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UNEMPLOYMENT AND THE DEMAND FOR UNIONS

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ABSTRACT

Why do people join open-shop unions when they would receive union wage rates even if they were not members? Why are unionization rates so low in the south-east of England? To address these questions, which we treat as inter-related, the paper considers the idea that unions offer insurance against victimization and arbitrary dismissal. Consistent with our theoretical approach, we find that union density is greatest, *ceteris paribus*, within establishments in areas of high unemployment.

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1. Introduction

This paper studies the factors which shape the degree of unionization within a plant. It makes consistent, and offers a potential explanation for, two famous puzzles in the literature. The first is a conceptual puzzle. If non-unionists in a unionized plant earn the same wage as those who are members, why does anyone join the union? This is a version of the familiar free rider problem. The second puzzle - known to all senior trade union officials and demonstrated in sources such as Booth (1986) and Bain and Elias (1985) - is the strong regional effect upon British union membership. Membership is much lower, *ceteris paribus*, in the south-east of England than elsewhere in Britain. Booth (1986) shows that this is not due to composition effects⁽¹⁾.

Our findings suggest that the key to these phenomena is the effect that unemployment (in the local area) has upon the demand for union representation. The intuitive argument is as follows. All individuals have some chance of being unfairly sacked by their employer. Joining a trade union is a way to lessen this risk, but it is costly, because the individual has to pay membership dues. Thus the more risk-averse workers join the union; those less averse to risk do not. When unemployment in the relevant labour market is high, the penalty associated with

being sacked is large, because it will be hard to find a new job once dismissed. Thus a greater proportion of individuals will feel it worthwhile to join the trade union.

The idea that unions might act to reduce victimization of individuals has a long history. Sidney and Beatrice Webb, for example, noted in 1920 that

" One of the principal grievances that Trades Unions are formed to remedy is, as we have seen, the autocratic manner in which the employer, in any unregulated trade, determines...a host of petty regulations, easily passing, with a brutal foreman, into gross personal tyranny" (p.540).

More recently, Barbash (1956) quotes from a union recruiting document:

" Join the union so that you can get a square deal. When you get a contract with seniority protection you don't have to worry every morning when you get to work whether you'll have a job when you come home at night; you won't have to worry about the boss firing you because he don't like the colour of your hair" (p.11).

A still more detailed modern account is available in Rees (1989):

" For a worker in an already unionized establishment, wages and hours are the same whether he is a union member or not. Thus it may require additional motives or pressures to lead him to join and to pay dues...In industrial unions, many workers join because of some incident in the plant in which they experienced or witnessed what they considered to be unfair or arbitrary action by a foreman or supervisor. The possibility of limiting or redressing such action through the grievance procedure is thus a primary motive for union membership..." (p. 25).

The assumption underlying these three statements is that it is less easy for an employer to act unfairly against the union member than against the unorganized worker. On this view the trade union provides a form of insurance for its members.

Section 2 of the paper formalizes this intuition. Section 3 then outlines the econometric methods suitable for estimating a unionization equation with establishment-level data for Great Britain in 1984. Section 4 presents our results. It finds a strong positive effect of (local) unemployment upon union representation⁽²⁾⁽³⁾. Section 5 concludes, and the appendices give further details about the data.

2. The Model

Consider a trade union as an organization which acts to assist individual workers in dispute with their employers. Workers pay dues to join, and these act as a form of insurance premium. A person who finds him or herself threatened with discriminatory dismissal can call on the services of the union. The trade union therefore acts as a kind of insurance agent.

The following assumptions are made for the analysis:

- A.1. An individual of type θ has utility $u(y, \theta)$, where y is income. The utility function is strictly increasing in y . Tastes are distributed on the support $[0, \theta_{\max}]$.
- A.2. The probability of discriminatory dismissal is given by the decreasing function $\delta(x)$, where x is the resources available to assist the worker. Non-union employees have $x = 0$. For union employees, $x > 0$.
- A.3. Union dues are $c > 0$ per member.
- A.4. The per capita cost of organising the trade union is $k > 0$. The union's budget constraint, per capita, is

$$c = k + x\delta(x).$$

A.5. The trade union is an open shop, so that workers need not join. Both non-union employees and union employees get wage $w > 0$.

A.6. Workers who are dismissed receive expected utility

$$z = \tau u^0 + (1 - \tau)u^1,$$

where τ is the probability of finding an alternative job, u^0 is the utility in that job, and u^1 is the utility from drawing unemployment benefit.

A.7. The three kinds of activities in the economy are utility-ranked

$$u(w, \theta) > u^0 > u^1.$$

A.8. The probability of finding alternative work is a decreasing, differentiable function of the aggregate unemployment rate, U .

Hence

$$\tau = \tau(U) \text{ and } \tau'(U) < 0.$$

Define the individual's probability of being discriminatorily dismissed as δ^u . This is a value of δ which solves the equations

$$\delta = \delta(x)$$

$$\delta(x) = (c - k)/x.$$

The first states that the dismissal probability depends on union per capita resources; the second defines the union's budget constraint, the inter-relationship between probabilities and per capita resources. Without making further assumptions it is not possible to guarantee the uniqueness of a solution.

Assume that the marginal union member (the "last to join") has tastes θ^* . This individual is indifferent to joining the union. Hence, for the marginal person, the gain from being a member may be defined as

$$W \equiv \delta^u z + (1 - \delta^u) u(w - c, \theta) \\ - [\delta^n z + (1 - \delta^n) u(w, \theta)] = 0,$$

where $\delta^n = \delta(0)$ is the non-union individual's probability of discriminatory dismissal.

Subtracting z from both sides of the $W = 0$ condition,

$$(1 - \delta^u) [u(w - c, \theta) - z] \\ = (1 - \delta^n) [u(w, \theta) - z],$$

which implies, by $u(w, \theta) > u(w - c, \theta) > z$, that

$$\delta^u < \delta^n.$$

In equilibrium, therefore, the probability of discriminatory dismissal is lower for union members.

The gain from unionization for the marginal member is a function of the unemployment rate. By differentiability,

$$w_U = (\delta^u - \delta^n) \tau'(U) (u^0 - u^1) > 0,$$

using A.7., A.8 and the result just proved. Hence the greater is the unemployment rate, the larger is the benefit from belonging to a trade union, and thus the more extensive is the level of unionization. The critical θ^* level will be higher on the $[0, \theta_{\max}]$ interval when unemployment is greater.

This result can be explained informally. When a trade union runs an open shop, individuals know that they will receive union

rates of pay even if they do not join⁽⁴⁾. Only union members, however, receive the backing of the union organization if they are discriminatorily dismissed (because of a personal disagreement with a supervisor, for example). Thus there is a return to trade union membership. In exchange for union dues, the individual gains the right to union representation. When unemployment is high there is a large loss of utility from being dismissed, because outside employment opportunities are then scarce. In a fully employed economy, by contrast, there is little point in joining the union, because outside jobs are instantly available⁽⁵⁾. Ex post, union members will be those among the employees who are most fearful of discriminatory dismissal. The demand for union representation will rise, at the margin, as the outside unemployment rate increases: the insurance provided by a trade union is most valuable to individuals living in a depressed region or economy⁽⁶⁾.

3. Econometric Methods

The model suggests that a worker's decision to join a trade union arises out of a rational decision process. Under suitable conditions, the decision of the i^{th} employee working at the j^{th} plant to join or not to join a trade union involves comparing the benefits, say W_{ij}^u , of being a member with the benefit, W_{ij}^n , of not being a member. The relationship between these two quantities will typically be a function of plant, individual and environmental characteristics. They can be represented by the following equations

$$w_{ij}^u = \beta_0^u + \beta_1^u X_j + \epsilon_{ij}^u$$

$$w_{ij}^n = \beta_0^n + \beta_1^n X_j + \epsilon_{ij}^n$$

where X_j is a vector of explanatory variables which affect the perceived benefits to the workers at the j^{th} plant. ϵ_{ij}^u and ϵ_{ij}^n are stochastic disturbance terms whilst β_1^u and β_1^n are vectors of parameters.

The probability that the i^{th} individual at the j^{th} plant is a trade union member is then

$$\Pr(w_{ij}^u > w_{ij}^n) .$$

If the stochastic disturbance terms are Gumbel distributed with the same scale, then

$$\Pr(w_{ij}^u > w_{ij}^n) = \frac{\exp(\beta_0 + \beta_1 X_j)}{1 + \exp(\beta_0 + \beta_1 X_j)}$$

where $\beta_0 = \beta_0^u - \beta_0^n$

$$\beta_1 = \beta_1^u - \beta_1^n ,$$

which is a standard result (McFadden (1976)).

If we let $Y_{ij} = 1$ if the i^{th} individual in plant j belongs to a trade union, and $Y_{ij} = 0$ otherwise, then total membership at plant j (r_j) is $r_j = \sum_{i=1}^{n_j} Y_{ij}$ where potential membership is n_j

and $\Pr(Y_{ij} = 1) = \Pr(w_{ij}^u > w_{ij}^n) = p_j$.

Y_{ij} is then Bernoulli distributed with

$$\Pr(Y_{ij} = 1) = p_j$$

$$\Pr(Y_{ij} = 0) = 1 - p_j$$

which can be written $\Pr(Y_{ij}) = p_j^{Y_{ij}} (1 - p_j)^{1 - Y_{ij}}$. This

distribution has mean p_j and variance $p_j(1-p_j)$.

Summing the Bernoulli decisions over all workers at plant j , we obtain the binomial distribution, which takes the form

$$b(r_j | n_j) = \binom{n_j}{r_j} p_j^{r_j} (1 - p_j)^{n_j - r_j} .$$

It has mean $E(r_j) = n_j p_j$ and variance $V_j = n_j p_j (1 - p_j)$. Trade union membership at the plant level, however, may not follow a binomial distribution. For instance, the data could have more variance than the binomial. This would occur if the membership decisions of individuals at the same plant are not independent or - crucially for our purposes - if some relevant plant level characteristics were omitted from the analysis.

To account for this extra-binomial variation it is necessary to derive an appropriate variance function. If we expect some dependence between the membership decisions of individuals at the same plant, then

$$\text{Cov}(Y_{ij} Y_{kj}) = \sigma(1 - p_j)p_j, \quad \text{with } \sigma > 0,$$

where σ is the correlation between the i^{th} and k^{th} individuals in plant j . This implies

$$\text{Prob}(Y_{ij} | Y_{kj} = 1) = p_j + (1 - p_j)\sigma$$

and

$$\text{Prob}(Y_{ij} | Y_{kj} = 0) = p_j(1 - \sigma)$$

i.e. Y_{ij} and Y_{ik} are independent iff $\sigma = 0$. Also

$$E(r_j) = n_j p_j$$

$$\text{Var}(r_j) = n_j(p_j(1 - p_j))(1 + \sigma(n_j - 1)).$$

When $\sigma = 0$ there is no extra binomial variation as $\text{Var}(r_j)$ is

binomial. If σ is not known, Williams (1982) suggests a moment estimator and provides a GLIM (1985) macro which can be used iteratively to estimate the model. First, σ is set to zero and β estimated by ordinary logit. The second stage is to use an equation based on the Pearson Chi-Square statistic to estimate σ . This value of σ is used to calculate the prior weights, and β is re-estimated using weighted logit analysis.

The procedure is continued until the Pearson Chi-Square statistic is equal to the residual degrees of freedom. The model scales up the variance of the binomial. Williams does not give a method for finding the standard error of σ , implicitly assuming that it is necessary to estimate σ if it is obviously different from zero.

The estimation of β assumes that σ is known and thus that the estimated standard errors for β make no allowance for the prior estimation of σ . However, these standard errors, while not accurate for testing the significance of β , are more than sufficient for screening purposes. The modified Pearson Chi-Square statistic is the most reliable basis for significance testing.

This is done in the following way. The value of σ is estimated on the proposed model and the (modified) Pearson Chi-Square obtained. This value of σ is set, and the model re-estimated without the variable(s) of interest. The increase in the (modified) Pearson Chi-Square is taken to be Chi-Square

distributed with degrees of freedom equal to the number of parameters left out of the reduced form model.

The technique described in this section provides a method for estimating what may be called a 'heterogeneous' model. The technique adjusts for unobserved variables at the plant level which affect workers' decisions to join a trade union. As a benchmark, we also estimate a 'homogeneous' model, which does no correction for heterogeneity. It is a conventional logit with the dependent variable set to the proportion of all manual workers at the plant who are union members.

4. Results

The paper uses establishment data from the 1984 Workplace Industrial Relations Survey. This data set has now been extensively used to analyse wage and employment determination, and many facets of industrial relations, but not to study the determinants of union density. A description of the data is provided in Appendix A. Variable definitions are provided in Appendix B.

The results of our statistical analysis are presented in Tables 1 and 2. They give, in turn, the estimates from the simple homogeneous model and those from the heterogeneous framework with a correction for unobservables.

Column 1 of Table 1 provides the most basic estimated equation. This is a logit form with no controls for regional fixed effects. The unemployment rate is the independent variable of principal concern. It is entered at the county level, which

allows 65 observations on unemployment. Consistent with the theoretical arguments of Section 2, the unemployment variable is positive and highly significant (with a t-statistic of approximately 80). While this appears to be evidence for the paper's key hypothesis, there are two general criticisms that can be made. First, because no other regional variables are included, it is possible that the coefficient on county unemployment is merely picking up the influence of some other geographical effect which is itself correlated with unemployment. The culture and history of an area, for example, may be correlated both with its degree of unemployment and the extent of unionization. Second, equation 1 in Table 1 makes no adjustment for the likely systematic heterogeneity across establishments.

Column 2 of Table 1 introduces a set of 10 regional dummy variables. This is feasible, because observations on unemployment are available at the more disaggregated county level, but is necessarily an imperfect correction if there are important county-specific fixed effects.

The strong positive effect of county unemployment upon unionization is unaffected by the addition of the regional dummies. The coefficient changes only from 1.7 to 1.64, with little reduction in statistical significance. The unemployment variable is more than a proxy for regional fixed effects.

Table 2 applies the methodology of Section 3. As with the earlier Table, results are given both with and without regional dummies. In this case, the coefficient does drop noticeably -

from 1.4 to 0.8 - when the regional controls are included. But the positive effect of county unemployment is visible in columns 3 and 4. Even in estimated equation 4, the null hypothesis of no effect is comfortably rejected. When taken together, these results are consistent with the theoretical idea that unemployment in the local labour market drives up the demand for union representation.

A number of secondary findings also emerge from the analysis. As known from the literature, unionization depends upon the composition of the establishment. Thus the degree of organization is lower in plants which contain high proportions of female, non-manual and part-time individuals. Unionization is greater in public bodies such as nationalized industries and Quangos, in public corporations, and in local and central government.

The variable 'few competitors' enters positively and significantly. It is a dummy variable for plants which faced five or less competitors for their main product or service. One possible interpretation of the result is that the variable identifies the existence of product market rents and these rents attract union organizing activity. There is some evidence from Blanchflower, Oswald and Garrett (1990), using these data, that this variable is significant in a union wage equation, which is consistent with the hypothesis that unions capture rents.

A more controversial variable is that denoted 'financial performance'. This is an ordering based on managers' assessments

of the financial position of their organization. It enters negatively and significantly, which suggests that the profitable plants tend to have low levels of unionization. Ideally the variable should be instrumented, but in practice no convincing instruments are available. The omission of financial performance has no effect on the inferences about the effect of unemployment.

The size of establishment is a major influence on the extent unionized - as has been noted before in sources such as Bain and Elsheikh (1980). Single independent establishments are much less likely than average to be highly unionized. Variables for shift-working and a change of control also enter significantly.

Although the tenor of the results is unaffected by the switch in estimation methods between Table 1 and Table 2, some coefficients change. First, the size of the county unemployment effect is reduced. Second, the parameters on 'age' 'trust/charity' and 'control changed' weaken. Third, there is a considerable alteration in the size of the coefficients on the regional dummies when moving from equation 2 to equation 4. Wales changes sign, and other coefficients are significantly affected. It is worth recording that in absolute terms the South-East coefficient is the second largest. If Table 2 is the preferable set of results, the unemployment variables fail to account for the whole of the South-East's low rate of unionization.

The paper's results indicate that the unemployment rate in the local area affects the demand for and quantity of

unionization. How large is the effect? While even small statistically significant coefficients are of interest, quantitatively large effects are of most importance.

Figure 1 provides information on the size of the effect on union density from county unemployment. It uses the results from equation 4 in Table 2 to plot the predicted union density of three hypothetical plants across an unemployment range of 2 per cent to 20 per cent. Three typical establishments are assumed - one each in the manufacturing, private services and government sectors. The detailed assumptions, made to conform to likely characteristics, are summarised in Table 3. These are used to obtain an indication of the quantitative impact of the level of unemployment in the local area.

As Figure 1 shows, the local unemployment rate has a large effect on predicted union density. In public administration, for example, our 'typical' plant has a union density of 25% when county unemployment is 2 per cent and a 66% unionization rate when county unemployment stands at 20 per cent. The equivalent numbers - again as unemployment in the local area changes from two per cent to twenty per cent - in the manufacturing plant are from 72% union density to 94% density, and in the non-manufacturing establishment from 2% density to 12% density. Although it is necessary to be cautious in interpreting such numbers, they illustrate the broad point that local unemployment has a major quantitative impact on the degree of union organization⁽⁷⁾.

5. Conclusions

This paper uses cross-section data on British establishments to examine the determinants of unionization. It attempts to shed light on two particular questions. First, why are union density rates so low, *ceteris paribus*, in the south-east of England? Second, why do people join unions in open-shop plants in which they would receive union wage rates even if they were not members? The latter cannot be answered definitively, but the paper presents a model and evidence which suggest a common thread to the two issues.

If unions offer 'insurance' against victimization and arbitrary dismissal, risk-averse workers will willingly join a union, and pay membership dues, even though there is no wage gain from doing so. Less risk-averse workers will prefer to take a chance and avoid union dues. If this hypothesis is correct, it suggests that unionization will be greater in areas where unemployment is high. This is because arbitrary dismissal carries a larger penalty in depressed areas.

The paper examines evidence on the effect of unemployment upon the degree of unionization within establishments. It estimates - with and without controls for regional fixed effects - both conventional logit models and a heterogeneity-corrected model. As predicted by the theoretical model, the county unemployment rate enters significantly positive in all estimated equations⁽⁸⁾. Moreover, our estimates suggest that unemployment is quantitatively important.

These findings help to explain why the south-east of England has low rates of unionization. More tentatively, they may also explain the famous puzzle of why open shops survive.

Table 1. Logit Equation on Manual Union Density - Homogeneous Model

Variable Name	(1)		(2)	
	Coefficient	Standard Error	Coefficient	Standard Error
County unemployment rate	1.697	0.024	1.643	0.036
% Part-time	-0.052	0.000	-0.051	0.000
% Female	-0.025	0.000	-0.024	0.000
% Manual	0.020	0.000	0.021	0.000
Partnership	-5.251	0.441	-5.193	0.454
Trust/Charity	-0.271	0.062	-0.344	0.064
Cooperative	1.194	0.092	1.267	0.094
State owned Ltd Co.	1.495	0.065	1.185	0.065
Nationalised industry	2.741	0.050	2.763	0.052
Non-trading Public Corp.	0.958	0.074	0.969	0.076
QUANGO	1.082	0.132	1.142	0.135
Local/Central Govt.	0.470	0.038	0.510	0.038
Financial performance	-0.202	0.008	-0.210	0.008
Single Independent	-0.797	0.027	-0.835	0.027
Control Changed	-0.152	0.025	-0.118	0.025
Few competitors	0.345	0.015	0.360	0.015
Age	-0.005	0.062	-0.052	0.063
Age ²	0.011	0.008	0.018	0.008
Shift working	0.098	0.020	0.158	0.020
50 - 99 employees	0.457	0.049	0.433	0.050
100 - 199 employees	1.151	0.047	1.197	0.048
200 - 499 employees	1.501	0.046	1.523	0.046
500 - 999 employees	2.423	0.046	2.379	0.047
1000 - 1999 employees	2.751	0.046	2.733	0.047
2000 employees and over	2.986	0.048	3.001	0.472
North West	-	-	-0.331	0.037
York & Humber	-	-	-0.991	0.039
West Midland	-	-	-0.877	0.038
East Midland	-	-	-0.350	0.041
East Anglia	-	-	-0.310	0.051
South West	-	-	-0.426	0.045
South East	-	-	-0.586	0.042
London	-	-	-0.486	0.043
Scotland	-	-	-0.970	0.039
Wales	-	-	-0.251	0.058
Industry dummies (49)	Yes		Yes	
Constant	-5.747	0.151	-5.000	0.185
Deviance	59522		57363	
Degrees of freedom	1336		1326	

Table 2. Logit Equation on Manual Union Density - Heterogeneous Model

Variable Name	(3)		(4)	
	Coefficient	Standard Error	Coefficient	Standard Error
County unemployment rate	1.382	0.175	0.763	0.281
% Part-time	-0.044	0.004	-0.044	0.003
% Female	-0.010	0.003	-0.010	0.003
% Manual	0.025	0.002	0.025	0.002
Partnership	-3.756	1.623	-3.714	1.626
Trust/Charity	-0.372	0.355	-0.357	0.361
Cooperative	2.601	0.571	2.706	0.581
State owned Ltd Co.	1.029	0.721	1.069	0.726
Nationalised industry	2.827	0.448	2.943	0.452
Non-trading Public Corp.	1.478	0.531	1.501	0.534
QUANGO	1.134	0.612	1.110	0.612
Local/Central Govt.	1.145	0.262	1.140	0.262
Financial performance	-0.255	0.062	-0.257	0.062
Single Independent	-0.811	0.164	-0.809	0.165
Control Changed	-0.064	0.185	-0.087	0.185
Few competitors	0.294	0.120	0.300	0.122
Age ₂	0.249	0.438	0.132	0.438
Age	-0.003	0.056	0.012	0.056
Shift working	0.371	0.116	0.376	0.117
50 - 99 employees	0.383	0.163	0.426	0.164
100 - 199 employees	1.032	0.171	1.052	0.171
200 - 499 employees	1.462	0.178	1.506	0.178
500 - 999 employees	2.174	0.196	2.199	0.198
1000 - 1999 employees	2.557	0.235	2.556	0.235
2000 employees and over	2.865	0.313	2.944	0.316
North West	-	-	-0.149	0.253
York & Humber	-	-	-0.570	0.275
West Midland	-	-	-0.446	0.258
East Midland	-	-	-0.656	0.286
East Anglia	-	-	-0.869	0.359
South West	-	-	-0.228	0.294
South East	-	-	-0.801	0.299
London	-	-	-0.581	0.298
Scotland	-	-	-0.364	0.268
Wales	-	-	0.345	0.336
Industry dummies (49)	Yes		Yes	
Constant	-6.826	1.009	-4.639	1.258
Sigma	0.360		0.355	
Chi-square	1338		1328	
Degrees of freedom	1336		1326	

Table 3. Assumptions About the Three Hypothetical Establishments
(Supplement to Figure 1)

1) Manufacturing

- | | |
|------------------------|------------------------|
| a) Motor vehicles | b) 5% part-time |
| c) 15% women | d) 80% manual |
| e) Limited company | f) Average performance |
| g) Not changed control | h) Not few competitors |
| i) Age 10-25 years | j) Shift work |
| k) 200-499 employees | l) West Midlands |

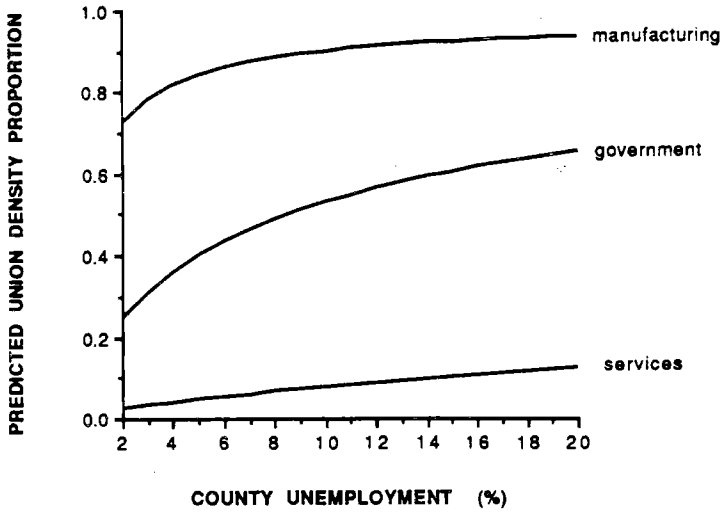
2) Government

- | | |
|--------------------------|------------------------|
| a) Public administration | b) 5% part-time |
| c) 40% women | d) 5% manual |
| e) Local/central govt. | f) Average performance |
| g) Not changed control | h) Not few competitors |
| i) Age 25 years + | j) Not shift work |
| k) 500-999 employees | l) South East |

3) Services

- | | |
|------------------------|------------------------|
| a) Retail distribution | b) 40% part-time |
| c) 60% women | d) 20% manual |
| e) Limited company | f) Average performance |
| g) Not changed control | h) Few competitors |
| i) Age 10-25 years | j) Not shift work |
| k) 50-99 employees | l) North West |

Figure 1: Predicted Union Densities For Different Unemployment Rates



Appendix A

The British Workplace Industrial Relations Survey of 1984 (WIRS2), which is the data source used in this paper, was sponsored by the Department of Employment, the Policy Studies Institute, the Economic and Social Research Council, and the Advisory, Conciliation and Arbitration Service. The sampling frame used was the 1981 Census of Employment. To be included in the survey an establishment had to have at least 25 employees (full or part-time) both in 1981 and 1984. The survey covered England, Scotland and Wales and its industrial coverage was all manufacturing and services, both public and private sectors.

A sample of 2019 establishments (defined as 'places of employment at a single address or site') was drawn. Establishments were selected differentially across establishment size bands, with large establishments over-sampled. Hence the data must be weighted to compensate for these inequalities of selection. The survey incorporated interviews with the senior manager responsible for dealing with employee relations, industrial relations or personnel matters, plus interviews with worker representatives and, where appropriate, with works managers. This paper restricts itself to data obtained from the senior manager's interview. For details of the weighting scheme, and the design and selection of the sample, see Millward and Stevens (1986, Technical Appendix).

Appendix B - Key to Variables

Independent Variables

Financial performance	A variable which assigns +2,+1,0,-1,-2 in turn to the performance categories, beginning with 'a lot above average' through to 'a lot below average'.
Performance a lot above average	A dummy variable where the manager reported that an establishment had performed a lot better than average compared with other establishments/firms in the same industry.
Performance a little above average	A dummy variable where the manager reported that the establishment had performed a little better than average compared with other establishments/firms in the same industry.
Performance a little below average	A dummy variable where the manager reported that the establishment had performed a little below average compared with other establishments/firms in the same industry.
Performance a lot below average	A dummy variable where the manager reported that the establishment had performed a lot below average compared with other establishments/firms in the same industry.
Performance - not possible	A dummy variable where managers reported that no relevant comparison of the

performance of the establishment was possible with other establishments/firms in the same industry.

County unempt. rate	The percentage of the workforce who were unemployed in each county in 1984 - in natural logarithms. (Source: <u>Regional Statistics</u> , 1985)
% Part-time	The percentage of workers who were part-time.
% Manual	The percentage of the workforce who were manual workers.
% Female	The proportion of the workforce who were female.
Shiftworking	A dummy variable for the existence of shift work at the establishment.
Single independent	A dummy variable for a single establishment organization.
Few competitors	A dummy variable where there were 5 or less competitors in the market for the main product or service of the organization.
Age	Age of the establishment.
Control changed	A dummy variable if there had been a change in ownership or control, 1980-1984.
Establishment size	Grouped into seven bands.
Ownership	Grouped into seven categories.

Regions Excluded category - North of England

Dependent variable

Union membership The proportion of manual workers in the establishment who were union members.

Footnotes

- (1) There have been a number of studies of union density using cross-section data for the United States. The results are surveyed in Addison and Hirsch (1986).
- (2) Although they do not study the effect of local unemployment, Farber and Saks argue, using US survey data, that 'fear of loss of a valued job is a significant factor in individual attitudes toward unionization' (Farber and Saks, 1980, p. 367).
- (3) The only published paper closely related to ours is Neumann and Rissman (1984), which identifies a positive relationship between union density and unemployment for the United States. The authors do not discuss their unemployment coefficient. More recently, Carruth and Schnabel (1988) report a positive association between the rate of growth of union membership and unemployment in Germany, 1956 - 1986. This is not found in UK data (Carruth and Disney (1988)).
- (4) The conventional way to measure the benefits from unionization is to think of the choice between a high wage union job and lower wage non-union alternatives. A measure of the net benefits from unionization is reported in Oswald (1982). The problem with this approach is that it is not

appropriate for an open-shop union where the worker receives the same wage whether or not he or she joins the trade union.

- (5) Workers may join the union because of custom and social pressure (Booth (1985), among others), but this leaves questions unanswered. For example, why does social pressure produce high rates of unionization in some sectors but not in others, and by what mechanism do social forces overcome economic incentives? At the least, our approach offers an alternative theoretical framework.
- (6) This assumes - plausibly in the British case - that union dues are determined nationally and not based on regional expenditures.
- (7) One problem we cannot solve with these data is what explains the downward trend in union density in the 1980s. It is unlikely that unemployment is the key determinant. However, our results suggest that, *ceteris paribus*, a rise in British unemployment would have beneficial consequences for manual trade union density.
- (8) As an additional check, we used individual data from the British Social Attitudes Surveys (1983-1987) to estimate a logit on manual union membership. The coefficient on

regional unemployment was positive and statistically significant with a t-statistic of 8.0. The equation included 16 controls for personal characteristics, 4 year dummies and 57 industry dummies. Full sets of results are available on request from the authors.

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