in the eight countries studied by Bain and Price [1980]--Australia, Denmark, Canada, Germany, Great Britain, Norway, Sweden and the United States--all but the Swedish unions declined during the 1920s and early 1930s, and all but the German unions (which were destroyed) grew rapidly during the late 1930s and 1940s.



[1954] called for a "pluralist" conception of union growth that allowed for different causes of union growth in different historical periods. In fact, Bernstein gave greatest emphasis to the impact of legislation. Shister [1953], similarly doubtful about the explanatory power of the business cycle hypothesis, argued that union leadership was decisive.

Ashenfelter and Pencavel [1969] initiated the third and final phase of the discussion by successfully fitting a relatively simple equation to union membership in the United States between 1904 and 1960. An econometric literature soon developed in which scholars estimated time series models of union membership data from the turn of the century to the recent past in a half dozen countries [Hines 1964, 1969; Sharpe 1971; Swidinsky 1974; Bain and Elsheikh 1976]. The thrust of the econometric results can be summarized in three findings. (1) The rehabilitation of the business cycle hypothesis: Business cycle variables, primarily price inflation and secondarily unemployment and wage inflation explain most of the variance of yearly changes in union membership in all countries. (2) The saturation effect: As union density increases, union growth slows down. (3) The relative unimportance of political variables: Political variables, by and large, did not appear to have a discernable effect on union growth. For example, George Bain and Farouk Elsheikh [1976] fit a business cycle model of union growth in four countries, United Kingdom, United States, Australia and Sweden. Only in the Australia prior to 1913 and United States from 1937-1947 did the fit of the model improve with the addition of a dummy variable. Other political variables had no impact.

The new business cycle models have not escaped criticism. Moore and Pearce [1978], Sheflin, Troy and Koeller [1981] and Fiorito [1982] have shown that the models lack stability: when estimated for the postwar period

alone, many of coefficients on the key cyclical variables lose significance and even flip sign. Moreover, the connection between the statistical models of union growth and economic theory is vague. Unions tend to be portrayed as defending whatever happens to be the income of their current members rather than maximizing some objective function under the constraint of the response of employers or the government.<sup>5</sup> Most importantly for the subject of this paper, the source of the large cross-national differences in union density remains a mystery when union growth is primarily explained by the state of the business cycle. That virtually the same model fits both Sweden and the United States reveals how little light this work sheds on the sources of cross-national variation.

This paper presents a formal model of union size as a consequence of strategic choices made by unions and an empirical application to the question of the variation of unionization rates among advanced industrial societies. Union growth is modeled from the unions' point of view. The key decision which is analyzed is the allocation of resources by unions to the recruitment of new members. Unions are not, of course, the only actors whose choices affect the level of unionization. In fact, discussions in the literature tend to devote much more attention to the decision of unorganized workers whether or not to join a union and the decision of employers whether or not to resist unionization. The hypothesis that is developed and tested here, however, is that international differences in the costs and benefits of expansion to already organized workers is an important part of the explanation of the cross-national differences displayed in Table One.

That the level of unionization is the subject of strategic decisions

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<sup>5</sup> See Michael Shalev [1980] for a similar controversy in the context of models of strike activity.

made by unions is an uncommon assumption in comparative politics.<sup>6</sup> Craft unions, unions that restrict entry, are not very popular among those who are not members, scholars included. The restrictive practices of the American Federation of Labor (AFL) are attributed to the "nativism" or the "racism" of American workers. In Great Britain the "labor aristocracy" is charged not only with betraying their fellow class comrades but with sharing the spoils of imperialist exploitation. On the other hand, unions which are committed to organizing "every man who earns his livelihood either by his brain or his muscle", in the words of Big Bill Haywood at the founding convention of the Industrial Workers of the World (IWW) [quoted in Weinstein 1975: 9], are regarded as examples of selfless, if impractical, dedication to the ideals of class solidarity. In contrast to both views, unions are regarded here as organizations seeking to do the best for their members under different circumstances, whether at a particular time they aggressively mount organizing drives or let membership decline through attrition and retirement.

In the next section cooperative bargaining theory is used to model the impact of union density on the outcome of collective bargaining. The model is expanded in the third section to derive the optimal size of the union from the members' point of view. The analysis of the comparative statics of the model reveals the impact of changes in the model's parameters on the

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<sup>6</sup> Richard Block [1980] and Richard Freeman and James Medoff [1984] have recently argued that declining union expenditures on organizing are part of the explanation of the postwar decline in union density in the United States. However, whether or not organizing expenditures have declined depends on the deflator used [Voos 1984b]. Organizing expenditures per unorganized worker deflated by an index of average hourly earnings declined substantially between 1953 and 1974. Deflated by the consumer price index, organizing expenditures per non-union member have been roughly constant.

unions' preferred size. The central implication of the analysis which relates union density to the size of the potential union membership is tested in section four. In the concluding section, the argument is generalized to encompass political objectives on the part of unions as well as the density of interest groups other than trade unions. The paper ends with a discussion of implications for the classic question in comparative industrial relations of "American exceptionalism".

## 2. A Model of Collective Bargaining and Union Density

Without a capacity to disrupt the supply of labor to employers, unions would be powerless participants in collective bargaining. As Wilkinson and Burkitt have written: "The ultimate sanction of union power is the ability to undertake strike action and so impose losses upon the employers of an industry" [1973: 113]. Or as Lazear put it: "That workers can impose a cost . . . on a firm endows them with a property right" [1983: 56]. The cost that unions can impose depends on the solidarity, not only of their members, but of all who could take their place. Unions seek to recruit new members because the presence of unorganized workers who can perform the same tasks as union members limits the gains unions can obtain at the bargaining table.

The impact of union density on the outcome of collective bargaining can be illustrated by introducing the level of unionization in a cooperative game model of collective bargaining initially developed by George de Menil [1971] and Ian McDonald and Robert Solow [1981]. Both unions and firms are assumed to be perfect agents of their (risk-neutral) constituents: firms

maximize profits and unions maximize the expected income of union members.<sup>7</sup>

Let the expected income of union members be written as:

$$u = \Theta(L)w + [1 - \Theta(L)]r, \quad r > 0, \quad (1)$$

where  $\underline{L}$  represents the firm's demand for labor,  $\Theta(L)$  represents the probability of being employed at the union wage,  $\underline{w}$  represents the union wage and  $\underline{r}$  is the (strictly positive) income workers can expect to receive if they are laid off or their reservation wage. The reservation wage consists of transfer payments and/or wages from non-union jobs or, if workers remain unemployed, whatever value workers attach to leisure. The assumption that workers are risk neutral, or maximize their expected income rather than their expected utility, simplifies the analysis without altering the conclusions regarding the optimal union size.

Firms enter collective bargaining seeking to maximize their profits:

$$\pi = R(L) - wL, \quad R_L > 0, \quad R_{LL} < 0, \quad (2)$$

where profits,  $\pi$ , is the difference between the firm's revenues,  $R(L)$ , and the wage bill,  $wL$ . As is conventional, the marginal revenue product of labor is assumed to be positive and diminishing as employment increases with other inputs held constant. (Subscripts will be used to denote partial differentiation throughout.)

Equations (1) and (2) together define the set of possible bargaining agreements. The outcome of bargaining also crucially depends on the disagreement point, that is the outcome which prevails if the two sides can't agree. It is natural to assume that workers on strike receive their

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<sup>7</sup> Other possible objectives which might be imputed to unions are discussed at the end of the paper.

reservation wage.<sup>8</sup> Letting  $u^S$  be the income of union members in the event of a strike,  $u^S = r$ . The gain for workers if an agreement is signed is

$$u - u^S = \Theta(w - r), \quad (3)$$

where  $(w - r)$  is the union wage differential.

The cost of a strike to firms depends upon the level of production that firms can maintain without the striking workers. In previous work it has generally been assumed that profits go to zero in the event of a strike [McDonald and Solow 1981, Wallerstein 1987]. Yet the extent to which a firm will have to reduce production depends, among other things, on the proportion of the firms' plants which are organized and the availability and willingness of other workers to take the place of those on strike. The effectiveness of a strike, in other words, depends on the proportion of the relevant, i.e. substitutable, work force which the union has organized. Let  $M$  be the number of union members in the local bargaining unit,  $EM = m$  be the total membership of the union,  $n$  be the number of available workers, including both those in the union and those outside the union, and  $\mu = m/n$  be proportion unionized or the union density. In the event of a strike, then, let the firm's expected profits be written:

$$\pi^S = S(\mu, x), \quad S_\mu < 0, \text{ and } S_{\mu\mu} > 0. \quad (4)$$

That  $S_\mu < 0$  indicates that profits during a strike are a declining function of the proportion of the available workers who are members of the union. It is assumed that  $S_{\mu\mu} > 0$  since, at least at high levels of unionization, further increases in union density must have a diminishing marginal impact on the union's power to reduce production. The variable  $x$  is a vector

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<sup>8</sup> Assuming striking workers receive some fraction of their reservation wage changes little.



representing all of the other factors aside from the level of unionization which affect the profits or losses firms would sustain during a strike: the level of the firm's inventories or the demand for the firm's output, the support that the union or the employers could expect from the government and the legislation covering industrial conflict. Note that  $S(\mu, x)$  may be negative if production is largely halted and there are significant fixed costs. Thus, the incentive firms have to reach an agreement is:

$$\pi - \pi^s = R(L) - wL - S(\mu, x). \quad (5)$$

There are multiple solutions which have been proposed to the bargaining problem. In one frequently studied case, however, where the number of union members in the bargaining unit exceeds or equals the demand for labor and all union members are equally likely to be laid off, most bargaining solutions coincide. If  $\Theta(L) = L/M$  with  $L \leq M$ , the Nash, the Kalai-Smorodinsky, the Maschler-Perles and the proportional solution all yield identical results.<sup>9</sup> Moreover, this assumption of equal probability of layoffs is less outlandish than it appears. Edward Lazear [1983] demonstrated that if workers are laid off strictly by seniority, unions which maximize workers' lifetime earnings will act as if to maximize

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<sup>9</sup> Nash [1950] proved that the point on the feasibility set which maximizes the weighted geometric average of the bargaining gains is the unique solution which satisfies the axioms of Pareto optimality, independence of affine transformations of the payoffs and the independence of irrelevant alternatives (or, more appropriately, the irrelevance of unchosen alternatives). Other bargaining solutions drop one or more of Nash's axioms (except for Pareto optimality) and add other axioms until a different unique solution is defined. See Kalai [1985] for a recent review. A new non-axiomatic justification for the Nash solution has been provided by Rubinstein [1987] who proved that the Nash solution is the limit of a non-cooperative bargaining game as the time between offer and counter-offer goes to zero. Note that the solutions differ in the case in which  $L > M$ , or in which the demand for labor in the plant exceeds the union local's membership. See Wallerstein [1987].

$(L/M)w + [1 - (L/M)]r$  every period.

An intuitive derivation of the general bargaining solution when  $\Theta = L/M$  and  $L \leq M$  proceeds by dividing the bargaining problem into two steps. First, the union and the firm maximize their joint surplus  $(\pi - \pi^S) + (u - r) = [R(L) - rL - S]$  by agreeing to the level of employment given by the condition:  $R_L = r$ . In an efficient bargain with risk neutral workers, the level of employment is determined by the requirement that the marginal revenue product of labor equal the opportunity cost of labor [Menil 1971].<sup>10</sup> Secondly, the aggregate rents received by union members,  $(u - r)M = (w - r)L$ , are set equal to some share, say  $\alpha$  ( $0 < \alpha < 1$ ), of the joint surplus  $[R - S - rL]$  which yields

$$w = \alpha[(R/L) - (S/L)] + (1 - \alpha)r \quad (6)$$

as the expression for union wages. Thus the wages of union members depend on their opportunities elsewhere,  $r$ , their productivity ( $R/L$ ), the bargaining parameter,  $\alpha$ , and the expected profits of the firm in the event of a strike,  $S$ . If union members could be replaced quickly with other workers at the reservation wage, the firm's profit during a strike would equal  $S = R - rL$  and equation (6) would reduce to  $w = r$ .<sup>11</sup>

The impact of  $S$  on the bargaining outcome can be seen clearly by writing the expressions for the expected income of workers and their

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<sup>10</sup> This is not true if unions are assumed to maximize the expected utility of risk-adverse workers [McDonald and Solow 1981]. However, Kim Clark [1984] provides evidence that labor contracts in the United States do satisfy this condition.

<sup>11</sup> See Wallerstein [1987] for more rigorous derivations of the Nash and proportional solutions for this model with  $\Theta(L) = \min(1, L/M)$ . Bargaining solutions generally include an axiom of symmetry which implies that  $\alpha = 1/2$  in equation (6). Yet symmetry in collective bargaining is hard to justify. There is nothing lost and some plausibility gained by letting  $\alpha$  be any fixed value between zero and one.

employers upon the conclusion of a labor agreement. Substituting equation (6) into equations (1) and (2), one obtains:

$$u = \alpha[(R/M) - (S/M) - (rL/M)] + r, \text{ and} \quad (7)$$

$$\pi = (1 - \alpha)(R - rL) + \alpha S. \quad (8)$$

The bargaining problem is illustrated in Figure One. The line with slope of  $-1$  represents the set of feasible bargains. The solution is the point of intersection of the bargaining frontier and the rays from the disagreement points with slopes of  $(1-\alpha)/\alpha$ . As union density rises from  $\mu^0$  to  $\mu^1$ , the disagreement point falls from  $S(\mu^0)$  to  $S(\mu^1)$ . The aggregate expected income of union members goes up from  $Mu^0$  to  $Mu^1$  while profits of unionized firms decline from  $\pi^0$  to  $\pi^1$ . As  $\mu$  approaches zero,  $S(\mu)$  approaches  $R - rL$  and  $u$  falls to  $\underline{r}$ .

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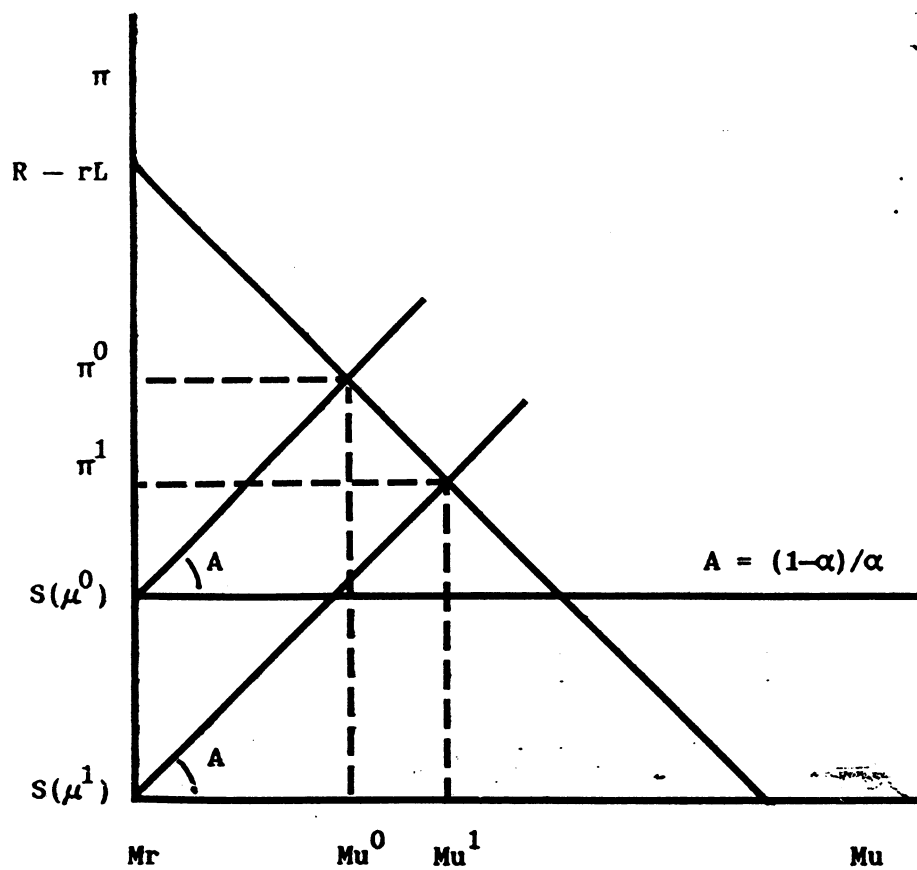
Figure One About Here

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### 3. The Optimal Rate of Unionization From the Union's Perspective

If the story told in Figure One were complete, unions would always want to increase the level of unionization. But recruiting new members is costly. In the United States, organizers must be paid, legal representation retained and, on occasion, strikes called. In a recent successful organizing drive in Mississippi by the United Food and Commercial Workers, the union estimated that it spent \$500,000 to organize 1,050 workers [Perl 1986]. This drive was relatively cheap: On the basis of a statistical analysis of organizing expenditures and recruitment by American unions, Paula Voos [1984a: 44] estimated that the marginal cost of an additional union member ranged from \$580 to \$1,568 (1980 dollars).

Figure One



Labor legislation in the United States makes union organizing particularly difficult [Rogers 1985]. In countries with laws which are more favorable to union recognition, the cost would be less. But organizing drives are not costless anywhere.

Therefore, let the per capital cost of recruiting new union members be written:

$$C = C(m', \mu, y), \quad C_{m'} > 0, \quad C_{m'm'} \geq 0, \quad C_{\mu} > 0, \quad C_{\mu\mu} > 0 \text{ and } C_{m'\mu} > 0, \quad (9)$$

where  $m' = dm/dt$  is the change of union membership over time,  $\mu = m/n$  is the proportion of the relevant work force which is organized as before, and  $y$  is a vector of all other factors such as plant size, the business cycle, labor legislation or employer resistance which affect the cost of recruiting new members. It is assumed that costs increase as the number of workers being organized increases ( $C_{m'} > 0$ ). The second assumption, that costs increase at a non-decreasing rate ( $C_{m'm'} \geq 0$ ), turns out to be a necessary condition along the optimal path. Thus, while there may be increasing returns to scale in organizing for some combinations of  $m'$  and  $\mu$ , unions will continue to expand their organizing drives until the marginal costs of recruitment are constant or increasing. Third, costs are assumed to increase at higher levels of unionization ( $C_{\mu} > 0$ ). This is the saturation effect observed in the econometric studies. Unions start by organizing those workers who are easiest to organize. As more become members of the union, those who remain outside become increasingly difficult to recruit. Thus the impact of union density on costs increases as union density increases ( $C_{\mu\mu} > 0$ ). In addition, higher union density increases the marginal costs of organizing ( $C_{m'\mu} > 0$ ).

Union members receive an expected income of  $\underline{u}$ , which depends on  $S(\mu, x)$ , and pay union dues of  $C(m', \mu, y)$ . The net income of union members

in each time period is therefore  $u - C = \alpha[(R/M) - (S/M) - (rL/M)] + r - C$   
 $= P - QS - C$  where  $P \equiv \alpha R/M + [1 - (L/M)]r$  and  $Q \equiv \alpha/M$ . Thus a union which  
 faithfully maximizes the present value of its members' net income with a  
 discount rate of  $\rho$  would choose the level of organizing activity  $m'(t)$   
 which minimizes the integral:<sup>12</sup>

$$\int_0^{\infty} e^{-\rho t} [QS(\mu(t), x) + C(m'(t), \mu(t), y)] dt. \quad (10)$$

The first order condition for a minimum is the Euler-Lagrange equation  
 $\partial J / \partial m = d(\partial J / \partial m') / dt$  where  $J = e^{-\rho t} [QS + C]$ , which, upon rearranging terms,  
 can be written as the second-order differential equation:

$$C_{m'm''} = -C_{m'\mu} + (Q/n)S_{\mu} + (1/n)C_{\mu} + \rho C_{m'}. \quad (11)$$

Also necessary for a minimum is the Legendre condition  $\partial^2 J / \partial m'^2 = e^{-\rho t} C_{m'm'} \geq 0$   
 along the optimal path. Since  $J$  is convex in both  $\mu$  and  $m'$ , the  
 necessary conditions are also sufficient [Tu 1984: 103].

From any initial conditions, the optimal path of  $\mu(t)$  converges to an  
 equilibrium solution where  $m'' = m' = 0$ .<sup>13</sup> It is the stationary value of  $\mu$ ,  
 the level of union density to which the optimal growth path converges,  
 which is of greatest interest. Writing the equilibrium value of  $\mu$ , denoted  
 $\mu^*$ , as an implicit function of the parameters  $\rho$ ,  $x$ ,  $y$  and  $n$ , we have:

$$H(\mu^*, \rho, x, y, n) = (Q/n)S_{\mu} + (1/n)C_{\mu} + \rho C_{m'} = 0. \quad (12)$$

The implications of equation (12) can be summarized in four  
 propositions:

<sup>12</sup> The infinite time horizon is not critical. See below.

<sup>13</sup> The equilibrium solution to (11) is a saddle point. Thus there is  
 a unique path satisfying (11) from any initial value  $\mu(0)$  which converges  
 to the equilibrium solution. All other paths will break boundary  
 conditions on  $\mu$ .



**Proposition 1:** As the discount rate  $\rho$  increases, the equilibrium union density  $\mu^*$  declines.

**Proof:** Note, first that

$$\frac{\partial H}{\partial \mu^*} = (Q/n)S_{\mu\mu} + (1/n)C_{\mu\mu} + \rho C_{m'\mu} > 0 \quad (13)$$

since  $S_{\mu\mu}$  and  $C_{m'\mu}$  are positive and  $C_{\mu\mu}$  is non-negative. By the implicit function theorem:

$$\frac{d\mu^*}{d\rho} = - \frac{\partial H / \partial \rho}{\partial H / \partial \mu^*} = - \frac{C_{m'}}{\partial H / \partial \mu^*} < 0 \quad (14)$$

since  $C_{m'} > 0$  and  $\partial H / \partial \mu^* > 0$ .

This is an intuitive result. Organizing drives are like an investment. The costs of recruiting new members are borne in the present while the benefits come in future wage negotiations. The higher the discount rate, the less unions care about the future, the less union members will want to "invest" in increasing the size of the union. This fits the common observation that industries with high rates of turnover are less unionized than industries with stable employment.<sup>14</sup>

**Proposition 2:** Any change in circumstances which increases the marginal strike effectiveness increases the equilibrium union density.

**Proof:** Let  $S(\mu, x) = xS(\mu)$ ,  $x > 0$ . Then

$$\frac{d\mu^*}{dx} = - \frac{\partial H / \partial x}{\partial H / \partial \mu^*} = - \frac{(Q/n)S_{\mu}}{\partial H / \partial \mu^*} > 0 \quad (15)$$

since  $S_{\mu} < 0$ . More generally,  $d\mu^*/dx > 0$  if  $S_{\mu x} > 0$ .

Anything that increases the benefits from increasing the size of the union, whether it be high levels of demand or the enactment of pro-union legislation, will increase the optimal unionization rate.

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<sup>14</sup> It is also true that the costs of organizing in industries with high turnover are greater.

**Proposition 3:** Any change in circumstances which increases the marginal costs of recruiting new members will reduce the equilibrium union density.

**Proof:** Let  $C(m', \mu, y) = yC(m', \mu)$ ,  $y > 0$ . Then

$$\frac{d\mu^*}{dy} = - \frac{\partial H / \partial y}{\partial H / \partial \mu^*} = - \frac{(1/n)C_{\mu} + \rho C_{m'}}{\partial H / \partial \mu^*} < 0 \quad (16)$$

since  $C_{\mu} > 0$  and  $C_{m'} > 0$ . More generally,  $d\mu^*/dy < 0$  if  $C_{\mu y}$  and  $C_{m' y}$  are both positive.

Proposition 3 is the converse of proposition 2. Any change that increases the costs of recruiting new members lowers the equilibrium unionization rate. Both propositions 2 and 3 can be readily understood with the analogy of unionizing drives as an investment. If the rate of return rises the optimal level of investment will increase. If the costs of investing rise, the optimal level of investment falls. The focus here on the unions' preferred level of unionization is not in conflict with the usual attention given to the resistance of employers and the sentiment of non-union workers. The level of economic activity and the political environment will affect the costs and benefits of organizing because of the impact of economic and political circumstances on the willingness of non-union members to join and employers to resist.

**Proposition 4:** The target level of unionization declines as the size of the labor force increases.

**Proof:** We start with the impact of the size of the labor force on the equilibrium size of the union:

$$\frac{dm^*}{dn} = - \frac{\partial H / \partial n}{\partial H / \partial m^*} = \frac{QS_{\mu} + C_{\mu} + [QS_{\mu\mu} + C_{\mu\mu} + n\rho C_{m'\mu}] \mu}{QS_{\mu\mu} + C_{\mu\mu} + n\rho C_{m'\mu}}$$

which may be positive or negative as the first term of the numerator is

negative and the remaining terms are positive. In contrast, the effect of  $\underline{n}$  on the equilibrium union density is unambiguous:

$$\begin{aligned} \frac{d\mu^*}{dn} &= (1/n)^2 \left[ \frac{dm^*}{dn} n - m \right] = \frac{QS_{\mu} + C_{\mu}}{QS_{\mu\mu} + C_{\mu\mu} + n\rho C_{m,\mu}} \\ &= \frac{-\rho C_{m,\mu}}{QS_{\mu\mu} + C_{\mu\mu} + n\rho C_{m,\mu}} < 0 \quad (17) \end{aligned}$$

since, from equation (12),  $QS_{\mu} + C_{\mu} = -\rho C_{m,\mu} < 0$  and the terms of the denominator are all non-negative with the first and third strictly positive.

The benefits from an expansion of the union membership depend on the proportion of the relevant workforce being organized. The costs, in contrast, depend in part on the absolute number of workers to be organized. Unions in large labor markets must pay a higher price to achieve the same union density and thus the same strike effectiveness than unions in smaller labor markets. Since the price is higher, unions in large labor markets purchase less. Small labor pools, whether due to the scarcity of particular skills or to geographical isolation, increase the incentives for unions to seek high levels of unionization.

Many of the assumptions of the model can be easily relaxed or altered. Expected income maximization can be changed to expected utility maximization. The infinite time horizon can be easily replaced by a two-period model in which the costs of organizing are paid in period one while the benefits of higher levels of unionization are received in period two. As long as unions look beyond the present period, the propositions remain valid. Instead of assuming the size of the labor force is fixed, we can let the  $\underline{n}$  grow at a constant rate,  $g$ ,  $g > 0$ , or  $dn/dt = gn(t)$ . In addition, we can allow union membership to fall each period by  $\delta m(t)$ ,

$\delta > 0$ , due to retirements and quits. The effect of both modifications is simply to replace  $\rho$  with  $(\rho + g + \delta)$  in equations (11) - (17). Finally, the assumption that the demand for labor in unionized firms does not exceed union membership can be dropped by writing the probability of being unemployed  $\Theta$  as  $\Theta(L) = \min(1, L/M)$ , although this last change entails a considerable increase in algebra. The critical assumptions are that the benefits of increasing size depend on the proportion of the workforce organized while the costs partly depend on the absolute number to be organized. From these two assumptions alone it follows that the optimal union density from the unions' point of view will be a declining function of the size of its potential membership.

#### 4. Explaining Cross-National Variation in Union Density

Given the generality of the model of the unions' optimal level of unionization, there are many ways in which countries differ that might be relevant in an explanation of cross-national variation. But the most striking difference among advanced industrialized countries is their size. The aggregate potential union membership in the United States is 24 times the size of the potential union membership in Sweden and over 1000 times the number of wage and salary and unemployed workers in Iceland. The size of the relevant workforce from the point of view of any single union ought to be related, among other things, to the size of the country's aggregate labor force. If the theoretical model of the optimal union size has any validity, the size of the national workforce will be a significant determinant of cross-national differences in unionization rates. The measure of size used in the statistical analysis was the log of potential membership defined to be total wage and salary earners plus the unemployed.

Using the log of the potential membership implies that the percentage increase rather than the absolute increase matters for union density.<sup>15</sup>

Differences in the legal and political environment may also have a significant impact on unionization rates. Labor legislation or political support which affects the costs of organizing new workers or the ability of unions to strike effectively alters the unions' optimal level of unionization. It is difficult to measure the legal environment directly. However, data on left party participation in government are available. Left governments are important for union density for two reasons. First, left parties are particularly sympathetic to union views on labor legislation. Thus left party participation is as good a proxy as any available for the extent to which laws protect union organizing. Second, the implementation of labor law and political support more generally can be just as important as the laws themselves for union organizing. Therefore, a index of cumulative left party participation in government from 1919 to the year of the union density figure was included in the analysis.<sup>16</sup>

A third way in which countries differ is the mix of industries which make up the national economy. Since unionization rates vary dramatically by industry within the same country, it is plausible that much of the cross-national variation in aggregate union density reflects cross-national

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<sup>15</sup> Using the raw size of the labor force would indicate that the addition of a million new workers would have the same impact whether it represented a 100% increase or only 5% increase of the total labor force.

<sup>16</sup> The Wilensky index gives each country from zero to three points for each year of left party participation in government depending on the left's share of parliamentary seats among members of the governing coalition, the party of the prime minister and whether the government has a majority in parliament. Left parties include all Communist, Socialist, Social Democratic and Labour Parties with the exception of the Socialist and Social Democratic Parties of Italy. Table Three presents the country scores.

variation in the distribution of workers among industries rather than differences in unionization rates holding the industry constant. Geoffrey Ingham [1974] and David Cameron [1978], among others, have argued that the cross-national differences in industrial structure explain much of the cross-national variation of the organization of the union movement, possibly including the level of unionization. It is doubtful that cross-national differences in the firm size are important: Data collected by Erik O. Wright [1985: 209] in Sweden and the United States on private sector employment by size of firm reveal virtually identical distributions for the two countries. Nevertheless, there may be other differences in industrial structure which are important. To control for industrial structure in a preliminary way, the proportion of the workforce in the more heavily unionized sectors of mining, manufacturing, utilities and construction was added as a third independent variable.

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Table 2 About Here

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Table Two displays the results of a cross-sectional analysis of union densities in the late 1970s.<sup>17</sup> The coefficient on the log of potential membership  $\text{LN}(N)$  is consistently negative and significant at all conventional levels of significance. A coefficient of  $-6.5$  indicates that a doubling of the potential union membership would reduce union density by  $\ln(2)(6.5) = (.69)(6.5) \approx 4.5$  percentage points. The coefficient on left party participation is positive and also highly significant. Its size

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<sup>17</sup> The sample consists of all advanced industrial societies which have been democratic since World War II for which complete membership data could be found. Unions in non-democratic countries operate under very different constraints.



Table Two

Cross-Sectional Analysis of Union Density in Advanced  
Industrial Societies in the Late 1970s  
(t statistics are in parentheses)

	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	2SLS (5)
CONSTANT	124.7** (7.85)	98.6** (7.04)	86.0** (3.54)	90.3** (4.96)	74.3* (2.48)
LN(N)	-8.42** (4.52)	-6.52** (4.32)	-6.56** (4.27)	-5.92** (3.37)	-5.99** (3.36)
LEFT		.271** (3.73)	.278** (3.72)	.356** (2.62)	.364** (2.58)
INDEMP			.364 (0.64)		.468 (0.77)
R <sup>2</sup>	.532	.743	.749	.722	.728
Adjusted R <sup>2</sup>	.506	.712	.702	.689	.677

\* Significant at the 0.05 significance level.

\*\* Significant at the 0.01 significance level.

Variable Names:

LN(N): Natural log of potential membership (wage and salary workers plus the unemployed).

LEFT: Wilensky's [1981] index of left party participation in government cumulated from 1919 to the year of union density.

INDEMP: Employment in mining, manufacturing, utilities and construction as a proportion of civilian employment.

Notes: N = 20. A dummy variable set equal to one for countries with highly centralized union confederations--Austria, Belgium, Finland, Israel, Netherlands, Norway and Sweden [Heady 1970, Windmuller 1975]--was used in addition to the other independent variables to estimate LEFT in equations (4) and (5). Table Three contains the values for potential membership and LEFT. Data sources are listed in the appendix.

indicates that one year of a social democratic majority government (three points in Wilensky's index) increases union density approximately one per cent. Together, size and Left party participation explain about 70% of the variance. In contrast, the proportion of workers in mining and industry is substantively and statistically insignificant.

A possible source of difficulty with the OLS estimates of Table Two is the potential endogeneity of left party participation. In many countries, union organizing was initially closely associated with and supportive of the political mobilization of workers by social democratic parties [Shalev and Korpi 1980, Przeworski and Sprague 1986]. If left party participation is endogenous, consistent estimates can be obtained by using a dummy variable for union centralization as an instrument. After controlling for LEFT and LN(N), union centralization is only weakly correlated with union density. In contrast, the centralization of the union movement is frequently cited as contributing to the electoral success of social democracy [Korpi 1983, Stephens 1980]. The 2SLS estimates of the impact of size and left government on union density are reported in equations (4) and (5) of Table Two. The results differ little from the OLS estimates. Moreover, the data do not decisively reject the OLS assumption that LEFT is exogenous. When LEFT is estimated by 2SLS with union density and union centralization as explanatory variables and LN(N) as an instrument, the t-statistic for union density is 1.06.

The OLS and 2SLS estimates do well in accounting for the variation of union density by the size of the labor force and the cumulative participation of left parties in government. None of the estimated values fall outside the permissible bounds of zero and one. Yet, since the dependent variable is bounded on both ends, an unbounded linear

relationship cannot be literally correct. Therefore a logistic curve was estimated using the criteria of least squares. The results were similar and the resulting sum of squared errors was only marginally less than the sum of squared errors of the linear model.<sup>18</sup> A linear relationship seems to fit the data as well as an S-shaped curve.

The insignificance of industrial structure in Table 2 may be due to the quality of the measure. A better measure requires data on union density rates by industry across countries, which is largely unavailable. However, Bain and Price [1980] do have comparable union membership and labor force data for 15 sectors of the economy in the United States and Great Britain in 1974.<sup>19</sup> Unfortunately, the industry-level union membership data for the United States include Canadian members who constitute 7-8% of the total [Bain and Price 1980: 100]. One can calculate, however, what British rate of unionization would be if Great Britain had the industrial mix of the United States. Let  $\gamma^B(i)$  be the share of the British workforce,  $\gamma^A(i)$  be the share of the American labor force and  $\mu^B(i)$  be the British level of unionization all in industry  $i$ . In 1974, the aggregate British unionization rate was  $\sum \gamma^B \mu^B = 49.2$ . Had Great Britain had the same distribution of workers among industries as the United States, British unionization in 1974 would have been  $\sum \gamma^A \mu^B = 45.8$ . Britain

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<sup>18</sup> Estimating the logistic transformation  $z = \ln[\mu/(1 - \mu)]$  by OLS also produced similar results.

<sup>19</sup> The sectors of the economy are: metal and machinery; clothing; food, drink and tobacco; paper, printing and publishing; leather and leather products; textiles; lumber and lumber products; chemicals, rubber, clay, glass and stone; the residual manufacturing sector; transportation, utilities and communication; construction; mining, quarrying and oil; central government (excluding health care in Britain); state and local government including education; and the residual (service sector). The source is Bain and Price [1980: 38, 43-78, 89 and 100].

does have a greater share of workers in highly organized industries than the United States. But the difference between the two countries in the distribution of the workforce accounts for less than 15 per cent of the difference in aggregate union density. In 1974 union density in the United States was 24.6. At least in the comparison of union density in the United States and Great Britain, differences in industrial structure do not seem to explain very much.

## 5. Conclusion

The benefits of union size depend on the proportion of potential members who are actual members while the costs of recruitment depend in part on the absolute number to be recruited. Unions in smaller labor markets can achieve high levels of unionization more cheaply. The simple comparison of the costs and benefits of organizing new workers yields the conclusion that unions in larger labor markets will accept lower levels of unionization. The statistical analysis indicates that differences in the size of aggregate labor force are an important part of the explanation of cross-national differences in unionization rates among advanced industrial societies.

The reasoning which connects the size of the total labor force to the resources unions devote to organizing the unorganized does not depend on the particular objectives that have been imputed to the union leadership. According to a more hostile view of unions, union leaders are primarily concerned with their own income. As important as the question of union accountability in other contexts, it has no obvious bearing on the analysis of optimal union size. Perfectly venal union leaders would maximize the present value of net union rents, as would perfect agents of the union

membership. In this context, the accountability of the union hierarchy matters mostly for the distribution of the rents between union members and union officers. A reputation for ignoring members' interests or outright corruption would increase the cost of recruiting new members and thus reduce unionization rates. Nevertheless, the logic which links the size of the labor force to unions' allocation of resources to organizing the unorganized is not altered.<sup>20</sup>

A different modification of the unions' objectives would emphasize the political role of unions. Representing the interests of union members to the government may be, in many countries, a more important function than collective bargaining with employers. But here, again, the size of the labor force should matter for union density. The political influence of the unions depends, not on their absolute size, but on the votes they can deliver relative to the total electorate while the costs of recruiting new members depends on the number being recruited. The same reasoning as before indicates that unions in smaller electorates will be more willing to commit the resources to organize a large share of voters than unions in large electorates.

Finally, the relationship between the size of the potential membership and the density of membership should hold for all organizations for whom the benefits depend on the proportion who are members while the costs of recruiting depend on number being recruited. Many interest groups appear to be in this category, not only trade unions. Small size ought to be

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<sup>20</sup> An alternate view that union leaders do not view organizing expenditures as a cost but, as in Niskanen's [1973] model of bureaucratic behavior, seek to maximize the size of their budget leads to the uninteresting conclusion that unions will allocate as much money for organizing drives as their membership permits.

conducive to high levels of membership density for interest groups of all kinds.

The relative weakness of the American labor movement in comparison with labor in most other advanced industrial societies has long challenged scholars. Indeed, as Michael Shalev and Walter Korpi have observed, "the major scholarly efforts at analyzing the conditions for working class organization and power have gone into attempts to understand the relative weakness of the American union movement and the absence of a major socialist party in the United States" [1980: 38]. The dominant explanations of what came to be called in the 1920s "American exceptionalism" include the relative affluence and mobility of American workers [Sombart 1906, Thernstrom 1970], the ethnic and racial diversity of the American working class [Commons 1906, Bonachich 1976], the absence of feudalism and the consequent lack of a rigid status hierarchy [Hartz 1955, Lipset 1983], the early extension of economic and political rights [Perlman 1928, Lipset 1983] and, more recently, the exceptional hostility of American employers [Goldfield 1987, Jacoby 1987].<sup>21</sup> Yet, to the extent that the strength of the union movement can be equated with the level of unionization, the sheer size of the American labor market accounts for most of the difference between the United States and other advanced industrial societies. The mean union density around 1978 among the countries included in this study was 54.5 per cent compared to only 24.5 per cent in the United States. But after taking account of the size of the American labor force, the expected unionization rate in the U.S. in 1978 becomes 31.1 per

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<sup>21</sup> See John Laslett and Seymour M. Lipset [1974] for an invaluable collection of papers which cover most of the major positions in the debate on American exceptionalism.



cent. Adding the absence of a left party which has participated in government as an endogenous variable--a characteristic the United States shares with Canada, Ireland, Italy, and Japan outside of a brief period under American occupation--lowers the predicted union density for the United States to 22.6 per cent. As can be seen in Table Three, the deviation of unionization in the U.S. from its expected value is small. The exceptionally low level of unionization in the United States is due, in large part, to the exceptional size of the American labor force.

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Table Three About Here

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**Table Three**  
**Estimated Values of Union Density**

Country	Year	Potential Membership (in thousands)	Left Govt. Index (LEFT)	Estimated Density	Actual Density
Sweden . . . .	1979	3931	111.84	81.1	82.4
Israel . . . .	1979	997	73.17	75.5	80.0
Iceland . . . .	1975	81	17.25	70.5	74.3
Finland . . . .	1980	2034	59.33	66.3	73.3
Belgium . . . .	1977	3348	43.25	57.7	71.9
Denmark . . . .	1980	2225	90.24	76.8	69.8
Ireland . . . .	1978	801	0.00	50.2	68.1
Austria . . . .	1977	2469	48.67	61.4	65.6
New Zealand . .	1979	1050	60.00	70.5	59.4
Norway . . . .	1979	1657	83.08	76.0	58.9
Australia . . .	1979	5436	33.75	51.4	51.4
Italy . . . . .	1978	15819	0.00	33.1	50.6
United Kingdom	1976	25757	43.67	45.7	48.0
Germany . . . .	1979	23003	35.33	43.4	39.6
Netherlands . .	1979	4509	31.50	51.7	37.7
Switzerland . .	1981	2551	12.45	48.3	34.7
Canada . . . .	1980	10516	0.00	35.5	31.2
Japan . . . . .	1979	39930	1.92	28.3	31.0
France . . . . .	1979	18846	8.67	35.1	28.2
United States	1978	92899	0.00	22.6	24.5

Notes: Estimated density is the predicted value from the 2SLS regression excluding EMPIND (equation 4) from Table Two. Data sources are listed in the appendix.

**Appendix: Data Sources**

**Union membership:** Membership figures for all countries other than Iceland and Switzerland are from the U. S. Department of Labor [1980].

Coldrick and Jones [1979] contain union membership in Iceland. Union membership in Switzerland was taken from Troy and Sheflin [1985].

**Potential membership:** The number of wage and salary earners plus the unemployed was obtained from OECD [1984] for all countries other than Israel. Israel, Central Bureau of Statistics [1980] was used for Israel.

**Left government:** Wilensky's index of left party participation in government is defined in Wilensky [1981]. The composition of government coalitions from 1919 to 1980 is contained in Wallerstein [1988]. Mackie and Rose [1974, 1982] was consulted for shares of seats in parliament.

**Employment in mining, manufacturing, utilities and construction as a share of civilian employment:** Data for all countries but Israel are from OECD [1980: 34]. Value for Israel is in Israel, Central Bureau of Statistics [1980: 316-317].

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