AN INTER-ESTABLISHMENT STUDY OF UNION MEMBERSHIP
IN GREAT BRITAIN
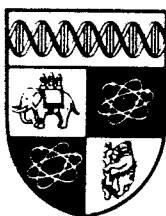
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I   Introduction

This paper examines empirically the determinants of union density across private sector establishments in Great Britain. The empirical analysis of union membership at the level of the aggregate labour market has received much attention recently[1], whilst there is also an empirical literature focussing on the determinants of union membership using cross-section data on individuals[2]. However, empirical studies using cross-section data at the level of the establishment are in short supply. The only major study in Britain is that by Bain and Elsheikh (1980), which draws on information from a 1978 survey of manufacturing establishments. Our paper uses data from the 1984 Workplace Industrial Relations Survey which provides detailed information on union institutions, membership, characteristics of the establishment and of its workforce, across all industrial sectors. Given the major changes which took place in the British labour market between 1978 and 1984, we feel it important to reconsider the determinants of unionisation in the light of the more recent observations.

A strong motivation for the current study derives from the attention being focussed on the role of unions in wage and employment outcomes. There is an extensive literature both on the theory of union bargaining (see Oswald (1982) and Manning (1987)) and on the empirical evidence of union wage effects (see Stewart (1987)). Stewart shows how the bargaining arrangements at the establishment affect the union's capacity to obtain a wage mark-up. In this context we believe it useful to develop a clearer understanding of the determinants of the level of unionisation at establishments. Similarly, we believe that such a development could illuminate the study of strike activity across industries and establishments (see Knight and Geroski (1983)) as the level of membership is likely to be an important factor influencing the probability of success of any industrial action. The level of membership is also likely to affect the union's impact on productivity and performance (see Machin and Stewart (1988)). Finally, understanding the determinants of union density at the establishment may throw light on the changing patterns of aggregate union membership as studied by Carruth and Disney (1988), Booth (1983) and Mudambi and Disney (1988).

There is little by way of consistent or comprehensive theoretical explanation of union density across establishments. A traditional recourse has been to invoke the Marshallian laws of the derived demand for labour, arguing that where the demand for labour is relatively elastic, because of particular characteristics of the establishment, unions will be less able to obtain a wage mark-up and hence less successful in recruiting members. Thus, one would expect to observe labour costs, product demand elasticities, capital-labour substitutability and supply elasticities of other factors as significant determinants of the level of union density in establishments. However, this approach has a number of unsatisfactory features. First, it is not clear that workers join

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[1] See the work of Carruth and Disney (1988), Booth (1983) and Disney and Mudambi (1988) for the UK, and of Neumann and Rissman (1984) and Dickens and Leonard (1985) for the US.

[2] See Booth (1986) and Bain and Elias (1985).

unions only where they can exert an influence over wages. Second, the approach has the implausible property of treating the firm as a passive agent. This contrasts markedly with model of Lazear (1978) in which the firm is the agent determining whether or not to recognise unions. Furthermore, Freeman (1986) and Freeman and Kleiner (1988) suggest that both the union and the firm will expend resources to influence the scale of union membership.

One class of models in which union membership is determined exogenously with wages stems from Grossman (1983). The work of Disney and Mudambi (1988) is in this tradition. These models are set in a median-voter framework and assume that workers choose jobs in either the union or in the non-union sector. This is also a feature of Booth (1984). However, this neat dichotomy of the labour market appears somewhat unsatisfactory in Britain against the background of the data presented in Table 1.

Table 1 (a) Union Density by Bargaining Arrangement.
(Manual Workers in Private Sector Establishments).

Union Density (D)	Non-Recog[3]	Recog	Manrec	Shop	Total
D=0	180	1	0	0	181
0<D<10	23	17	0	1	41
10≤D<20	9	7	2	1	19
20≤D<30	9	14	1	2	26
30≤D<40	2	15	3	7	27
40≤D<50	4	18	4	0	26
50≤D<60	1	21	0	2	24
60≤D<70	4	23	4	3	34
70≤D<80	1	26	12	7	46
80≤D<90	0	16	10	11	37
90≤D<100	2	31	30	35	98
D=100	4	12	68	203	287
	- - -	- - -	- - -	- - -	- - -
	239	201	134	272	846
	- - -	- - -	- - -	- - -	- - -

Source: WIRS, 1984.

The final column in Table 1 (a) shows that in our sample of 846 private sector establishments union density among manual workers was either zero or 100% in 181 and 287 establishments, respectively. This means that in 44.7% of the cases union density is at some intermediate level. There are a number of interesting aspects to the

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[3]Non-Recog refers to establishments where unions are not recognised for bargaining purposes.

Manrec signifies that management recommends membership and Shop denotes the presence of a closed shop, either pre- or post- entry.

Table calling for further attention. First, there is a small number of establishments with a closed shop where density is very low. Inspection of these individual cases reveals that this is largely attributable either to the closed shop explicitly covering only some groups of manual workers or to part-time workers not joining the unions in establishments where managers indicate all workers are covered by the closed shop. Second, Table 1(a) demonstrates how density can be both high in non-recognised establishments and low where unions are recognised. In the former case there are six establishments where density exceeds 90% in the absence of recognition. This is explained partly by the presence of Coops. Conversely, there are 18 establishments where unions are recognised but density is less than 10%. On further inspection it appears that much of this is explained by the presence of a high proportion of (non-joining) part-time workers in the establishment.

Table 1 (b) Union Density by Bargaining Arrangement.
(Non-Manual Workers in Private Sector Establishments).

Union Density (D)	Non-Recog	Recog	Manrec	Shop	Total
D=0	393	0	0	0	393
0<D<10	11	20	1	0	32
10≤D<20	14	21	2	3	40
20≤D<30	5	31	4	2	42
30≤D<40	6	22	6	1	35
40≤D<50	5	41	7	1	54
50≤D<60	3	38	16	8	65
60≤D<70	1	26	9	8	44
70≤D<80	0	30	15	16	61
80≤D<90	0	13	15	13	41
90≤D<100	2	14	13	9	38
D=100	5	10	18	27	60
	- - -	- - -	- - -	- - -	- - -
	445	266	106	88	905
	- - -	- - -	- - -	- - -	- - -

Source: WIRS, 1984.

Table 1(b) shows a similar pattern for non-manual workers. Recognition is less frequent: in 49% of cases a union is not recognised for the purposes of bargaining over wages and other working conditions, against 28% for manual workers. Closed shops are less common: less than 10% amongst non-manual workers compared with approximately one-third for manual employees. An additional reason for high membership amongst non-manual workers in establishments where unions are not recognised is that for non-manuals the density figure includes membership of a staff association.

The next Section of the paper discusses the theoretical background and suggests the

likely explanatory variables to be included in the empirical work. Section III describes the data and the modelling process, Section IV presents the results, and Section V assesses their significance, identifying directions for future work.

II Theoretical Background

Most models of union density fail to overcome the free-rider problem generated by the public goods characteristics of union wage outcomes. Booth (1986) argues that compulsion in the form of the closed shop is not sufficient to account for the observed level of union membership. She develops a social custom model of individuals' membership decisions and demonstrates that this framework is capable of explaining levels of workplace union density within the closed (0,1) interval. Nevertheless, the model falls short of providing a satisfactory explanation of stable equilibrium levels of union membership. Following Naylor (1988), Naylor and Cripps (1988) develop a social custom model with the property of stable equilibrium intermediate levels of union density. In the current paper we extend this model, viewing the individual worker's union membership decision as being influenced by three forces: the union the firm and other individual workers. It is this identification of the union, the firm and the workforce as active agents in the determination of union density that suggests the potential usefulness of establishment level data.

(i) The influence of other workers

This influence is the source of the reputation effects discussed in Booth (1986) and in Naylor and Cripps (1988). Both these models attempt to explain intermediate equilibrium levels of union membership in the workplace. We now summarise the latter model. Consider an individual worker, i. The utility of individual i is given by:

$$U_i = w - ds + e_i(a + r\mu)s - (1 - s)b \tag{1}$$

where,

      w   is the wage, which is independent of union status.

      d   is the union subscription cost (net of any private benefits)

      $s = ($ 1 if the worker joins the union

          (0 otherwise

      $(a + r\mu)$ is the reputation component of utility and is linear in μ, the proportion of workers believing in the social custom invoking workers to join the union rather than to free-ride.

      b   is a measure of the utility loss suffered by an individual free-riding.

      e_i is a measure of the utility-sensitivity of individual i to the

reputation effects. e_i is assumed to be distributed uniformly between a lower bound, e_0, and an upper bound, e_1.

It is assumed that individuals choose to join if the utility from so doing is at least as great as the utility derived from not joining. $\emptyset$ represents the proportion of individuals who join. In the short-run, equilibrium is consistent with $\mu = \emptyset$, as μ is fixed in the short-run. If $\emptyset > \mu$,i.e. if some believers do not join this period, then the proportion of believers falls next period. Conversely, for $\emptyset < \mu$. The condition for long-run equilibrium is that $\emptyset = \mu$.

From equation (1) we find that the individual worker i will join the union iff:

$$e_i \geq \frac{d-b}{a+r\mu} \qquad (2)$$

Figure 1, below, represents the decision and e-distribution schedules for this model.
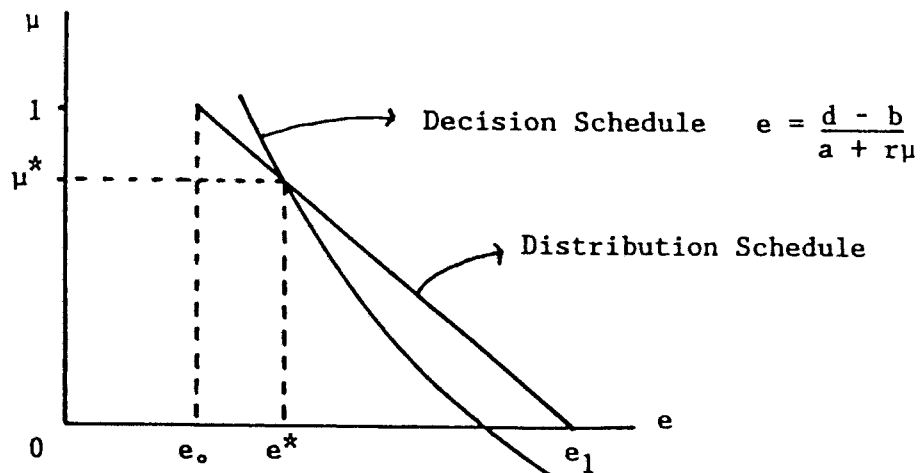
It can be seen that μ^* represents the stable equilibrium level of union density in the long-run. As the decision schedule shifts to the left, union membership grows. In other words, density is falling in d, the cost of joining, and rising in b, a and r, which represent the costs of not joining. This is as one would expect. According to the arguments of this social custom model, then, we posit that union density is likely to be affected by the following characteristics. First, where workers in an establishment have strong labour market attachments or identities, we would predict a high proportion for union membership. Such work attachments will be expected to be lower for part-time workers, temporary workers and also, possibly, for women in the light of a literature suggesting that the derivation of their social identities lies outside the workplace. The results obtained by Bain and Elsheikh (1980) support the social custom interpretation of union density. They found that the presence of part-time workers reduced density only amongst non-manual workers. They conclude that amongst manual workers, where density is high, part-timers conform to the social custom of joining, whereas amonst non-manuals, where density is relatively low, part-timers feel no such norm and hence, typically, do not join.

Second, following the terminology of Kerr and Siegel (1954), where workers are characterised more as an "isolated mass" than as "integrated individuals" we would expect stronger reputation effects and hence higher membership. Outram et al. (1989) develop this idea in the context of strike activity. Third, it is likely that plant-level bargaining would minimise the large numbers problem associated with the provision of public goods, and hence increase the expected level of membership. Fourth, following Bain and Elsheikh (1980), we might expect the attitude of the firm to affect adherence to a social custom. For example, paternalistic firms (those not belonging to the CBI or to an employers' association, or which are single independent establishments) are less likely to provoke a strong social custom invoking workers to join a trade union. Fifth, we expect social custom effects to be stronger in establishments with a tradition of employee involvement or of collective voice. Finally, reputation effects of unionisation are predicted to be weak in establishments employing a large proportion of workers with a close attachment to the firm's management: eg non-manual and managerial staff who will tend to associate their future prospects with loyalty to the firm rather than to the union.

(ii) The influence of the union and of the firm

We view the union as expending resources to increase membership in the establishment. Similarly, the firm is assumed to allocate resources to discourage union membership. Following Freeman (1986), we think of membership, M, as influenced by, inter alia, union expenditures, R_u, and resources R_m, devoted by the firm:

Let, $$M = M(R_u, R_m, H)$$

where H is a vector of other relevant characteristics and,

$$\frac{\partial M}{\partial R_u} > 0, \quad \frac{\partial M}{\partial R_m} < 0$$

We incorporate this into the social custom model by specifying the utility loss term b in the individual's utility function as dependent upon R_u and R_m. Thus, we have:

$$U_i = w - ds + e_i(a + r\mu)s - (b + b_1 R_u + b_2 R_m)(1 - s) \qquad (3)$$

The last term in expression (3) specifies how the utility loss from free-riding depends upon R_u and R_m. We assume $b_1 > 0$ and $b_2 < 0$. The condition for joining becomes:

$$\text{join iff;} \qquad e_i \geq \frac{d - (b + b_1 R_u + b_2 R_m)}{a + r\mu}.$$

Consequently, union density is rising in R_u and falling in R_m. Naylor (1989) explores a model in which R_u, R_m and μ are determined endogenously with the wage. As Freeman (1986) has argued, the traditional approach is to see union membership as influenced only by R_u, where R_u is argued to depend upon variables determining the potential wage mark-up. Thus high market power, inelastic labour demand and high industry unionisation are argued to produce high membership levels in the establishment. Freeman's insight is to observe that where the establishment is characterised by a high potential mark-up not only will R_u be higher than otherwise, but also the value of R_m will be higher. Indeed, Freeman argues that for a given increase in the potential mark-up the increase in R_m is likely to be greater than the rise in R_u. This is because a rise in wages is likely to reduce the firm's profit by an amount greater than the transfer to the union.

In our empirical work we include proxies for the potential mark-up in an attempt to get a handle on this issue. We can also think of b as depending on union recognition. Where a union is recognised there is, plausibly, a greater pressure of social custom on workers to join the union given that they are receiving a union negotiated wage. Similarly, recognition is likely to affect R_u and R_m. Hence, as the next section on the modelling process explains, we divide our sample into union and non-union sectors, the distinguishing feature being that the former consists of those establishments where unions are recognised for bargaining purposes. As is discussed later, recognition is treated as determined exogenously.

The discussion of the theoretical background has identified three forces operating within the establishment to influence the individual's union membership decision, and hence the union density level in the establishment. In the next section we describe the data and the modelling process, identifying the variables that the discussion in this section has indicated to be likely determinants of union density at the level of the establishment.

III   The Data and the Modelling Process

The analysis in this paper uses establishment-level data drawn from the Workplace Industrial Relations Survey of 1984[4]. Whereas the Bain and Elsheikh study is of establishments within manufacturing industry only, the present analysis is based on 2019 establishments drawn from all private sector industries, except agriculture and mining. Establishments are included in the survey only if they employed at least 25 workers at the times of both the 1981 Census of Employment and the 1984 sampling period. There is a two-step weighting system to correct for over-sampling of large establishments and for the greater likelihood of small firms having dropped out of the sampling frame. The variable to be explained is the level of union density in the

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[4] See Millward and Stevens (1986) for a detailed account of this data set.

establishment, defined as the number of workers who are members of a trade union (or also of a staff association in the case of non-manual workers) divided by the number of employees in the establishment. Hence, this cannot be compared readily with aggregate union density figures which include unemployment in the denominator.

As union density is a continuous variable in the (0, 1) interval it is appropriate to select a transformation of the dependent variable which avoids the possibility that the predicted union density lies outside this range. We select the logistic transformation, also employed by Booth (1983) in her time-series analysis of aggregate union density. Within the period of Booth's data set, union density always lies within the closed (0, 1) interval and hence the transformation,

$$z_i = \log(p_i / (1 - p_i))$$

is well-defined for all p_i, where p_i is union density for observation i. However, in our cross-section study p_i takes the values of 0 and 1 in the cases of some observations causing z_i to be undefined. To overcome this problem we apply the adjustment suggested by Cox (1970) and discussed in Gart and Zweifel (1967). This adjusted logistic transformation is:

$$z_i = \log\{(p_i + 1/(2n_i)) / (1 - p_i + 1/(2n_i))\},$$

where n_i is the value of the demoninator for establishment i. We then specify:

$$z_i = f(x_i), \qquad\qquad (4)$$

where x_i is a vector of relevant establishment characteristics. Equation (4) is then estimated using a two-step weighted least squares procedure. Separate equations are estimated for manual and non-manual workers[5]. Furthermore, for each regression we split the sample of establishments into those where unions are recognised for bargaining purposes and those where they are not, and estimate separate equations. This follows from our previous discussion where it was argued that the influences affecting union membership are likely to differ with the issue of recognition/non-recognition. The significance of this split can be tested. From the discussion in Section II we identify the variables characterised below as likely to be important determinants of establishment level union density.

(i) Worker Characteristics

(a) *Proporion of workers who are part-time*. (P.PT)[6].

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[5]For the manual density equations establishments were included in the sample only if the workforce consisted of more than ten manual workers.

[6]Abbreviations in parentheses are relevant variable names as they appear in the regression results reported in Section IV. Definitions of the variables are provided in the Data Appendix.

The argument here is that part-time workers are likely to have a weaker attachment to the work group and hence to be less susceptible to reputation and social custom effects, with a correspondingly lower unionisation rate.

(b) *Proportion of workers who are female.*(P.FEM).

The argument here is similar to that above. It may also be the case that female workers perceive unions as more concerned with traditional 'male issues'.

(c) *Proportion of workers who are non-manual*, (P.NMAN), or are managerial, (P.SF, P.CS).

It is predicted that non-manual workers and mangerial staff will be more amenable to management attempts to resist unionisation. Proximity to management reduces the need for a collective voice mechanism.

(d) *Proportion of workers of non-white ethnic origin.* (ETHN).

We would expect workers who face establishment-based discrimination to feel less loyalty to management and hence to be more amenable to a union-induced social custom.

(e) *Nature of inter-worker relations.* Following the Kerr and Seigel distinction between an "isolated mass" and "integrated individuals", we expect greater loyalty to the social custom amongst workers living and/or working in close proximity with each other. Information on residence would be useful for this but is not available in the data set employed. One proxy for such an effect is the incidence of shift-working (SHIFT) as an indication of a continuous production process. Also, geographical region (NORTH[7]) may be a proxy for community-based social norms.

(ii) Union Institutional Characteristics

(a) *Union recognition.* Whether or not the establishment recognises a union for the purposes of negotiating over pay and conditions is likely to be an important determinant of the effects of unionisation in the plant. In the current paper recognition is treated as determined exogenously, and our union density equations are run separately for recognised and non-recognised establishments. The exogeneity assumption is justified by the argument that recognition is historically determined and rarely re-negotiated in Great Britain.

(b) *Management attitude to membership.* (MANREC). Management recommending membership is taken as an indication of little management opposition to unions, and is interpreted as a low value of R_m.

(c) *Presence of a closed shop.* (SHOP). This can be thought of either as compelling individuals to join the union or as inducing strong peer pressure to join rather than to free-ride: though the latter remains an option through moral objection clauses.

(d) *The level of bargaining.* (FIRM). Where bargaining takes place only at the national level, it is expected that the free-rider problem will be exacerbated and union density will be low. As the focus of bargaining narrows to the company and ultimately to the

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[7]The variable NORTH is a composite regional variable comprising North-West, North, West Midlands, East Midlands, Yorkshire and Humberside, Wales and Scotland.

plant, the large numbers problem associated with public goods provision diminishes and, ceteris paribus, higher union density would be predicted.

(iii) Characteristics of the establishment

(a) *Ownership*. Where the establishment is owned cooperatively, (COOP), or as a trust, (TRUST), we would predict fewer management resources to be devoted to opposing unions than where it is organised as a private company.

(b) *Market power*. This is proxied by labour costs as a proportion of sales (LCSL) and by the number of competitors in the product market (FEW, MANY, MAIN). As indicated previously, the signs on these variables are uncertain as market power affects both R_u and R_m. It is suggested also that the proportion of skilled workers, (P.SK), affects the level of membership as skilled workers face a relatively less elastic demand schedule.

(c) *Size*. Previous work has explored the effects of establishment size, (SIZE), and company size, (OSIZE), on workplace industrial relations (see Marginson (1984)). A common finding is that union membership is higher where establishment and company size are greater. This has been argued to be because workers are more alienated from management in larger organisation, but might also derive from economies of scale in union recruitment.

(d) *Independence of establishment*. Bain and Elsheikh (1980) argued that a more paternalistic, single independent establishment (SITE) would be more likely to deter workers from joining unions. We incorporate this and a head office variable (HEAD) to test the expectation that workers not engaged in the direct production of a good or service will be less likely to join a trade union because of their proximity to the centre of the organisation.

(e) *Extra-union consultation*. We incorporate a dummy variable for the presence of a joint consultative committee (JCC) as a measure of the establishment's attitude to worker involvement in decision-making. One argument is that a tradition of consultation in the establishment will facilitate union organisastion. Conversely, it might be argued that the JCC is encouraged by management as an alternative to the development of a strong trade union. One causality problem with the inclusion of this variable stems from the possibilty that it is the existence of the union which generates or sustains the JCC.

IV Results

Table 2 presents the regression results of the union and non-union sector equations for manual workers. The table gives the logistic coefficient of each explanatory variable, the corresponding standard errors and the computed mean marginal effects. The latter are calculated as $Bj(p)(1 - p)$, where Bj is the estimated logistic coefficient of the jth variable and p is the sample mean union density level[8]. The parsimonious

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[8]This is true for large n_i, ie in establishments with high employment. In general, the vector of partials is given by: $dp_i / dx = B (p_i + 1/2n_i)(1 - p_i + 1/2n_i) / (1 + 1/n_i)$.

regression equations reported in Table 2 are those which include only variables which are statistically significant in at least one of the two sectors for manual workers. A number of other explanatory variables had been included in earlier regressions, but were found to be insignificant. These variables are discussed first.

The variables depicting the degree of competition in the product market were insignificant in each of the four sectors. These variables (MAIN, FEW, MANY) describe whether the establishment is the main supplier in its product market and whether there are few or many competitors. The insignificance of the market power variables might be explained by the effect described by Freeman, in which the higher potential mark-up in establishments with market power (see Stewart (1989) induces greater union recruitment activity, but is offset by greater anti-recruitment activity of the firm afforded by its higher profits. Similarly, the labour costs variable, giving information on the proportion of labour costs to total sales, was insignificant in each sector. The variable was included in order to pick up any effect of the relevant Marshallian condition.

Second, the-level-of bargaining variables did not emerge as significant determinants of the level of union density. This was surprising as the prior expectation was that a local focus for bargaining would increase the propensity to join the union, through mitigating the large numbers aspect of the public good problem. Again, it could be that a local focus for bargaining induces the establishment management to spend more resources to deter membership.

Third, the variable representing organisation size did not appear as a significant determinant of density. This is surprising in view of the finding by Marginson (1984) of "powerful evidence of the impact of company size as opposed to plant size" on the level of unionisation across establishments. Follwing Bain (1970), Marginson views this impact as strong confirmation of the hypothesis that union density is affected by recognition which is determined at company level. This interpretation is consistent with our results,according to which company size is not significant, as we are separating our sample by recognition status.

Finally, following Bain and Elsheikh, we included a dummy variable for membership of an employers' association. Whereas Bain and Elsheikh found this to have a consistently negative and significant effect, in our work it is signicant in only one of the four sectors. We are also concerned about the direction of causation in any such relationship and find it at least equally plausibe that the level of unionisation is a determinant of the establishment's membership of an employers' association. We have excluded the variable from each of our preferred equations.

Manual Workers

The union and non-union regressions were run separately. A Chow test upholds

this procedure as the hypothesis of a linear restriction is rejected[9]. From Table 2 it is clear that the important determinants are quite different across the two sectors. Only two variables, JCC and P.PT, are both statistically significant and have the same sign in each sector.

Turning to the effects of establishment size on union density, there appears to be a reasonably monotonic effect of size in the union sector only. SIZE5 and SIZE6 are statistically significant and positive. This supports other results (for example Marginson (1984)) and is consistent with the argument of economies of scale in union recruitment activity. Interestingly, lending further cooroboration to this, there is no such clear size effect in the non-union sector.In this sector, ownership emerges as an important determinant, as both COOP and TRUST are significant. Their positive signs imply that these ownership types of establishment are likely to be characterised by higher levels of membership than the private limited companies. However, in establishments where unions are recognised there is no such ownership effect for manual workers. The issue of formal recognition appears less important in establishments run as cooperatives or trusts.

We now consider the influence of the workforce characteristics variables. The proportion of part-time workers in the establishment has a highly significant negative effect in both sectors, corroborating the finding of Bain and Elshekh (1980). In the union sector the mean marginal effect implies that a rise in the proportion of part-time workers by ten percentage points will cause a 7.6 percentage point reduction in union density. The effect in the non-union sector is a 1.3 percentage point reduction.

The sensitivity of union density to the proportion of part-time workers in the establishment is as predicted in Section II of the paper, where it was suggesed that the strength of the social custom to join unions would be weaker amongst part-time workers. We predicted also that the social custom would be more influential in the union sector and this is consistent with the finding of a greater sensitivity of density to the proportion part-time in this sector. This interpretation is also consistent with the finding that the proportion of female workers in the establishment is a negative and highly significant determinant of union density in the union sector, but is insignificant in the non-union sector. Bain and Elsheikh reported the percentage of females to be very negative and highly significant, but did not split the effects into union and non-union sectors. From Table 2, the relevant marginal effect implies that in the union sector an increase of 10% in the percentage of the workforce which is female produces a 1.3 % reduction in union density. There is no significant effect in non-union establishments.

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[9]For the manual workers sample the F-Statistic is calculated as $F = 48.33$ which is significant at the 1% level, with degrees of freedom 18, 808.

Table 2   Manual Workers: 2-Step WLS estimates of the determinants of union density, using the adjusted logistic transformation.

	Logistic Coefficient		Marginal Effect	
	Union Sector	Non-Union Sector	Union Sector	Non-Union Sector
P.FEM	-0.903***	0.265	-0.132	0.018
	(0.345)	(0.768)		
P.PT	-5.179***	-1.861***	-0.756	-0.127
	(0.312)	(0.673)		
P.MAN	-0.128	1.304*	-0.018	0.089
	(0.409)	(0.742)		
P.SK	0.533	2.013***	0.078	0.137
	(0.357)	(0.625)		
ETHN	-0.391**	1.264***	-0.057	0.086
	(o.162)	(0.341)		
SIZE3	-0.347	-0.863*	-0.051	-0.059
	(0.321)	(0.478)		
SIZE4	0.127	0.558	0.019	0.038
	(0.284)	(0.428)		
SIZE5	0.575*	-0.718	0.084	-0.049
	(0.313)	(0.757)		
SIZE6	0.735**	-2.683	0.107	-0.182
	(0.309)	(1.742)		
COOP	0.969	9.084***	0.141	0.618
	(0.986)	(1.277)		
TRUST	0.713**	1.612*	0.104	0.110
	(0.292)	(0.864)		
NORTH	0.497***	0.380	0.073	0.026
	(0.147)	(0.331)		
JCC	0.503***	1.186***	0.073	0.081
	(0.153)	(0.334)		
SHIFT	0.941***	0.803	0.137	0.081
	(0.186)	(0.306)		
MANREC	2.868***		0.419	
	(0.240)			
SHOP	4.470***		0.653	
	(0.250)			
CONSTANT	0.312	-5.777		
	(0.448)	(0.635)		
No. of observations	607	239		

[***,**,* denote significance at 1%, 5%, 10%, respectively. Standard errors are in parentheses. Sample means are given in the data appendix.]

The dummy variables for the presemce of shift-working and for location in the North are both positive and significant in the union sector, and insignificant where unions are not recognised. The argument in Section II suggests that the North variable

might be interpreted as proxying the regional strength of social custom effects. The finding, then, of the significance of region only in the union sector is consistent with this idea. The presence of shift-working is taken as a proxy for a continuous production process. In a voice-exit framework this process can be thought of as generating a high demand for a collective voice mechanism and, hence, for unionism. In the social custom model the continuous production process is argued to generate stronger group reputation effects. The finding of positive significance for the variable in the union sector only is consistent with this argument.

In the union sector neither the proportion manual nor the proportion skilled is a significant determinant of union density in the establishment. Each of these variables is positive and significant in the non-union sector. The absolute effect of these variables is not large. For example, a 10% rise in the proportion of the workforce which is manual produces a 0.9% rise in union density amongst establishments not recognising unions. In these establishments, where the level of union density amongst manual workers is low but higher than that for non-manuals, a rise in the proportion of manual workers increases the proportion of them joining unions. This may be picking up a "safety-in-numbers effect", not observed in establishments where unions are recognised because of the perceived lower probability of management discriminating against union members.

In Section II it was argued that the presence of non-UK ethnic minority workers would be likely to increase the level of union membership. In the non-union sector this is the finding we obtain. The mean marginal effect is such that the presence of ethnic minority workers increases the percentage of workers joining the union by 8.6%. Conversely, and unexpectedly, in the union sector the presence of ethnic minority workers reduces the level of membership by 5.7%. Our tentative explanation here is that where the union is recognised, its organisation and behaviour deter membership by ethnic minority workers relative to other workers.

Finally, we find that amongst establishments where unions are recognised, the nature of the bargaining arrangements is a significant determinant of union membership. The effects of either management recommending membership or of a closed shop are best seen with reference to Table 3. Table 3a shows the attributes characterising both the basic establishment in the union sector and that in the non-union sector. The attributes of the basic establishment are calculated as the sample mean values of the continuous variables and as either 0 or 1 values for the dummies according to whether the sample mean is less than or greater than 0.5, respectively. From these values we can use the logistic coefficients of the significant variables to compute the predicted value of the transformed variable, and from this derive the predicted union density level of the basic establishment for each sector. This is 70.7% for the basic union sector establishment and 11.6% for its non-union counterpart.

Table 3a   Predicted Union Density in the Basic Etsablishment (Manual Workers)
Characteristics of the Basic Establisment.

	Union Sector	Non-Union Sector
P.FEM	0.173	0.261
P.PT	0.103	0.298
P.MAN	0.652	0.842
P.SK	0.323	0.411
ETHN	1	1
SIZE3	0	0
SIZE4	0	0
SIZE5	0	0
SIZE6	0	0
COOP	0	0
TRUST	0	0
NORTH	1	1
JCC	1	1
SHIFT	1	1
MANREC	0	
SHOP	0	
Predicted Density	70.7%	11.6%

Table 3b Predicted Union Densities with Deviations from the Set of Basic
Characteristics (Manual Workers)

(i) Union Sector   Predicted Density (%)

	Basic Establishment	70.7

Deviations[10]:

MANREC	= 1	98.6
SHOP	= 1	100.0
NORTH	= 0	59.1
JCC	= 0	59.0
SHIFT	= 0	47.9
ETHN	= 0	78.3
SIZE5	= 1	81.4
SIZE6	= 1	83.8
P.PT	=0.2	59.0
	=0.3	45.9
P.FEM	=0.2	70.1
	=0.3	68.2

(ii) Non-Union Sector

Basic Establishment		11.6

Deviations:

JCC	= 0	3.2
ETHN	= 0	2.9
P.PT	=0.2	13.8
	=0.3	11.6
	=0.4	9.7
P.SK	=0.3	9.4
	=0.4	11.4
	=0.5	13.8
P.MAN	=0.7	9.7
	=0.8	11.1
	=0.9	12.5

Table 3b shows how the predicted union density level changes with deviations from the
set of basic dharacteristics. In the case of the union sector, management recommending
union membership raises the predicted density level by almost 28%. With a closed shop
predicted density is 100%. Conversely, predicted density falls to about 59% if the
establishment is located in the South, or if it has no JCC, or if the proportion of
workers who are part-time rises to 20%. Predicted density rises to over 81% if there are
more than 500 workers in the establishment and to almost 84% with more than 1000
workers. For the non-union sector, Table 3b(ii) demonstrates the large fall in the level
of predicted density if the establishment lacks either a JCC or ethnic workers. Higher
proportions of workers who are either manual or skilled increases predicted density,
while higher proportions of part-time workers have the opposite effect.

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[10]The deviations from the set of basic characteristics are considered singly.

Non-Manual Workers

Table 4 presents the regression results of the union and non-union equations for non-manual workers. As for manual workers, the union and non-union regressions were run separately. An F-test upholds this procedure as the hypothesis of a linear restriction is rejected[11]. The most surprising result in these equations is the largely monotonic but negative effect of establishment size in the non-union sector. There are no significant effects of size in the union sector. One argument here is that the economies of scale aspect of union recruitment activity amongst manual workers does not apply to non-manual workers amongst whom membership is generally low acroos establishments. In the non-union sector we could be picking up the effect of large anti-union establishments. From Table 5 it appears that the predicted union density level of the non-union establishment with basic characteristics is 2.7%. This establishment has less than 100 employees. If the establishment is SIZE4 (200 - 499 employees) density is just over 1%, and if it is SIZE6 (over 1000 employees) predicted density falls to zero.

The proportions female and part-time have the expected sign and are significant in the non-union sector, but not in the union sector. The proportion non-manual is also significant and negative in the non-union sector, as we would expect, but is positive and significant where unions are recognised. It is not clear why this arises, but it is possible that where unions are recognised, and given establshment size, the larger the number of workers who are non-manual, the lower is the perceived level of management opposition to union membership by non-manuals.

The proportions clerical and supervisory (P.CS and P.SF) have the expected positive signs (the base group is the proportion managerial) in the union sector and are significant. In the non-union sector the insignificant negative sign on P.CS probably stems from the number of managerial workers belonging to professional bodies and therefore included in the union density figure. As is the case for manual workers, ETHN has a significant and negative effect in the union sector, though it is insignificant where unions are not recognised.

With respect to the ownership-type variables, COOP is positive and significant in both sectors for manual workers, but TRUST is significant in neither. Instead, the HEAD variable appears in the non-manual equations, with a significant negative coefficient in the union sector. This is consistent with the previous prediction that proximity to the management centre of the organisation would be likely to diminish unionisation.

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[11]For non-manual workers F = 8.45, which is significant at the 1% level, given degrees of freedom 19, 867.

Table 4 Non-Manual Workers: 2-Step WLS estimates of the determinants of union density, using the adjusted logistic transformation.

	Logistic Coefficient		Marginal Effect	
	Union Sector	Non-Union Sector	Union Sector	Non-Union Sector
P.FEM	0.266	-1.318**	0.063	-0.049
	(0.645)	(0.552)		
P.PT	0.433	-0.874*	0.103	-0.032
	(0.721)	(0.497)		
P.NMAN	0.699*	-0.636*	0.166	-0.024
	(0.399)	(0.374)		
P.CS	1.886***	-1.101**	0.449	-0.041
	(0.441)	(0.437)		
P.SF	1.480*	-0.382	0.352	-0.014
	(0.850)	(0.845)		
ETHN	-0.435**	0.062	-0.104	-0.092
	(0.188)	(0.184)		
SIZE3	-0.212	-0.937***	-0.050	-0.035
	(0.588)	(0.229)		
SIZE4	0.200	-0.600**	0.048	-0.022
	(0.513)	(0.242)		
SIZE5	-0.439	-2.477***	-0.104	-0.092
	(0.494)	(0.382)		
SIZE6	-0.007	-3.311***	-0.002	-0.123
	(0.497)	(0.562)		
COOP	1.897***	7.908***	0.451	0.293
	(0.813)	(1.504)		
HEAD	-0.435**	0.046	-0.104	0.002
	(0.200)	(0.210)		
NORTH	0.632***	0.850***	0.150	0.031
	(0.139)	(0.181)		
JCC	-0.402**	0.102	-0.096	0.004
	(0.164)	(0.188)		
SHIFT	0.745***	0.192	0.177	0.007
	(0.247)	(0.191)		
MANREC	0.955***		0.227	
	(0.163)			
SHOP	2.027***		0.482	
	(0.260)			
CONSTANT	-1.438	-2.790		
	(0.613)	(0.405)		

No. of
observations 460   445

In each of the manual worker equations the presence of a JCC has a positive and significant effect. For non-manuals JCC is significant only in the union sector where it is negatively signed. This is less easy to explain but could derive from non-manual workers seeing joint consultative committees as an alternative voice-mechanism. The presence of shift-working, on the other hand, behaves the same for both manuals and non-manuals, being significant only in the union sector where it is positively signed.

The nature of the bargaining arrangements is again a significant determinant of union membership. Both management recommending membership and the presence of a closed shop have positive and significant effects on the union density of non-manual workers. These effects are best seen with reference to Table 5b. When management recommends workers to join a trade union membership is almost 80% in the otherwise basic establishment. The density level rises further to almost 89% in the presence of a closed shop. Conversely, density falls to 44.5% if the basic establishment is located in the south, ceteris paribus, and to 41.7% in the absence of shift-working. For the non-union sector, Table 5b shows the effect of establishment size. Predicted density is zero for establishments with more than 500 employees but with otherwise the basic set of characteristics.

Table 5a   Predicted Union Density in the Basic Establishment (Non-Manual Workers) Characteristics of the Basic Establishment

	Union Sector	Non-Union Sector
P.FEM	0.301	0.341
P.PT	0.064	0.119
P.NMAN	0.454	0.532
P.CS	0.387	0.410
P.SF	0.177	0.129
ETHN	1	1
SIZE3	0	0
SIZE4	0	0
SIZE5	0	0
SIZE6	1	0
COOP	0	0
HEAD	0	0
NORTH	1	1
JCC	1	0
SHIFT	1	0
MANREC	0	
SHOP	0	
Predicted Density	60.2%	2.7%

Table 5b   Predicted Union Densities with Deviations from the Set of Basic
Characteristics (Non-Manual Workers)

(i) Union Sector   Predicted Density (%)

	Basic Establishment	60.2

Deviations:

MANREC	= 1	79.7
SHOP	= 1	88.6
SOUTH	= 1	44.5
JCC	= 0	69.3
SHIFT	= 0	41.7
ETHN	= 0	70.0
P.CS	= 0.25	53.8
P.SF	= 0.25	62.7

(ii) Non-Union Sector

	Basic Establishment	2.7

Deviations:

SOUTH	= 1	0.6
P.FEM	= 0.25	3.1
P.PT	= 0.05	2.9
P.NMAN	= 0.40	3.0
	= 0.20	3.5

V Conclusions

The paper is concerned with the determinants of union density across private sector establishments. The data relate to 1984 and hence our work attempts to build on the results of Bain and Elsheikh for 1978 data. We also employ an adjusted logistic transformation specification to deal with the bounded nature of the dependent variable. Our main findings can be summarised as follows. First, a number of variables predicted by traditional theory to be important determinants of union density at the establishment level do not emerge as important in our study. For example, neither the labour cost variables nor the variables proxying the degree of product market competition appear to be significant. One explanation for this is that the higher potential mark-up in establishments with market power induces greater union recruitment activity, but generates simultaneously greater anti-recruitment activity by the firm, afforded by its higher profits. In general, we find it useful to have as a theoretical backdrop the framework in which union density is seen as influenced by other workers and by the activities of both the union and the firm, within their market contexts.

Second, we find the regression results for manual workers to be quite different from those for non-manuals. Furthermore, within each group we find it important to distinguish between establishments where unions are recognised and those where they are not. For manual workers the significant determinants of union density in the union sector are P.FEM, P.PT and ETHN (all negative) and TRUST, NORTH, JCC,

SHIFT, two establishment size variables, MANREC and SHOP (all positive). Conversely, in the non-union sector the proportion female, the regional, the size and the shift variables are not significant, while the proportions skilled and manual do become significant.

The major differences between manuals and non-manuals lay in the effects of the size variables and of the proportions female and part-time. The latter two are negative and highly significant in the union sector for manual workers but appear insignificant for non-manuals in establishments where unions are not recognised. Comparing our results with those of Bain and Elsheikh, for manual workers, the qualitative effects of establishment size, proportion female and region are similar, but we find it important to distinguish between union and non-union establishments. The major differences lay in our findings that the proportion part-time, the type of ownership, the presence of ethnic minority workers, of a JCC, of shift-working and the bargaining arrangements emerge as significant determinants of union density, while the labour costs variables are insignificant. However, given the different data sets and regression techniques, it is not surprising that the results are so different.

There is ample scope for further research using the WIRS data set to investigate the determinants of union density at the level of the establishment. We suggest the following particular areas of interest. First, it would be interesting to focus on the determinants of union density amongst part-time workers. There is good data to enable this and much discussion within trade unions of the need to increase recruitment within this group. Second, it would be potentially worthwhile to merge into the WIRS data set information on variables such as industry unionisation rates and barriers to entry to estimate their effect on establishment level union density. Third, this study splits the sample of establishments into union and non-union sectors. This is argued to be important, but a more sophisticated approach would be to model union density conditional on each of the bargaining arrangement variables. Finally, work drawing on the WIRS panel data should provide important insights into the nature of the changes in unionisation that took place between 1980 and 1984.

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Data Appendix

Description and sample means of explanatory variables used in Tables 2 and 4.

		Manual Workers		Non-Manual Workers	
		Union	NonUnion	Union	Non-Union
P.PT	Proportion of Employees Part-Time	0.103	0.249	0.064	0.119
P.FEM	Proportion of Employees Female Full-Time	0.173	0.189	0.301	0.341
P.MAN	Proportion of Employees Manual	0.652	0.590		
P.NMAN	Proportion of Employees Non-Manual			0.454	0.532
P.SF	Proportion of Employees Supervisory/Foreperson			0.177	0.129
P.CS	Proportion of Employees Clerical/Secretarial			0.387	0.410
P.SK	Proportion of Employees Skilled	0.323	0.276		
ETHN	Presence of Workers of Non-White Ethnic Origin	0.598	0.452	0.667	0.501
SHIFT	Presence of Shiftworking at Establishment	0.679	0.381	0.700	0.387
NORTH	Location of Establishment in North (see Footnote 7)	0.657	0.439	0.637	0.467
MANREC	Management Recommends Union Membership	0.221		0.230	
SHOP	Presence of a Closed Shop	0.448		0.191	
COOP	Cooperative Ownership of Establishment	0.028	0.013	0.039	0.004
TRUST	Ownership by Trust	0.030	0.067		
HEAD	Establishment is Organisation Head Office			0.161	0.231
JCC	Presence of a Joint Consultative Committee	0.577	0.314	0.602	0.355
SIZE3	100-199 empolyees in Est.	0.152	0.180	0.163	0.227
SIZE4	200-499 empolyees in Est.	0.213	0.121	0.213	0.162
SIZE5	500-999 empolyees in Est.	0.193	0.046	0.222	0.065
SIZE6	1000+ empolyees in Est.	0.199	0.013	0.237	0.020

The following variables were reported in the text as insignificant in each equation:

FIRM   Bargaining at the level of the company

LCSL   Labour Costs as a Proportion of Sales

FEW   Few ($\leq$5) Product Market Competitors

MANY   Many (>5) Competitors

MAIN   The Organisation is the Main Supplier in the Product Market

EMPA   The Establishment is Affiliated to an Empolyers' Association

OSIZE   Refers to the Number of Employees in the Organisation