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Insider Power in Wage Determination

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The paper argues that wage determination is best seen as a kind of rent-sharing in which workers' bargaining power is influenced by conditions in the external labour market. It uses British establishment data from 1984 to show that pay depends upon a blend of insider pressure (including the employer's financial performance and oligopolistic position) and outsider pressure (including external wages and unemployment). Lester's feasible 'range' of wages appears typically to be between 8 and 22 per cent of pay. Estimates of the unemployment elasticity of the wage lie in a narrow band around −0·1.

> Anyone who teaches labor economics ... cannot help recognising the extent to which it is necessary to ... resort to such devices as wages in theory versus wages in practice, upper and lower limits with an uncharted no man's land between, a catalogue of imperfections ...
>
> Ross (1948, p. 2)

> Wage theory must include among its basic assumptions ... that a range of indeterminacy is natural ... and that company managements ... can often select a position of long run stability at various points within the range of indeterminacy
>
> Lester (1952, p. 500)

> ... market forces appear to set only the outside limits within which the wage bargain will be struck.
>
> Mackay *et al.* (1971, p. 391)

INTRODUCTION

One of the oldest questions in economics is whether wage rates are determined as if by a classical competitive market. This was actively discussed in the period after the Second World War, but the dominance of the human capital school in the 1960s and 1970s then helped largely to remove it from the textbooks and the economics journals. That it is now back on the agenda is probably the result of world-wide concern about high and persistent unemployment rates.

This paper examines the role of 'insider' power in wage determination. It views the equilibrium wage rate as the result of an explicit or implicit bargain between workers and their employer. In this framework the determination of pay can be seen as a form of rent-sharing: the employer and the workers join forces to extract from consumers some surplus over and above that required to pay production costs. In a purely competitive world, the surplus cannot exceed that amount which is just required to compensate the agents for their efforts. More generally, however, there may be a net surplus, or *rent*, to be divided somehow between those who organize the firm and those who make the product. The determination of pay, on this view, is ultimately about the cutting of a cake into two pieces: the side with the greater power obtains the

larger slice. This approach may even be applicable when there is no formal trade union. A group of skilled workers may conceivably function as a *de facto* union, because (as Lindbeck and Snower, 1986, 1988, and others have emphasized) they cannot be quickly and costlessly replaced.

The paper uses British microeconomic data[1] to attempt to provide answers to the following kinds of questions.

1. Is it possible to test and reject the classical theory of wage determination?
2. Do wage rates respond to internal pressure (insider variables) as measured by, for example, the profitability of the employer?
3. If employment falls, does that induce the retained insiders to raise their wage demands, *ceteris paribus*, at the expense of future jobs for outsiders?
4. Does insider power depend upon the existence of a trade union, or merely upon the employer's need for trained labour?
5. Do unionized and non-unionized labour markets respond to market shocks in the same way?

As stressed by the traditional competitive model, however, external (or 'outsider') pressures may also influence equilibrium levels of pay. This suggests another set of questions.

6. How important are outsider pressures in wage determination, and do they work in the same way in the union and non-union sectors?
7. Does unemployment depress pay?
8. Do wage rates 'follow' one another, either because of competitive or wage parity[2] effects?
9. If both internal and external pressures determine wage rates, what is their relative importance?
10. If market forces fix only the limits of a feasible *range* of wage levels, how large is that range?

The analysis in the paper draws upon a number of strands in the economics literature. These include insider–outsider theory itself,[3] the literatures on bargaining[4] and trade union models,[5] the literature on the empirical estimation of time series and cross-section wage equations,[6] and a much older current of research on industrial relations. All bear upon the same issues, and the dividing lines are blurred.

Section I of the paper examines previous work in the area. Section II sets out a model of wage determination in which, through a process of bargaining, an employer's equilibrium wage rate is influenced by a mixture of internal and external pressures. Various models in the recent literature are shown to emerge as special cases of this general framework. Some new results are proved. In particular, the paper shows that *the equilibrium wage rate is likely to be shaped by both the outside rate of pay and an insider variable such as profit per employee.* Section III describes a microeconomic data-set on British establishments in 1984. Subject to small caveats, the data-set provides a correct statistical sample of the whole of Britain's economy. Sections IV and V use the data to explore questions 1–10 raised above. The sections estimate cross-section wage equations and examine the empirical relevance of insider and outsider pressures. The paper's conclusions are summarized in Section VI.

I. Old and New Work

According to the competitive model, an employer is a wage-taker and must set that wage rate which gives workers the market level of utility. There is no scope for bargaining; employees are unable to appropriate any of the returns to an improvement in their firm's prosperity; there are no rents; insider workers and outsider workers are equal.

Objections to this view have been voiced for many years. Lester (1952) and Slichter (1950), both knowledgeable of real labour markets, began an early round of dissent. They argued that uniformity of wages was the exception rather than the rule, and they provided evidence of large pay disparities across similar people and establishments. In Lester's terminology, there exists a feasible 'range' of wage rates, and a central task of labour economics is to uncover the determinants of its size. These authors did not claim to explain fully why 'wages, within a considerable range, reflect managerial discretion' (Slichter, 1950, p. 88), but both mentioned the employing company's ability to pay as one relevant factor. Slichter, moreover, established the existence of a correlation between manual workers' wages and both their industries' profit and value-added rates.[7] Discussions of profit's relevance also appear in, for example, Dunlop (1944, around p. iv); Hicks (1963, around p. 155), and Ross (1948, around p. 15).

A later British study, MacKay *et al.* (1971), echoed such sentiments. After examining the personnel records of 75,000 manual workers in 66 engineering plants, the authors were led to reject the validity of the competitive model. They found substantial and persistent wage differentials which could not be explained satisfactorily by non-pecuniary factors. MacKay *et al.* drew a distinction between 'ins' (those already employed by a plant) and 'outs' (non-employees) and argued that

> an employee's increases in earnings . . . will depend more on the plant in which he is employed than on . . . the demand and supply conditions for his particular type of skill. (Mackay *et al.*, p. 391)

Their explanation relied on the idea that employees can obtain a share of product market rents:

> what we are suggesting is that the labour force will benefit in the form of higher wages if the plant enjoys high profitability, economies of scale, efficient management or methods of production, monopoly elements in the product market, and so forth . . . . (p. 391)

Recent developments in insider–outsider theory, closely related both to bargaining models and to the theoretical analysis of trade unions, offer a way to conceptualize such findings. Gregory (1986) and Solow (1985) stress the importance for wage setting of internal rather than external pressures. Solow concludes his paper:

> I would be happy to have made a credible case for the following proposition: one reason for the persistence of unemployment over a wide range of fluctuations of aggregate demand is the willingness and ability of insiders to convert higher demand into higher wages for themselves rather than into increased access to jobs for outsiders. (Solow, 1985, p. 247)

Similarly, Blanchard and Summers (1986), Carruth and Oswald (1987a), Lindbeck and Snower (1987) and Gottfries and Horn (1988) suggest that a

smaller group of insiders, *ceteris paribus*, will tend to lead to lower employment and higher pay.

Lindbeck and Snower (1986) do not rely upon the assumption that labour is represented by a trade union. The authors put forward the hypothesis that it is skill that creates insider power: employees who cannot be quickly and costlessly replaced are able to bargain for a share of any surplus profit. Exactly the same idea lies behind a recent literature on non-cooperative bargaining (see, for example, Shaked and Sutton (1984)). Skilled non-union individuals may be in a position analogous to unionized employees, in which case insider power should be weakest among those of low skill who are not represented by a union.

A number of relevant empirical studies have recently appeared. These include Krueger and Summers (1987, 1988), Dickens and Katz (1987), Nickell and Wadhwani (1987) and Gregory, Lobban and Thomson (1987). Krueger and Summers,[8] and Dickens and Katz, conclude that in modern US data there is evidence of large unexplained wage differentials, and the latter uncover a positive correlation between pay and profitability per employee. Krueger and Summers favour an efficiency wage interpretation of their evidence. Nickell and Wadhwani, and Gregory, Lobban and Thomson, use British panel data. The former find that wages depend on the employer's average productivity and financial position, the latter that profits affect pay. A second category of empirical work relies on time-series data, and is the descendent of Kaldor's (1959) remark that the Phillips curve should have been written with profits, rather than unemployment, as the independent variable. In explorations of this hypothesis, Carruth and Oswald (1987b) and Rowlatt (1987) reach the conclusion that wage rates move with (lagged) levels of company profitability.

II. Wage Theory

Although recent contributions to the theory of pay determination take diverse forms, it is possible to encompass many within a single framework. Consider a firm with a maximum profit function[9]

$$\pi(w, e) = \max_{n} r(n, e) - wn$$

where w is the wage, e is a demand shock, n is employment, r is revenue, and $\pi(\cdot, \cdot)$ and $r(\cdot, \cdot)$ are appropriately differentiable. Assume that it faces a trade union, or a non-unionized group of skilled employees, with reduced-form utility function

$$v(w, m, e) = \mu(w, -\pi_w(w, e), m)$$

where the union's utility function μ is increasing in the wage, non-decreasing in employment ($n \equiv -\pi_w(w, e)$), and an ambiguously signed function of membership, m. Let $f(e)$ be the density function of demand shocks, and E be the expectations operator. Assume that Ev is concave in the wage. (The traditional monopoly union problem is then well defined.)

Assume that fall-back utilities[10] for the firm and union are, respectively, π^* and v^*, and that wage determination can be modeiled using an asymmetric Nash bargain. This may be justified axiomatically (as in Nash, 1953), or

strategically (as in Binmore, Rubinstein and Wolinsky, 1986). In the latter case the fall-back outcomes may be seen as the delay or strike utilities. It is natural to see external labour market forces as working through the workers' v^* levels. Finally, define the variable π^e as $E(\pi - \pi^*)/En$.

Within this framework, the following results can be established. (Proofs are contained in the Appendix.)

Proposition 1. The equilibrium wage, w, is an increasing function of π^e, the ratio of the firm's expected surplus profit to expected employment, and of workers' fall-back utility, v^*.

Proposition 2. Consider a risk-neutral union with locally flat indifference curves and known product demand. Then the equilibrium wage is a weighted average of the fall-back wage and the surplus profit per employee.

Corollary. The partial elasticity of the equilibrium wage to the fall-back wage is less than unity.

Proposition 3. Consider a utilitarian monopoly union which cares only about insider members, m. Then a decline in membership, m, may raise or lower the equilibrium wage, w.

The first of these analytical results includes a general but little noted observation about wage bargaining models, namely, that the equilibrium wage is positively related to the employer's profitability. Workers' remuneration moves with the financial performance of their employer. Proposition 2 captures an illuminating special case. If, perhaps because of a layoff-by-seniority rule,[11] the trade union is locally indifferent to employment, there is no product demand uncertainty, and workers have linear utility functions, then pay is determined by a simple formula. The bargained wage is:

$$w = w^* + \sigma(\pi - \pi^*)/n$$

where σ is a weight based on the sides' bargaining strengths. This equation illustrates in a particularly sharp way how and why pay may depend upon a mixture of internal and external forces. It also follows immediately that a 1 per cent change in the fall-back wage, which can be assumed to move with outsider variables, has less than a 1 per cent effect upon the equilibrium wage rate (except in the limiting case when employees have no power, so that $\sigma = 0$). Proposition 3 reveals[12] that most of the recent hysteresis literature (e.g. Blanchard and Summers, 1986; and Lindbeck and Snower, 1987); has ignored an ambiguity in a central comparative-static prediction. These writings argue that a fall in membership will raise wage demands as the reduced number of insiders act to appropriate rents rather than to expand employment for outsiders. But in general this need not be true. The intuition is clearest in the upward direction. Consider a trade union which receives an inflow of new members whose preferences count. The direction of the union's response depends on the stronger of two conflicting effects. First, larger size means that a slump in demand exposes insiders to greater risk of unemployment, because the jobs must be divided among a larger pool. This makes for lower wage demands. Second, the larger size means that in a boom there are greater gains from higher pay. If all members are going to be employed anyway, the union will

respond to higher membership by being more militant. The trade union's marginal utility from pay is, in a boom, membership multiplied by the marginal utility of income of an individual. This tends to generate greater wage demands.

III. Empirical Results

The British *Workplace Industrial Relations Survey* of 1984 (*WIRS*2), 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) in both 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).

The dependent variable in the later regressions is the weekly earnings of a typical worker for (in order) unskilled, semi-skilled and skilled manual workers.[13] The wage data are grouped and open-ended. When there was no single 'typical' worker, managers gave multiple answers. In order to put these data into a tractable form, we followed the standard practice of allocating midpoints to all of the wage-bands. (Stewart's (1987) alternative method gave similar results to Blanchflower (1984).) The open ends were closed off in an inevitably *ad hoc* way. A series of sensitivity tests were undertaken, which showed that the results reported here were relatively stable to changes in the values allotted to the end categories. This is to be expected, given the small numbers of observations in these end groupings. Appendix 2 provides means and standard deviations for the variables. Appendix 3 contains definitions of the variables.

Insider variables in the data-set include the following. First, there is for each establishment a qualitative measure of financial performance, which is a five-fold grouping from 'a lot better than average' down to 'a lot below average'. The exact question in the *WIRS* survey was

> How would you assess the financial performance of this establishment compared with other establishments/firms in the same industry?
>
> (Question 14a)

Precise profit statistics would be preferable, but such data were not available, and in the case of many establishments will not exist. We used the five-fold

ordering to create both dummy variables for each category and a single variable ('financial performance') where the numbers +2, +1, 0, −1, −2 were assigned to the ordering 'a lot better than average' down to 'a lot worse than average'. The latter method imposes a cardinality restriction which was suggested by the unrestricted dummy variable coefficients (see n. 15, for example).

Second, there is information about the establishment's competitive position. Interviewees were asked

> Is this market dominated by your organization? Are there only a few competitors (5 or less), or are there many competitors?
>
> (Question 11d)

That product market concentration may play a role goes back at least to Weiss (1966).

Third, the data-set includes statistics on previous employment levels, so measures of growth or decline can be constructed. Fourth, various union forms (for example, different types of closed shop) can be identified.

Two outsider variables were grafted onto the *WIRS*2 data. County unemployment rates and county wage rates (supplied by the Department of Employment) give reasonably disaggregated proxies—across 65 British counties—for labour market pressures external to the establishment. These variables are used as indicators of the fall-back utilities (v^*) of workers.

Many structural and compositional characteristics are also recorded within the data set. Our choices were shaped primarily by earlier findings (including those in Blanchflower, 1984, 1985, and in the US literature surveyed in Freeman and Medoff, 1984, and Lewis, 1985). All equations include up to 60 industry dummies.

IV. Empirical Results: Total Sample

Table 1 presents the estimated logarithmic (manual worker) wage equations for the largest feasible sample within the 1984 *Workplace Industrial Relations Survey*. This combines the private and public sectors, and includes union and non-union establishments. It provides approximately 1000 degrees of freedom. For each of the three skill categories, two equations are reported, one with the (natural logarithm of the) county unemployment rate as the outsider variable, and the other with the (natural logarithm of the) county average weekly wage rate as that variable. Comparable estimates for non-manual workers are reported in Blanchflower and Oswald (1988b).

In the unskilled sector of the labour market, there is little indication that insider variables matter. The employing establishment's financial performance and oligopolistic position have no significant effects upon pay. By contrast, outside pressure appears to be important. The unemployment elasticity of wages is approximately −0·14,[14] and in the alternative equation the outside wage enters with an elasticity just below 0·7. The only insider variable to enter with a significant t-statistic is that on the pre-entry closed shop. Unskilled workers gain a small wage premium from certain kinds of unionization.

Insider power seems to be important in the determination of the pay of workers with skills. The four such equations in Table 1 reveal that financial performance is significant and positive in each case, and that there is some

TABLE 1

WEEKLY WAGES: TOTAL SAMPLE

	Unskilled		Semi-skilled		Skilled	
Insider variables						
Financial performance	0·011427	0·015404	0·033186	0·035360	0·018841	0·023408
	(0·91)	(1·24)	(3·42)	(3·70)	(2·29)	(2·91)
Few competitors	0·023640	0·018990	0·026786	0·023105	0·035135	0·029399
	(0·95)	(0·77)	(1·42)	(1·24)	(2·20)	(1·88)
1-yr employment change	−0·000872	−0·000838	−0·000746	−0·000602	−0·000935	−0·000823
	(1·67)	(1·63)	(1·58)	(1·29)	(2·71)	(2·44)
Union recognition	0·056966	0·049147	0·035279	0·037425	0·029553	0·024408
	(1·90)	(1·66)	(1·48)	(1·60)	(1·43)	(1·21)
Pre-entry closed shop	0·082479	0·078891	0·092485	0·093366	0·074766	0·070700
	(2·08)	(2·01)	(3·16)	(3·25)	(2·94)	(2·84)
Post-entry closed shop	0·028052	0·020372	0·009982	0·007012	0·038059	0·031372
	(1·00)	(0·74)	(0·47)	(0·34)	(2·04)	(1·75)
Outsider variables						
County unemployment rate (logged)	−0·136731	—	−0·068717	—	−0·120432	—
	(3·63)		(2·27)		(4·63)	
County wage rate (logged)	—	0·675449	—	0·486073	—	0·584974
		(6·47)		(5·85)		(8·21)
Other variables						
% part-time	−0·005697	−0·005709	−0·003642	−0·003642	−0·003932	−0·003845
	(7·84)	(7·96)	(6·05)	(6·14)	(7·04)	(7·04)
% total manual	0·002063	0·002301	0·000685	0·000935	0·000284	0·0005125
	(4·33)	(4·87)	(1·59)	(2·20)	(0·79)	(1·44)
Majority male	0·348034	0·346265	0·294002	0·293087	0·302454	0·309297
	(13·62)	(13·72)	(13·51)	(13·68)	(10·80)	(11·29)
% unskilled	0·001580	0·001452	—	—	—	—
	(4·37)	(4·07)				

% semi-skilled	—	—	0·000299	0·000288	—	—
			(0·71)	(0·69)		
% skilled	—	—	—	—	−0·000606	−0·000460
					(1·43)	(1·11)
Foreign-owned	0·073942	0·066698	0·059573	0·051559	0·025744	0·019503
	(1·90)	(1·74)	(2·15)	(1·88)	(1·08)	(0·83)
Shiftworking	0·034349	0·038022	0·098961	0·099351	0·081596	0·083791
	(1·45)	(1·63)	(5·27)	(5·38)	(4·87)	(5·11)
Single independent	−0·032572	−0·028640	−0·057283	−0·053981	−0·026083	−0·020160
	(0·91)	(0·81)	(2·10)	(2·07)	(1·15)	(0·88)
No. of employees $\times 10^4$	0·804744	0·723550	0·552766	0·474031	0·534432	0·456486
	(3·86)	(3·50)	(3·51)	(3·05)	(3·87)	(3·37)
(No. of employees)$^2 \times 10^8$	−0·586820	−0·513917	−0·420810	−0·362738	−0·358311	−0·299702
	(2·66)	(2·36)	(2·65)	(2·32)	(2·50)	(2·13)
Nationalized industry	0·061588	0·041640	0·105707	0·090205	0·109917	0·098210
	(0·87)	(0·60)	(1·80)	(1·56)	(2·25)	(2·06)
Public sector	−0·011040	−0·001593	−0·108311	−0·095871	−0·145723	−0·139289
	(0·24)	(0·04)	(2·92)	(2·62)	(4·53)	(4·42)
Performance not possible	0·037791	0·037327	0·039764	0·037978	0·013235	0·010518
	(1·04)	(1·04)	(1·45)	(1·41)	(0·57)	(0·47)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4·420549	0·568415	4·623740	1·912898	5·010631	1·648156
	(38·51)	(1·04)	(50·58)	(4·37)	(60·68)	(4·38)
Adjusted R^2	0·53610	0·54746	0·50306	0·51838	0·49815	0·51935
F	21·04771	21·98679	15·34818	16·25594	16·65165	18·03802
Degrees of freedom	1128	1128	909	909	1019	1019

Notes: t-statistics in parentheses

evidence that oligopolistic position (the variable 'few competitors') matters. The existence or otherwise of a union shop is influential, but the estimated union differentials are all below 10 per cent.

On the financial performance variable, the significant coefficients lie between 0·018 and 0·035. This implies, using the five-fold classification, that establishments in the best-performance category pay between 7 and 14 per cent more than those in the lowest-performance category.[15] In the skilled sector, workers receive an additional 3 per cent if they are employed by an oligopolistic establishment. The existence of a closed shop adds a further 7–9 per cent.

Extreme versions of the insider–outsider model predict that outside pressures will have no impact. This view appears to be rejected by the data (although the unemployment elasticity is small). External wage rates and unemployment levels have reliable and significant effects upon skilled, semi-skilled and unskilled employees' remuneration. It may not be entirely coincidental that both the unemployment and the external wage rate elasticities are largest in the unskilled sector.

The variable measuring employment change over the previous year (1983/4) enters wage equations consistently negatively. However, its quantitative impact upon pay is small. This is the closest our data-set allows us to come to an evaluation of the hysteresis hypothesis that declining groups become more aggressive in their wage claims. Ideally, however, the hypothesis should be tested using panel data in which previous employment *levels* can be included in estimating equations. The cross-section finding here of a negative employment growth effect upon the level of pay is not a validation of the Blanchard–Summers model, but it may be of relevance to the debate. British workers appear to have been rewarded over the 1983/4 period if they accepted reductions in the workforce.

The factors listed under 'other variables' are conventional controls and are consistent with established knowledge about cross-section wage equations. Establishments with part-time workers and female workers pay less, for example, and the size of the establishment is strongly associated with levels of pay. Table 1 suggests that nationalized industries pay wages up to 10 per cent higher, *ceteris paribus*, while the rest of the public sector pay up to 15 per cent less, *ceteris paribus*. These findings suggest that further exploration of the UK public/private distinction would be fruitful.

It is possible to use the results to calculate the quantitative importance of Lester's (1952) 'range' of feasible wage rates. There is no orthodox way to do this, but the five-fold classification of financial performance suggests a procedure. Consider the top of the range to be determined, *ceteris paribus*, by the

TABLE 2

ESTIMATED WAGE BANDS*

	Unskilled	Semi-skilled	Skilled
Range excluding union markups	0%	13%	11%
Range including union markups	8%	22%	18%

* Derived from regressions in Table 1 with the county unemployment rate.

sum of the top financial performance category and oligopoly power, and the bottom of the range to be fixed by the wage rate when financial performance is in the lowest category and the establishment is not an oligopolist. The effects of unions' markups may be added to this—to create a total estimate of the range. The results of doing so are given in Table 2. These estimates should be considered as tentative, but they provide one way in which to try to conceptualize and measure the extent of insider influence.

V. Empirical Results: Union and Non-Union Establishments in the Private Sector

Union, bargaining and insider–outsider models have been designed principally for the private sector of an economy. It is also of interest to examine whether internal and external influences work differently in unionized and non-unionized labour markets. Hence Tables 3 and 4 present wage equations on subsamples for, respectively, the unionized private sector and non-unionized private sector.

Following the logic of, for example, Lindbeck and Snower (1986), it might be expected that insider power would be least prevalent in the unskilled non-union portion of an economy. The first two columns of Table 4 appear to be consistent with that view. Wage rates move almost one for one with the external level of pay, and few other variables matter. Unemployment, interestingly, does not play any role in (non-union) unskilled wage rate determination. A classical wage-taking theory seems to fit these data.

Table 3 reveals that unskilled unionized employees' wage rates are moulded somewhat differently. The external wage has a coefficient of 0·49 rather than 0·92 in the non-union sector, whereas unemployment has an elasticity of −0·16 rather than zero. In neither case do unskilled employees in the private sector seem to benefit from above-average financial performance of their establishment. But unionized establishments that have few competitors in the product market pay a 5 per cent wage premium. The only hint of that in the non-unionized establishments is among skilled employees, and in no case is the effect statistically significant.

The financial performance variable enters significantly in six out of eight of the semi-skilled and skilled wage equations in Tables 3 and 4. The largest wage 'band' (the differential between the top and bottom groups of establishments) is in the semi-skilled non-union sector. It is estimated at 24 per cent of the wage.

It is noticeable that the financial performance variable is insignificant in the skilled non-union wage equations of Table 4. This is against the spirit of some versions of insider–outsider theory. To explore the finding further, we estimated unrestricted financial performance effects. The result was that high performance had an insignificant positive coefficient of 0·05, while low performance entered with a large negative coefficient of up to −0·3 with a t-statistic of approximately 1·9. This, coupled with the relatively small number of observations, suggests that it would be unwise to write off insider power in the skilled non-union sector.

The outside wage rate works systematically throughout Tables 3 and 4, and takes higher coefficient values, by skill class, in the non-union equations.

TABLE 3

WEEKLY WAGES: UNIONIZED PRIVATE SECTOR

	Unskilled		Semi-skilled		Skilled	
Insider variables						
Financial performance	0·000473	0·005835	0·029605	0·030828	0·018562	0·022466
	(0·36)	(0·44)	(2·66)	(2·79)	(1·97)	(2·43)
Few competitors	0·055819	0·055427	0·047379	0·041093	0·019233	0·010185
	(1·98)	(1·96)	(2·14)	(1·86)	(1·00)	(0·54)
1-yr employment change	−0·000361	−0·000275	−0·001761	−0·001476	−0·001201	−0·001051
	(0·64)	(0·49)	(3·05)	(2·55)	(3·06)	(2·73)
Pre-entry closed shop	0·036415	0·031316	0·070978	0·065820	0·068475	0·055816
	(0·90)	(0·87)	(2·28)	(2·13)	(2·46)	(2·04)
Post-entry closed shop	0·084437	0·074785	0·035464	0·033133	0·057494	0·049674
	(2·75)	(2·45)	(1·50)	(1·42)	(2·74)	(2·42)
Outsider variables						
County unemployment rate (logged)	−0·161657	—	−0·090736	—	−0·159653	—
	(3·14)		(2·25)		(4·51)	
County wage rate (logged)	—	0·493583	—	0·394624	—	0·639917
		(3·27)		(3·25)		(6·12)
Other variables						
% part-time	−0·004819	−0·004964	−0·005389	−0·005624	−0·003657	−0·003817
	(3·98)	(4·40)	(4·84)	(5·07)	(4·30)	(4·56)
% total manual	0·001787	0·001815	0·000884	0·000945	0·000642	0·000832
	(2·53)	(2·57)	(1·36)	(1·46)	(1·23)	(1·62)
Majority male	0·277588	0·279850	0·259388	0·260888	0·272173	0·256877
	(8·18)	(8·26)	(8·38)	(8·48)	(5·24)	(5·03)

% unskilled	0·002248	0·002136	—	—	—	—
	(4·75)	(4·53)				
% semi-skilled	—	—	0·000773	0·000778	—	—
			(1·47)	(1·48)		
% skilled	—	—	—	—	0·000138	−0·000363
					(0·23)	(0·62)
Foreign-owned	0·043745	0·036553	0·049498	0·043764	0·045441	0·035226
	(1·13)	(0·95)	(1·69)	(1·50)	(1·74)	(1·36)
Shiftworking	−0·000518	−0·001658	0·110411	0·110972	0·099183	0·102675
	(0·02)	(0·05)	(4·09)	(4·14)	(4·19)	(4·41)
Single independent	−0·102995	−0·112212	−0·081608	−0·082637	−0·016277	0·009621
	(2·05)	(2·24)	(2·24)	(2·28)	(0·49)	(0·29)
No. of employees $\times 10^4$	0·810775	0·743243	0·492199	0·448911	0·617311	0·547736
	(1·52)	(2·75)	(2·27)	(2·09)	(3·32)	(2·99)
(No. of employees)$^2 \times 10^8$	−0·574402	−0·518447	−0·366604	−0·323575	−0·312838	−0·346813
	(2·47)	(2·22)	(2·02)	(1·79)	(2·52)	(2·14)
Performance not possible	−0·025764	−0·024136	0·008109	0·003943	−0·027863	−0·028322
	(0·56)	(0·53)	(0·23)	(0·11)	(0·93)	(0·96)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4·710739	1·735571	4·770077	2·490175	5·1626042	1·420628
	(30·23)	(2·19)	(38·58)	(3·91)	(44·41)	(2·59)
Adjusted R^2	0·47261	0·47354	0·47424	0·48086	0·44002	0·45754
F	8·87962	8·90931	8·55815	8·76145	8·57824	9·13418
Degrees of freedom	452	452	428	428	510	510

Note: t-statistics in parentheses

TABLE 4

WEEKLY WAGES: NON-UNIONIZED PRIVATE SECTOR

	Unskilled		Semi-skilled		Skilled	
Insider variables						
Financial performance	0·024077	0·024264	0·061148	0·061380	0·016828	0·022104
	(0·73)	(0·76)	(2·59)	(2·65)	(0·80)	(1·10)
Few competitors	−0·065880	−0·046393	−0·022002	−0·017460	0·057800	0·052574
	(0·98)	(0·72)	(0·45)	(0·36)	(1·31)	(1·24)
1-yr employment change	−0·003624	−0·003158	−0·002082	−0·002044	−0·000301	−0·000073
	(2·17)	(1·93)	(1·40)	(1·39)	(0·31)	(0·08)
Outsider variables						
County unemployment	0·043569	—	−0·041934	—	−0·118424	—
rate (logged)	(0·39)		(0·46)		(1·55)	
County wage rate	—	0·920423	—	0·412836	—	0·743811
(logged)		(3·30)		(1·98)		(3·89)
Other variables						
% part-time	−0·005804	−0·005126	−0·001106	−0·000884	−0·004084	−0·003914
	(2·88)	(2·62)	(0·88)	(0·71)	(2·98)	(2·98)
% total manual	0·000866	0·001695	−0·000486	−0·000084	0·001344	0·001906
	(0·63)	(1·25)	(0·43)	(0·08)	(1·35)	(1·97)
Majority male	0·389726	0·370579	0·399649	0·391585	0·334078	0·332636
	(5·50)	(5·36)	(7·41)	(7·34)	(5·16)	(5·42)

% unskilled	0·000518	0·000646	—	—	—	—
	(0·48)	(0·62)				
% semi-skilled	—	—	−0·000044	−0·000119	—	—
			(0·04)	(0·10)		
% skilled	—	—	—	—	−0·001830	−0·001659
					(1·58)	(1·49)
Foreign-owned	0·165249	0·115582	0·013499	−0·014776	−0·050001	−0·072752
	(1·50)	(1·08)	(0·17)	(0·18)	(0·72)	(1·09)
Shiftworking	−0·000997	−0·001816	0·086241	0·081297	−0·006386	−0·019564
	(0·14)	(0·03)	(1·76)	(1·68)	(0·13)	(0·42)
Single independent	0·025943	0·022760	0·005873	0·003191	−0·063118	−0·048941
	(0·36)	(0·33)	(0·11)	(0·06)	(1·35)	(1·09)
No. of employees $\times 10^4$	5·65349	5·56852	4·50025	4·60149	2·21784	3·06420
	(2·21)	(2·25)	(2·33)	(2·42)	(1·31)	(1·87)
(No. of employees)$^2 \times 10^8$	−0·166545	−0·172321	−8·73411	−9·57904	−3·38776	−6·98648
	(1·43)	(1·53)	(1·08)	(1·20)	(0·48)	(1·01)
Performance not possible	0·100745	0·071018	0·110565	0·087495	0·053309	0·007500
	(1·08)	(0·78)	(1·49)	(1·18)	(0·87)	(0·13)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3·999947	−0·662265	4·439947	2·187845	4·889453	0·709854
	(11·98)	(0·45)	(15·81)	(2·01)	(19·81)	(0·71)
Adjusted R^2	0·37657	0·40963	0·48738	0·50099	0·41230	0·45868
F	3·95845	4·39851	4·58963	4·79052	3·79185	4·37209
Degrees of freedom	191	191	136	136	146	146

Note: t-statistics in parentheses

Unemployment never enters significantly in Table 4 (although it approaches significance in the skilled case). It is always significant in Table 3's unionized estimates. The coefficients vary between −0·09 and −0·16. Table 4 corresponds more to the full sample results of Table 1 than Table 3 does, but the latter's smaller size may be a contributory factor. Employment change is important in Table 3's semi-skilled and skilled equations, whereas in Table 4 that is also true of the unskilled equations.

Compositional and other variables work in orthodox ways. Tables 3 and 4 encompass the earlier work of Blanchflower (1984, 1985, 1986) and Stewart (1987), but do little to change those authors' conclusions about such variables.

Finally, a number of possible methodological objections are worth considering. The first is the idea that the financial performance variable may be acting as a proxy for overtime working and this could be a reason for the positive effect on employees' remuneration. One counter-objection to this is that overtime working might be seen as an expression of insider power, in which case the present approach would be legitimate. More forcefully, however, a number of experiments with hourly wage equations were conducted, and the results were the same. Moreover, an overtime explanation cannot account for the insignificance of establishment performance in the unskilled wage equations.

As with any empirical work, it is sensible to question the meaning of ostensibly significant variables. The county unemployment and wage rate variables, for example, could be acting as proxies for rather different geographical effects (different consumer price levels, for instance). Failing direct data, one rather strong test of this was conducted. Eleven regional dummy variables were entered into Table 1's equations, and the coefficients on county unemployment and wage levels became those given in Table 5 (t-statistics in parentheses). On an extreme view, this calls into question the idea that outsider

TABLE 5

	Unskilled	Semi-skilled	Skilled
County unemployment rate	−0·09016	−0·00113	0·00725
	(1·51)	(0·02)	(0·18)
County wage rate	0·17984	0·29510	0·15215
	(0·81)	(1·67)	(1·05)

pressure plays a significant role. While not fatal for our analysis, which is concerned to stress insider power and rent-sharing, we are reluctant to accept such a judgment. Regional dummies are likely to capture some of the geographical element of excess labour supply, so a reduction in the significance of county unemployment is to be expected. The fact that county wages are also driven insignificant by the addition of regional dummies suggests that it is an unduly strong test.

Another potential weakness is that, because it is an establishment-level data-set, the *Workplace Industrial Relations Survey* lacks adequate controls on workers' characteristics (though it has the advantage that there are three comparatively narrow skill categories), so that financial performance might

be acting as an indirect measure of labour quality. This argument is misleading, because in a competitive framework there need be no correlation between skill and profits. Unusually talented individuals are paid appropriate wage premia, and, by free entry, profit is equalized across firms. The new work by Krueger and Summers (1987) also sheds doubt on the view that (unexplained) industry wage differentials are the result of unobservable worker characteristics.

A further issue is that of simultaneity. Profitability is a declining function of the wage, *ceteris paribus*; but in our cross-section data set there are no convincing instruments which could be used to disentangle a wage function depending upon profits from a profit function affected by wages. The reported wage equations may be prone to simultaneity bias, but this bias will act to *understate* any positive coefficient in a wage equation, so there is no reason on these grounds to believe the paper's qualitative results to be misleading. Probit equations for financial performance using these data are given in Blanchflower and Oswald (1988c) and find strongly negative effects from unionization.

VI. Conclusions

The broad conclusion from this paper is that the classical competitive model of the labour market does not provide an adequate explanation of wage determination in the United Kingdom. Instead, pay levels are shaped by an intricate blend of internal and external forces. For all but the unskilled non-union sector, a model based on the distinction between insiders and outsiders, where unions and bargaining play a central role, may offer the most appropriate framework. Even parts of the non-unionized sector of the economy exhibit signs of insider influence.[16]

Both internal and external pressures affect wage rates. First, pay depends upon an establishment's financial performance and oligopolistic position. Tentative calculations of the induced 'range' of wages (Lester, 1952) suggest a band of up to 16 per cent of pay in the unionized sector (the closed shop adds a further 7 per cent) and 24 per cent of pay in the non-unionized sector. Profitable employers therefore pay significantly more, *ceteris paribus*, than unprofitable ones. Second, pay moves with factors such as the level of unemployment and the going wage in the establishment's geographical area. For most kinds of labour, the unemployment elasticity of pay apparently lies between $-0{\cdot}06$ and $-0{\cdot}16$.[17] This is similar to new time-series and cross-section estimates for Britain and elsewhere.[18] In the unskilled non-union sector, which might be expected to approximate to a competitive market, the (partial) wage elasticity with respect to outside wages is near to unity; for other sectors of the labour market it is close to one half. There is no evidence of insider influence in the unskilled non-union sector.

These results, when taken together, appear to favour the idea that British wage determination may be seen as a kind of rent-sharing in which workers appropriate a portion of profits and high external unemployment weakens workers' bargaining strength.[19] Our findings are compatible with arguments expressed over many decades by economists such as Slichter (1950) and Lester (1952) in the United States and Mackay *et al.* (1971) in Britain. They are consistent with theoretical ideas proposed in the analytical literatures on

bargaining, on trade unions and on the economics of insiders and outsiders. They are also compatible with new work by Krueger and Summers (1988) and Dickens and Katz (1987) on American microeconomic data; the panel data findings of Gregory, Lobban and Thomson (1987) and Nickell and Wadhwani (1987);[20] time-series work by Carruth and Oswald (1987b) and Rowlatt (1987); and the questionnaire evidence of Gregory, Lobban and Thomson (1985, 1986) and Blanchflower and Oswald (1988a). In one sense, a new consensus may be emerging. In another, any such consensus is but a rediscovery of an earlier generation's ideas.

APPENDIX 1

Proof of Proposition 1

The Nash maximization can be formulated as

$$\max_{w} \{E\pi(w, e) - \pi^*\}^s \{Ev(w, m, e) - v^*\}^{1-s}. \tag{1}$$

On taking logs, and differentiating with respect to the wage w, the first-order condition for an interior maximum is

$$\frac{sE\pi_w}{E\pi - \pi^*} + \frac{(1-s)Ev_w}{Ev - v^*} = 0. \tag{2}$$

This establishes that, around the equilibrium,

$$Ev_w \equiv E(\mu_w - \mu_n \pi_{ww}) > 0. \tag{3}$$

After some rearrangement of (2), and using the definitions $\sigma \equiv (1-s)/s$ and $\pi^e \equiv \{E\pi(w, e) - \pi^*\}/En$,

$$Ev = v^* + \sigma\pi^e Ev_w, \tag{4}$$

which defines the bargained utility level of the workers.

Equation (4) defines an implicit function linking wages to w^*, workers' fall-back wage, to σ, relative bargaining strength, to π^e, the profit ratio, and to m, union membership. Differentiation establishes

$$\frac{\partial w}{\partial \pi^e} = \frac{\sigma Ev_w}{Ev_w - \pi^e \sigma Ev_{ww}} > 0, \tag{5}$$

because, by the concavity of Ev and the requirement in (4) that its derivative be positive around equilibrium, both numerator and denominator are positive. Hence the wage is an increasing function of the profit variable π^e. An equivalent proof establishes $\partial w/\partial v^* > 0$.

Proof of Proposition 2

The assumption of certainty allows the expectations operators to be dropped. A risk-neutral union that is locally indifferent to employment has utility levels that can be written without loss of generality as

$$v \equiv w \tag{6}$$

$$v^* \equiv w^*. \tag{7}$$

Hence, after rearrangement, (4) becomes

$$w = w^* + \sigma(\pi - \pi^*)/n. \tag{8}$$

Proof of Corollary. By (8), and the assumption $w \geq w^*$,

$$\frac{dw}{w} \leq \left(\frac{dw^*}{w}\frac{w^*}{w^*}\right) \leqslant \frac{dw^*}{w^*},$$

where the inequality is strict when σ is strictly positive.

Proof of Proposition 3

A trade union that assigns zero weight to outsiders decides upon its optimal wage rate in the following way. Its decision can be written formally as

$$\max \quad J = \int_0^1 \mu(w, n, m) f(e)\, de \tag{9}$$

$$\text{s.t.} \quad n = n(w, e) \tag{10}$$

or more simply as

$$\max \int_0^1 v(w, m, e) f(e)\, de, \tag{11}$$

where $v = \mu(w, n(w, e), m)$. This assumes, realistically, that there is no private unemployment insurance. (See Oswald, 1986, and Oswald and Turnbull, 1985, for evidence.)

The only difficulty with the maximization in (11) is that at a certain point, defined to be $e = \varepsilon$, all members have jobs. Hence ε occurs when

$$m - n(w, \varepsilon) = 0. \tag{12}$$

It is helpful to define a function $\varepsilon = \varepsilon(w, m)$ which has the property

$$\varepsilon_w = -n_w / n_e > 0 \tag{13}$$

$$\varepsilon_m = 1/n_e > 0. \tag{14}$$

The level of demand shock required to produce full employment of members is an increasing function of the wage and of the membership.

The maximization in (11) may be written

$$\max_w J = \int_0^\varepsilon v^s(w, m, e) f(e)\, de + \int_\varepsilon^1 v^b(w, m, e) f(e)\, de \tag{15}$$

in which v^s is the utility when demand is sufficiently low for there to be unemployed members (v^s is union utility in a 'slump') and v_b is the utility when demand is sufficiently high to ensure that employment is no less than membership (v^b is union utility in a 'boom'). An optimal wage requires that the following first-order condition holds:

$$\begin{aligned} J_w &= \int_0^\varepsilon v_w^s f(e)\, de + f(\varepsilon)\varepsilon_w (v^s - v^b)\big|_{e=\varepsilon} + \int_\varepsilon^1 v_w^b f(e)\, de \\ &= \int_0^\varepsilon v_w^s f(e)\, de + \int_\varepsilon^1 v_w^b f(e)\, de = 0. \end{aligned} \tag{16}$$

The term $(v^s - v^b)$ is zero, because at $e = \varepsilon$ a slump turns into a boom and the utilities v^s and v^b are (momentarily) equal.

By conventional methods, the effect of an increase in membership upon the optimal wage is given by the cross-partial derivative of (16). Thus,

$$\text{sign} \frac{\partial w}{\partial m} = \text{sign}\, J_{wm}. \tag{17}$$

Differentiating (17)

$$J_{wm} = \int_0^\varepsilon v_{wm}^s f(e)\, de + f(\varepsilon)\varepsilon_m (v_w^s - v_w^b)\big|_{e=\varepsilon} + \int_\varepsilon^1 v_{wm}^b f(e)\, de. \tag{18}$$

In this case the term $(v^s - v_w^b)$ does not drop out.

The most common assumption in the union literature is that the union's utility takes one of two forms (where membership is greater than or equal to employment):

(19) $U = nu(w)+(m-n)u(b)$ Utilitarian

(20) $U' = \frac{n}{m}u(w)+\left(1-\frac{n}{m}\right)u(b)$ Expected utility.

The former is that the union simply adds up all its members' utility levels and thinks of the total as a measure of its own welfare. The latter assumes that it is the average member's utility that matters. This is normally justified by the (unrealistic) assumption that firing is by random draw.

The above expressions are incorrect when employment exceeds the total number of members. Therefore, because all members have jobs at or above $n = m$, for that full-employment range:

(21) $U = mu(w)$ Utilitarian

(22) $U' = u(w)$ Expected utility.

The union's overall utility function, which must be defined generally, is then a mixture of two expressions: one governs the region $m \geq n$, and the other the region $m \leq n$. When expressed geometrically, the function is one in which there are kink points in preferences. The downward-sloping segments of the indifference curves correspond to employment of insiders, the flat segments to outcomes in which outsiders are hired.

To discover how membership affects wage demands under Proposition 3's conditions, assume a utilitarian union utility function. Then substitution reveals that the three components of formula (18) are:

(23) $$\int_0^{\varepsilon} v^s_{wm} f(e)\,de = 0$$

(24) $$(v^s_w - v^b_w)|_{e=\varepsilon} = n_w\{u(w)-u(b)\}$$

(25) $$\int_{\varepsilon}^1 v^b_{wm} f(e)\,de = \int_{\varepsilon}^1 u'(w) f(e)\,de.$$

Thus, by (14),

(26) $$J_{wm} = f(\varepsilon)(n_w/n_e)\{u(w)-u(b)\}+\int_{\varepsilon}^1 u'(w)f(e)\,de \gtrless 0.$$

This expression determines the effect of union membership upon pay, because sign $\delta w/\delta m = \text{sign } J_{wm}$. Contrary to most results in the literature, its sign is ambiguous.

APPENDIX 2: MEANS AND STANDARD DEVIATIONS

(*a*) *Total sample*

	Unskilled	Semi-skilled	Skilled
Unskilled wage	4·281	n/a	n/a
	(0·530)		
Semi-skilled wage	n/a	4·587	
		(0·379)	n/a
Skilled wage	n/a	n/a	4·827
			(0·328)
Financial Performance	0·382	0·398	0·413
	(0·847)	(0·877)	(0·901)
Performance not possible	0·080	0·087	0·094
	(0·271)	(0·283)	(0·293)
Few competitors	0·244	0·279	0·253
	(0·430)	(0·449)	(0·435)
Employment change: 1 yr	3·280	2·548	2·768
	(25·463)	(18·323)	(25·931)
Union recognition	0·607	0·645	0·637
	(0·489)	(0·479)	(0·481)
Pre-entry closed shop	0·052	0·061	0·068
	(0·222)	(0·239)	(0·252)
Post-entry closed shop	0·180	0·189	0·190
	(0·385)	(0·392)	(0·393)
County unemployment rate	2·536	2·521	2·526
	(0·274)	(0·255)	(0·259)
County wage rates	5·172	5·164	5·154
	(0·095)	(0·097)	(0·087)
% part-time	19·422	16·511	14·047
	(23·297)	(22·087)	(19·920)
% manual	55·770	61·486	63·236
	(28·811)	(25·477)	(23·863)
Majority male	0·522	0·750	0·847
	(0·500)	(0·433)	(0·360)
% unskilled	57·627	n/a	n/a
	(35·912)		
% semi-skilled	n/a	24·501	n/a
		(24·703)	
% skilled	n/a	n/a	25·128
			(23·564)
Foreign-owned	0·044	0·050	0·063
	(0·205)	(0·218)	(0·242)
Shiftworking	0·431	0·457	0·425
	(0·495)	(0·498)	(0·495)
Single independent	0·194	0·204	0·222
	(0·396)	(0·404)	(0·416)
No. of employees	123·339	133·885	134·832
	(285·199)	(306·284)	(312·698)
(No. of employees)^2	96474·924	111621·329	115851·965
	(1907099·021)	(2133621·329)	(2104817·505)
Nationalized	0·046	0·052	0·041
	(0·210)	(0·223)	(0·198)
Public sector	0·323	0·257	0·228
	(0·468)	(0·437)	(0·420)

(*b*) *Union and non-union private sector*

	Unskilled		Semi-skilled		Skilled	
	Union	Non-union	Union	Non-union	Union	Non-union
Unskilled wage	4·512	4·277	n/a	n/a	n/a	n/a
	(0·442)	(0·514)				
Semi-skilled wage	n/a	n/a	4·703	4·513	n/a	n/a
			(0·361)	(0·369)		
Skilled wage	n/a	n/a	n/a	n/a	4·939	4·795
					(0·288)	(0·294)
Financial performance	0·437	0·644	0·486	0·543	0·446	0·605
	(1·015)	(0·946)	(0·960)	(0·984)	(0·994)	(0·972)
Performance not possible	0·047	0·133	0·078	0·121	0·070	0·136
	(0·211)	(0·340)	(0·269)	(0·327)	(0·256)	(0·344)
Few competitors	0·337	0·284	0·323	0·312	0·293	0·282
	(0·473)	(0·451)	(0·468)	(0·464)	(0·456)	(0·451)
Employment change: 1 yr	4·670	4·078	0·085	5·647	2·436	5·393
	(37·712)	(16·182)	(18·833)	(13·990)	(36·193)	(16·854)
Pre-entry closed shop	0·126	n/a	0·126	n/a	0·141	n/a
	(0·332)		(0·333)		(0·348)	
Post-entry closed shop	0·309	n/a	0·297	n/a	0·300	n/a
	(0·463)		(0·458)		(0·459)	
County unemployment rate	2·579	2·463	2·558	2·451	2·562	2·449
	(0·260)	(0·256)	(0·249)	(0·230)	(0·252)	(0·245)

County wage rates	5·176	5·178	5·165	5·175	5·167	5·173
	(0·093)	(0·099)	(0·093)	(0·103)	(0·095)	(0·098)
% part-time	11·127	20·749	10·197	18·774	8·631	16·415
	(18·140)	(24·272)	(18·223)	(23·177)	(15·257)	(21·291)
% manual	66·800	54·544	68·469	59·386	68·687	60·613
	(22·010)	(30·014)	(19·859)	(27·393)	(18·757)	(25·379)
Majority male	0·708	0·577	0·818	0·741	0·928	0·845
	(0·456)	(0·495)	(0·387)	(0·439)	(0·258)	(0·363)
% unskilled	42·656	57·662	n/a	n/a	n/a	n/a
	(35·437)	(34·222)				
% semi-skilled	n/a	n/a	28·046	21·874	n/a	n/a
			(25·018)	(23·403)		
% skilled	n/a	n/a	n/a	n/a	29·698	24·449
					(24·023)	(22·491)
Foreign-owned	0·095	0·040	0·089	0·042	0·100	0·059
	(0·294)	(0·195)	(0·285)	(0·202)	(0·300)	(0·236)
Shiftworking	0·423	0·362	0·431	0·377	0·430	0·346
	(0·495)	(0·481)	(0·496)	(0·486)	(0·496)	(0·476)
Single independent	0·154	0·384	0·217	0·334	0·188	0·385
	(0·361)	(0·487)	(0·413)	(0·472)	(0·392)	(0·487)
No. of employees	154·987	65·394	148·576	71·367	151·444	66·578
	(354·687)	(82·183)	(339·083)	(88·177)	(349·320)	(81·252)
(No. of employees)^2	129,446·459	11,013·274	136,702·439	12,841·097	144,634·248	11,014·114
	(2,135,303·405)	(109,141·610)	(3,179,500·580)	(121,972·281)	(3,066,422·167)	(113,604·551)

APPENDIX 3: KEY TO VARIABLES

Independent variables

Financial performance	A variable that 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
Few competitors	A dummy variable where there were 5 or fewer competitors in the market for the main product or service of the organization
Employment change: 1 year	Percentage change in employment at the establishment, 1983–84
Pre-entry closed shop	A dummy variable if all or some manual workers were required to be union members before starting work
Post-entry closed shop	A dummy variable if all or some manual workers were required to be union members after starting work
County unemployment rate	The percentage of the workforce who were unemployed in each county in 1984, in natural logarithms (source: *Regional Statistics*, 1985)
County wage rate	The gross average weekly wage rate in each county in 1984 in natural logarithms (source: *New Earnings Survey*, 1985)
% part-time	The percentage of workers who were part-time
% manual	The percentage of the workforce who were manual workers
Majority male	A dummy variable if the majority of the unskilled/semi-skilled/skilled workforce were male
% unskilled	The percentage of the workforce who were unskilled
% semi-skilled	The percentage of the workforce who were semi-skilled
% skilled	The percentage of those in the workforce who had received formal training
Foreign-owned	A dummy variable for a foreign-owned establishment
Shiftworking	A dummy variable for the existence of shift work at the establishment
Single independent	A dummy variable for a single-establishment organization
Size of establishment	The number of workers (full and part-time) at the establishment

Dependent variables

Unskilled wage	Typical level of gross (weekly) pay of unskilled manual workers (in natural logarithms)
Semi-skilled wage	Typical level of gross (weekly) pay of semi-skilled manual workers (in natural logarithms)
Skilled wage	Typical level of gross (weekly) pay of skilled manual workers (in natural logarithms)

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NOTES

1. In our earlier papers (Blanchflower and Oswald, 1987; Blanchflower, Oswald and Garrett, 1987), upon which this version is based, results are presented for both 1980 and 1984. The results are similar, so for brevity the former are omitted here. The model in Section II encompasses both of those set out in the previous papers.
2. Such effects are widely stressed outside the economics literature (as in Adams, 1965; Brown and Sisson, 1975; and Runciman, 1972).
3. The literature includes Lindbeck and Snower (1986, 1988), Blanchard and Summers (1986) and Solow (1985).
4. See e.g. Shaked and Sutton (1984), and Binmore, Rubinstein and Wolinsky (1986).
5. Farber (1987), Oswald (1985) and Pencavel (1985) provide surveys.
6. See e.g. Layard and Nickell (1986) and Stewart (1987).
7. Ball and Skeoch (1981) find a correlation between wages and value product per person using British plant data. They are sceptical of the classical wage-taking framework.
8. Krueger and Summers (1987) favour 'the rent-sharing view' (p. 40) for non-union US labour markets. Their reasons include the following. First, they argue, high wages tend to be paid in industries that are concentrated, have high profits, and have relatively small labour shares. Second, high-wage industries appear to reward all types of workers about equally, despite great differences in their personal and job characteristics. Third, industries in severe financial trouble often succeed in extracting wage concessions from both employees in booming regions and those in depressed regions. Fourth, and as an example, the US deregulation of airlines provided a natural experiment of relevance to the rent-sharing explanation. Exactly in line with that approach, wages fell significantly after the incumbent airlines' drop in profits. Competitive theory, however, would if anything have suggested the reverse, because of the growth in demand for airline flights which deregulation stimulated.
9. This presumes that equilibria are on the labour demand curve (as in Nickell and Andrews, 1983, and Oswald, 1987), an assumption defended in Oswald and Turnbull (1985) and Farber (1986). However, very similar results emerge from an efficient bargain model.
10. The term 'fall-back' utility is used to encompass the two possibilities discussed in the literature, one of which is the utility during a strike, and the other the utility available in the event of a permanent separation. For our empirical purposes, it is unnecessary to chose between the two.
11. Such a model is developed in Oswald (1987). Labour demand equilibria are then efficient, which circumvents a traditional criticism.
12. It uses a utilitarian union utility function (Oswald, 1982), which is similar to the expected utility function in McDonald and Solow (1981).

13. Respondents were asked to identify whether the majority of workers in five skill groups (unskilled manual workers, semi-skilled manual workers, skilled manual workers, clerical/secretarial/administrative, and supervisors/foremen/forewomen) were men or women. (This is our 'majority male' variable.) They were then requested to report the 'gross earnings, inclusive of any bonus or overtime, of a typical man (woman)' depending upon whichever sex was in the majority.
14. This is similar to Blackaby and Manning's (1987) estimate, although the data are quite different.
15. Multiplication by 4 gives the 'range', because the variable is +2 to −2. Table N1 gives the unrestricted coefficients and *t*-statistics, where the sample and other variables are as for Table 1.

*Table N*1 *Weekly wage results (unrestricted estimates)*

	Unskilled		Semi-skilled		Skilled	
Performance very high	0·058807 (1·79)	0·066422 (2·05)	0·070973 (2·87)	0·074214 (3·05)	0·036799 (1·71)	0·044033 (2·09)
Performance quite high	0·052055 (1·62)	0·064206 (2·02)	0·022542 (0·97)	0·033481 (1·46)	0·004592 (0·23)	0·014093 (0·70)
Performance quite low	0·044017 (0·79)	0·054858 (1·00)	−0·023124 (0·54)	−0·016063 (0·38)	−0·028158 (0·77)	−0·026421 (0·74)
Performance very low	0·094492 (1·40)	0·080476 (1·21)	−0·074370 (1·37)	−0·080296 (1·50)	−0·050265 (1·14)	−0·065000 (1·51)
Performance not possible	0·060060 (1·59)	0·061893 (1·66)	0·038613 (1·36)	0·039097 (1·40)	0·009190 (0·38)	0·007364 (0·31)

Note: *t*-statistics in parentheses.

16. Pencavel (1985) raises such a possibility.
17. In his study of US panel data, Bils (1985) finds an elasticity of around −0·12. We are grateful to Mark Bils for helpful correspondence about this elasticity. McConnell (1988) also finds evidence of a small negative unemployment elasticity.
18. These estimates seem to be small and are consistent with the macroeconomic observation that unemployment is persistent. They provide empirical measures of real-wage inflexibility.
19. We cannot rule out an 'efficiency wage explanation', especially if using the broad definition of Krueger and Summers (1988). But a bilateral bargaining framework seems a natural one.
20. Dowrick's (1987) and Holmlund and Skedinger's (1988) results are in the same spirit, but profitability effects cannot be calculated directly.

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