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THE DETERMINATION OF WHITE-COLLAR PAY

By DAVID G. BLANCHFLOWER *and* ANDREW J. OSWALD

1. Introduction

THE study of wage rates has always been a central part of industrial relations and labour economics. In all but exceptional cases, however, British investigators have focused their attention upon the pay of manual or blue-collar workers. To take one example, the standard British econometric wage equations include Mulvey (1976) and Mulvey and Foster (1976) using sectoral data, Blanchflower (1984) and Stewart (1987) using data on the establishment, and Layard, Metcalf and Nickell (1978), Stewart (1983) and Shah (1984) using individual data. Of these only Layard, Metcalf and Nickell (1978) separately examines non-manual remuneration.

The paucity of information on white-collar workers has three drawbacks. First, the white-collar sector is large (54% of the British workforce in 1985). Second, it is becoming steadily larger (up from 49% in 1981, for example).¹ Third, the sector includes the majority of Britain's best paid workers, so that it is of particular significance to policy makers interested in issues such as income distribution and the design of incentives.

Our purpose in this study is to examine the proximate determinants of white collar employees' pay. To do so we use six recent surveys of British private sector establishments and individuals, and focus upon questions such as the following.

1. Are white-collar wage rates shaped by the same forces as manual employees' wage rates?
2. What is the effect upon white collar pay of aggregate unemployment?
3. Does foreign ownership produce higher or lower levels of white-collar pay?
4. Is the level of white-collar remuneration related to the financial prosperity or monopoly position of the employing establishment?
5. Do white-collar employees' wage rates move with some outside or going rate of pay?
6. Are there significant differences between the factors which influence managers' earnings and those which influence clerical workers' earnings?

Any analysis has to begin with a definition of 'white-collar' workers. Phelps-Brown (1977) has suggested that they are individuals "distinguished from the manual in that they do not transform, handle or transport

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¹ Both figures are from the respective Labour Force Surveys.

materials, but use processes of thought" (p.81). A more easily applied definition can be drawn from Bain (1970), who allocates the term to certain kinds of occupations.² This is the approach we adopt. Throughout the paper the label 'white-collar' will mean occupations of a managerial, professional or clerical nature.

We estimate a series of wage equations using data from the Workplace Industrial Relations Surveys (WIRS), which provide information from a representative sample of establishments in the British economy. The technical details of the data collection, together with a statement of the implications of the statistics, are contained in Daniel and Millward (1983) and Millward and Stevens (1986). The first survey was in 1980 and the second in 1984. In each case senior managers from approximately 2000 establishments were interviewed. Response rates were high and the results when scaled provide information on approximately 15 million British employees. The only important excluded categories were, first, establishments with fewer than 25 employees (full or part-time) and, second, coal mines and the armed forces. Union representatives at the establishment were also interviewed, but our study does not use those data. We also restrict the analysis to private sector establishments.

The earnings variables in WIRS are grouped and open-ended. When there was more than one group of workers, managers gave information on the pay of each group. In order to put the data in tractable form we follow the common practice of allocating midpoints to all wage bands including those cases where multiple responses are available; and open ends are closed off in an inevitably *ad hoc* way.

The 1980 survey (WIRS1) separates out two groups of white-collar individuals. They are defined as 'clerical workers' and 'middle managers'. For the 1984 survey (WIRS2) the classification was slightly different—'clerical workers' and 'foremen/supervisors'.³ A further difference between the surveys is in the definition of pay. In WIRS1 the figures are the "gross weekly pay of a typical worker"; in WIRS2 they measure "the gross earnings, inclusive of any bonus or overtime, of a typical man (woman)" depending upon whichever sex was in the majority. These points notwithstanding, the WIRS datasets are the best current sources of information on workplaces in Britain, and allow some judgements to be made about the changes which occurred over the four year period.

We also estimate earnings equations using data from the series of British Social Attitudes Surveys (BSA). These surveys provide information on a

² Bain (1970, p. 4) defines the following occupational groups as white-collar: "foremen, overlookers and supervisors, scientists and technologists and technicians; clerical and administrative workers; security personnel including the police; professional workers; salesmen, shop assistants and commercial travellers; government administrators and executive officials; and "creative" occupations such as artists, musicians and entertainers".

³ The survey effectively allowed the respondents to use their own classifications of 'clerical' and other groups of workers: it would have been impracticable to impose a set of *ex ante* definitions. Whether this problem produces serious bias is an open question.

representative sample of employees. The data cover the years 1983 to 1986 and generate a sample of 3700 employees of which 1105 are non-manuals in the private sector. The earnings data are grouped and open-ended, and again mid-points are used in the econometric estimation.

2. Questionnaire evidence

If one is interested in the factors which influence white-collar pay, a natural first approach is to question those whose responsibility it is to negotiate about and to set wage rates. Information of this sort is available within our data, because WIRS2 asked managers the question

“What factors influenced the level of pay decided upon in the most recent settlement?”

Management Questionnaire Q.92(b), p. 40

and respondents were allowed to reply in their own words. The answers, for establishments employing non-manual workers, are set out in Table 1. They are broken down by union and non-union sector, and by private manufacturing and private services. Although each respondent was permitted to cite

TABLE 1
Factors Cited by Managers as Influencing the Level of Pay in the Most Recent Settlement by Industrial Sector—Non-manual Workers

	<i>Private Manufacturing</i>		<i>Private Non-manufacturing</i>	
	<i>Union Sector</i>	<i>Non- union Sector</i>	<i>Union Sector</i>	<i>Non- union Sector</i>
All establishment could afford	11	9	8	3
Increasing cost of living	23	35	43	28
Going rate in industry	15	21	12	1
Merit/individual performance	8	31	4	30
Published norms	3	2	3	5
Internal pay structure	10	18	4	11
External pay structure	9	5	9	13
Government regulation	1	3	14	2
Strikes	0	0	0	0
Profitability/productivity	39	45	37	30
Economic climate	6	4	16	2
Other	8	5	18	6
Not answered	13	1	11	1
Number of establishments	109	315	247	657

Base: establishments with non-manual workers.

Notes: (1) union status of establishment is determined by whether or not non-manual unions were recognised at the workplace for purposes of bargaining. (2) managers could cite more than one factor, so the columns sum to more than 100. (3) all data are weighted.

Source: 1984 Workplace Industrial Relations Survey.

many such influences, most mentioned only one or two. As a guide to how the table should be read, the top left hand number indicates that 11% of establishments in the union manufacturing sector cited the reason 'All the establishment could afford'.

Four forces make a particular impact upon pay. They are:

- 1) the profitability and productivity in the establishment
- 2) the cost of living
- 3) the 'going rate' in the industry
- 4) merit and individual performance.

The difference between union and non-union matters significantly, according to the values reported in Table 1, only for the fourth, which is consistent with the idea that unions tend to affect merit differentials.

Table 1's results suggest that much the same criteria are used for fixing non-manual pay as have long been believed to determine the wages paid to manual workers (see, for example, Slichter (1947)⁴). The wage rate appears to depend principally upon the employer's ability to pay, the retail price index and the rate of pay being offered elsewhere. The recent results of Gregory, Lobban and Thomson (1985), and our findings in Blanchflower and Oswald (1988), are consistent with this view. To pursue the issue in more detail we estimate cross-section equations in which pay is the dependent variable.

3. Statistical evidence

The theoretical framework for the wage equations is akin to that set out in Blanchflower, Oswald and Garrett (1990). It assumes that wage rates depend upon composition effects, the nature of the establishment, the prosperity of that establishment, whether or not there are trade unions, and the wage and unemployment levels in the geographical region. Thus pay is moulded, according to our model, by both internal and external forces. The first derive from the performance of the establishment: there may be *de facto* profit sharing, for example, if wages rise with the establishment's profits. The second kind of force, which captures the traditional economic view that excess labour supply bids down pay, is also likely to play a role. Hence equilibrium may be determined by a blend of establishment and outside pressures. The purpose of the statistical analysis is to investigate this hypothesis.

The regressions reported in Tables 2 to 5 are (natural logarithmic) wage equations for, in order, clerical workers in 1980, middle management in 1980, clerical workers in 1984 and foremen/supervisors in 1984. Each table gives two cross-section equations, estimated using Ordinary Least Squares and based on between three and five hundred private sector British

⁴ Slichter's list corresponds closely to the factors in Table 1.

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TABLE 2
Wage Equations—Clerical Workers in 1980

	<i>Union</i> (1)	<i>Non-union</i> (2)
% Part-time	-0.0031 (3.78)	-0.0050 (6.46)
% Foremen/supervisors	0.0051 (1.79)	-0.0003 (0.11)
% Female	-0.0034 (5.92)	0.0001 (0.08)
% Clerical/admin./sec.	0.0015 (2.03)	0.0008 (0.86)
% Junior tech./prof.	-0.0004 (0.52)	0.0012 (1.05)
% Senior tech./prof.	0.0002 (0.18)	0.0001 (0.03)
% Middle/senior mgmt.	0.0020 (1.14)	-0.0023 (1.21)
UK Owned	-0.0666 (2.65)	-0.0425 (1.07)
Shiftworking	0.0158 (0.68)	-0.0268 (0.92)
Outworkers	-0.0160 (0.47)	-0.0534 (1.48)
Share ownership	0.0232 (1.09)	0.0512 (1.36)
Single independent	-0.0453 (1.56)	0.0196 (0.72)
Employers' Association	-0.0365 (1.89)	-0.0067 (0.23)
No. of employees * 10 ⁴	0.4733 (2.71)	0.7182 (1.02)
(No. of employees) ² * 10 ⁸	-0.4279 (1.62)	-0.5559 (0.25)
Performance—above avge.	-0.0143 (0.80)	0.0357 (1.42)
Performance—below avge.	-0.0482 (1.46)	-0.0242 (0.44)
Performance—not possible	-0.0445 (1.12)	0.1156 (1.55)
Pre-entry closed shop	0.0441 (1.03)	*
Post-entry closed shop	0.0652 (2.11)	*
Operating under 3 years	—	-0.1168 (0.64)
Operating 3–5 years	0.0017 (0.02)	0.0876 (0.90)
Operating 5–10 years	0.0352 (0.98)	0.0024 (0.06)
Operating 10–25 years	-0.0132 (0.63)	0.0845 (3.03)

TABLE 2 *Contd.*

	<i>Union</i> (1)	<i>Non-union</i> (2)
Manning levels	-0.0340 (1.96)	*
Employment change (1 year)	0.0017 (2.78)	0.0011 (1.52)
Employment change (5 year)	-0.0004 (1.25)	0.0001 (1.76)
Regional unemployment	-0.0580 (2.34)	-0.0795 (2.32)
Regional wage rate	-0.2276 (1.14)	-0.2714 (1.12)
Industry dummies	Yes	Yes
Constant	5.5621 (5.69)	5.7397 (4.80)
Adjusted R ²	0.3698	0.2211
F	5.2634	3.2520
Degrees of Freedom	401	416

Notes: (1) * not applicable (2) *t*-statistics in parentheses (3) union status is defined as in Table 1.

Source: 1980 Workplace Industrial Relations Survey.

TABLE 3
Wage Equations—Middle Management in 1980

	<i>Union</i> (3)	<i>Non-union</i> (4)
% Part-time	-0.0047 (2.62)	-0.0035 (3.66)
% Foremen/supervisors	0.0058 (0.98)	-0.0003 (0.08)
% Female	-0.0048 (3.91)	-0.0020 (2.03)
% Clerical/admin./sec.	0.0035 (2.35)	0.0014 (1.15)
% Junior tech./prof.	0.0025 (1.60)	0.0012 (0.79)
% Senior tech./prof.	0.0031 (1.49)	0.0073 (3.25)
% Middle/senior mgmt.	0.0100 (2.70)	-0.0009 (0.36)
UK Owned	-0.1560 (2.96)	-0.1484 (2.88)
Shiftworking	-0.0229 (0.47)	0.0094 (0.26)

TABLE 3 *Contd.*

	<i>Union</i> (3)	<i>Non-union</i> (4)
Outworkers	-0.0620 (0.90)	-0.0669 (1.46)
Share ownership	0.0058 (0.13)	0.0744 (1.54)
Single independent	-0.0331 (0.56)	0.1118 (3.24)
Employers' Association	-0.0419 (1.03)	-0.0431 (1.13)
No. of employees * 10 ⁴	1.3307 (3.66)	3.4145 (3.78)
(No. of employees) ² * 10 ⁸	-1.0942 (2.01)	-4.8911 (1.76)
Performance—above avge.	0.0063 (0.17)	0.0179 (0.57)
Performance—below avge.	-0.0776 (1.10)	0.0376 (0.52)
Performance—not possible	0.1151 (1.30)	0.1995 (2.12)
Pre-entry closed shop	0.0380 (0.42)	*
Post-entry closed shop	-0.0304 (0.46)	*
Operating under 3 years	—	-0.1187 (0.52)
Operating 3–5 years	0.1814 (0.86)	-0.0521 (0.43)
Operating 5–10 years	0.1838 (2.47)	0.1457 (2.99)
Operating 10–25 years	-0.0002 (0.00)	0.0988 (2.78)
Manning levels	-0.0748 (2.06)	*
Employment change (1 year)	0.0010 (0.80)	0.0009 (1.03)
Employment change (5 year)	0.0003 (0.51)	-0.0001 (1.04)
Regional unemployment	-0.0506 (0.96)	-0.0439 (1.00)
Regional wage rate	0.5067 (1.21)	0.3262 (1.08)
Industry dummies	Yes	Yes
Constant	2.5713 (1.25)	3.4053 (2.28)
Adjusted R ²	0.3548	0.3144
F	4.7289	4.5383
Degrees of Freedom	370	403

Notes: (1) * not applicable (2) *t*-statistics in parentheses.
Source: 1980 Workplace Industrial Relations Survey.

TABLE 4
Wage Equations—Clerical Workers in 1984

	<i>Union</i> (5)	<i>Non-union</i> (6)
% Part-time	-0.0021 (4.04)	-0.0031 (4.70)
% Foremen/supervisors	0.0014 (0.95)	-0.0026 (1.10)
Majority Male	0.0996 (6.78)	0.1398 (5.23)
% Clerical/admin./sec.	-0.0000 (0.07)	-0.0005 (0.84)
% Junior tech./prof.	-0.0001 (0.22)	0.0008 (1.17)
% Senior tech./prof.	0.0001 (0.10)	-0.0004 (0.40)
% Middle/senior mgmt.	0.0019 (1.65)	0.0008 (0.47)
U.K. owned	-0.0367 (2.21)	-0.0320 (1.09)
Shiftworking	-0.0013 (0.09)	0.0288 (1.19)
Outworkers	0.0385 (1.65)	0.0185 (0.52)
Share ownership	-0.0077 (0.56)	0.0050 (0.20)
Profit Sharing	0.0149 (0.97)	-0.0081 (0.34)
Value Added Bonus	0.0072 (0.37)	0.0663 (2.54)
Few Competitors	0.0017 (0.15)	-0.0140 (0.66)
Single independent	-0.0459 (1.68)	-0.0509 (1.55)
Employers' Association	-0.0087 (0.69)	-0.0657 (2.56)
No. of employees * 10 ⁴	0.3198 (2.95)	1.4603 (1.53)
(No. of employees) ² * 10 ⁸	-0.1743 (1.81)	-0.4882 (0.08)
Performance—a lot above average	-0.0165 (0.99)	0.0115 (0.49)
Performance—a little above average	0.0063 (0.43)	0.0130 (0.53)
Performance—a little below average	0.0154 (0.49)	-0.0226 (0.29)
Performance—a lot below average	0.0015 (0.06)	-0.0998 (1.76)
Performance—not possible	-0.0056 (0.30)	0.0048 (0.14)
Pre-entry closed shop	0.0044 (0.13)	*

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TABLE 4 *Contd.*

	<i>Union</i> (5)	<i>Non-union</i> (6)
Post-entry closed shop	0.0090 (0.50)	*
Operating under 3 years	0.0592 (0.85)	0.0529 (0.65)
Operating 3-5 years	0.0690 (1.51)	-0.0064 (0.13)
Operating 5-10 years	-0.0137 (0.62)	-0.0275 (0.98)
Operating 10-25 years	0.0026 (0.20)	0.0144 (0.67)
Manning levels	0.0152 (1.20)	*
Empt. change 1 year	-0.0003 (0.81)	-0.0007 (1.42)
Empt. change 4 year * 10 ⁴	4.2335 (1.79)	-0.0504 (0.09)
Regional unemployment	-0.0891 (3.25)	-0.0481 (1.09)
Regional wage rate	0.3865 (2.83)	0.6973 (3.48)
Industry dummies	Yes	Yes
Constant	2.7025 (3.79)	1.1099 (1.05)
Adjusted R ²	0.3324	0.3352
F	4.5445	3.7833
Degrees of Freedom	459	321

Notes: (1) not applicable (2) *t*-statistics in parentheses.

Source: 1984 Workplace Industrial Relations Survey.

TABLE 5
Wage Equations—Foremen in 1984

	<i>Union</i> (7)	<i>Non-union</i> (8)
% Part-time	-0.0031 (3.56)	-0.0030 (3.25)
% Foremen/supervisors	0.0033 (1.31)	0.0001 (0.04)
Majority Male	0.1940 (6.84)	0.1687 (5.06)
% Clerical/admin./sec.	-0.0012 (1.79)	-0.0001 (0.12)
% Junior tech./prof.	0.0010 (1.26)	0.0003 (0.34)
% Senior tech./prof.	-0.0003 (0.24)	-0.0003 (0.14)

TABLE 5 *Contd.*

	<i>Union</i> (7)	<i>Non-union</i> (8)
% Middle/senior mgmt.	0.0024 (1.07)	0.0003 (0.13)
U.K. owned	-0.0474 (1.88)	-0.0489 (1.27)
Shiftworking	0.0397 (1.70)	0.0258 (0.87)
Outworkers	0.0086 (0.24)	0.0050 (0.11)
Share ownership	0.0019 (0.09)	0.0372 (1.25)
Profit Sharing	-0.0306 (1.29)	-0.0202 (0.69)
Value Added Bonus	0.0116 (0.41)	0.0167 (0.51)
Few competitors	-0.02419 (1.35)	0.0325 (1.19)
Single independent	0.0090 (0.21)	-0.0537 (1.23)
Employers' Association	-0.0124 (0.63)	-0.0221 (0.71)
No. of employees * 10 ⁴	0.5867 (3.42)	-0.4583 (0.31)
(No. of employees) ² * 10 ⁸	-0.3912 (2.67)	2.6406 (0.20)
Performance—a lot above average	0.0049 (0.18)	0.0279 (0.97)
Performance—a little above average	0.0077 (0.35)	-0.0184 (0.58)
Performance—a little below average	0.0268 (0.69)	-0.0368 (0.53)
Performance—a lot below average	-0.0459 (0.98)	-0.1108 (1.26)
Performance—not possible	0.0125 (0.42)	0.0233 (0.56)
Pre-entry closed shop	0.1295 (2.24)	*
Post-entry closed shop	0.0257 (0.90)	*
Operating under 3 years	-0.0740 (0.49)	-0.1275 (1.08)
Operating 3–5 years	0.0591 (0.76)	0.0636 (1.04)
Operating 5–10 years	-0.0144 (0.40)	0.0030 (0.08)
Operating 10–25 years	0.0221 (1.08)	0.0258 (0.96)
Manning levels	0.0195 (1.01)	*
Employment change (1 yr)	-0.0002 (0.37)	-0.0009 (1.35)

TABLE 5 *Contd.*

	<i>Union</i> (7)	<i>Non-union</i> (8)
Employment change (4 yr) * 10 ⁴	2.1453 (0.58)	2.7452 (1.00)
Regional unemployment	-0.0268 (0.63)	-0.0195 (0.34)
Regional wage rate	0.5146 (2.36)	0.9056 (3.42)
Industry dummies	Yes	Yes
Constant	2.0496 (1.80)	0.1305 (0.09)
Adjusted R ²	0.3540	0.4363
F	4.6363	4.3989
Degrees of Freedom	417	234

Notes: (1) * not applicable (2) *t*-statistics in parentheses.

Source: 1984 Workplace Industrial Relations Survey.

establishments. Union and non-union estimates are provided separately,⁵ and in each equation 40 industry dummies are included. Appendix A contains a description of the variables.

⁵The dividing line is whether or not there are trade unions recognised for the purposes of bargaining over pay and conditions. In comparison with manual workers, a relatively small proportion of workers in the private sector have their pay determined by a trade union or staff association. Millward and Stevens (1986) using these same WIRS data reported on the differences in collective bargaining arrangements between manual and non-manual workers.

	Manuals		Non-manuals	
	1980	1984	1980	1984
i) <i>Private Manufacturing</i>				
Union recognition	65	55	27	26
Most important level of bargaining influencing the most recent pay increase				
National/regional	27	22	5	5
Company/divisional	10	11	8	9
Plant/establishment	26	21	13	11
Other answer	1	1	—	1
ii) <i>Private Services</i>				
Union recognition	34	38	28	30
Most important level of bargaining influencing the most recent pay increase				
National/regional	19	20	12	11
Company/divisional	10	12	10	15
Plant/establishment	3	4	2	3
Other answer	—	2	5	—

Source: Millward and Stevens (1986, Tables 9.2 and 9.8).

The above table summarises their results across private manufacturing and private services. In the two parts of the table the base is establishments employing the relevant category of worker in, respectively, 1980 and 1984 (all figures are in percentages).

In choosing the explanatory variables we were guided by a mixture of established knowledge and experiment. Slichter (1950), using only rank correlation methods on US industry data, played a seminal role in the identification of the structural determinants of pay. Freeman and Medoff (1984) summarises more recent US studies. Our precise starting point was Blanchflower (1984), which details its own precursors, but many variables (especially outside wages and unemployment, and internal performance factors) have been added here. Moreover, Blanchflower (1984) reports only manual wage regressions.

It is possible to use Tables 2–5 to provide answers to the six questions posed at the beginning of the paper. The first conclusion is that the factors which influence white-collar wages are very similar to those identified by statistical analyses of manual workers' pay. A clerical or supervisory employee's earnings appear to depend (negatively), just as do a manual employee's, upon the percentages of part-timers and females in the establishment, and (positively) upon the size of the establishment as measured by the numbers employed. For examples of comparable effects in establishment studies of manual workers, see Blanchflower (1984) and Stewart (1987), which show that the manual trade union wage differential in Great Britain in 1980 was in single figures, and composed principally of a closed shop differential which is not dissimilar from that for clerical workers reported in Table 2. However, by 1984 the evidence of a closed shop effect upon clerical workers' pay seems to have disappeared. Blanchflower, Oswald and Garrett (1990) find a significant closed shop effect upon unskilled, semi-skilled and skilled manual employees' pay in 1984; so in this case there is a difference between the blue and white-collar sectors.

A central question in labour economics is that of whether unemployment has a discernible negative effect upon wage rates. To capture this we spliced onto the WIRS datasets a set of regional unemployment rates in the years 1980 and 1984. Hence each establishment is allocated to one of the 11 regions, and that region's unemployment percentage (entered as a natural logarithm) is used as an explanatory variable in the regression equations. The regional wage rate (as a measure of the geographical going rate of pay) is also included in the wage equations.

This procedure has a number of drawbacks. First, although it may be plausible to think of the region as the appropriate unit of aggregation (it is known that inter-regional job migration is low), there are then relatively few unemployment observations. Second, it is conceivable that regional unemployment is correlated with unobserved region-specific fixed effects which themselves influence pay. If so, the estimated coefficient on regional unemployment may be biased. Third, the regional unemployment variable is likely to be correlated with that for regional wages, and the omission of regional pay might then be justified if the object were to obtain the *reduced form* effect of excess labour supply on establishment remuneration. As a check, Appendix B reports the coefficient on the regional unemployment

variable obtained from equations which exclude the regional wage rate. Fourth, time series evidence (for example, Layard and Nickell (1986) and Carruth and Oswald (1987)) suggests at best a small unemployment elasticity of around -0.1 , and investigators such as Beckerman and Jenkinson (1986) argue that the true coefficient is zero. It is likely to be difficult to discriminate between the hypothesis of a zero coefficient and that of a small negative coefficient.

Our chosen approach is to include the regional wage as an explanatory variable. This should pick up most of the region-specific fixed effects upon pay. It is not an ideal procedure, because of possible collinearity between regional wages and regional unemployment, but appears to be a defensible compromise. It might be expected that high regional unemployment would reduce an establishment's typical wage and that high regional pay would raise an establishment's typical wage.

Our evidence suggests that the pay of clerical workers is depressed by regional unemployment. The estimated elasticities are tabulated below.

<i>Workers' Group</i>	<i>Unemployment elasticity of pay</i>
Clerical workers:	
Unionized, 1980	-0.06
Non-unionized, 1980	-0.08
Unionized, 1984	-0.09
Non-unionized, 1984	-0.05*
Middle managers:	
Unionised, 1980	-0.05*
Non-unionised, 1980	-0.04*
Foremen/supervisors:	
Unionised, 1984	-0.03*
Non-unionised, 1984	-0.02*

* Insignificantly different from zero at standard levels.

Despite the fact that these estimates are close to those obtained from time series analysis (for aggregate wage data) such as Layard and Nickell (1986), they should be treated cautiously. The caveats raised earlier mean that no conclusion can be accepted uncritically, and the negative sign on the (insignificant) regional wage variable in Table 4 may be a matter for concern.

We cannot reject the hypothesis that the pay of more senior white-collar workers is unaffected by the rate of unemployment in their establishment's region. The estimates are reported above. This negative result accords with that derived—for quite different data—by Beckerman and Jenkinson (1986).

The wage regressions reveal an interesting and powerful effect from whether or not establishments are United Kingdom-owned. The 'UK owned' variable enters Tables 2, 4 and 5 with coefficients between -0.03

and -0.07 . Clerical workers and foremen thus earn between 2% and 7% more if they work for foreign establishments. The effect is strongly significant in the union sector, less so in the non-union sector. Table 3 reveals the remarkable consequences upon the pay of middle-management. Managers in 1980 earned approximately 15% less if they were employed by establishments owned from the United Kingdom. The coefficients in equations (3) and (4) are tightly concentrated around -0.15 and both have t -statistics greater than 2.8. Whether or not this considerable income differential is justified by differences in management quality cannot be ascertained from our data.

Slightly unexpectedly, financial performance (as assessed by the interviewed manager) does not appear to have a reliably significant *ceteris paribus* effect upon the earnings of white-collar workers. The WIRS1 results show one or two weak signs of an ability-to-pay effect (for example, the -0.05 coefficient on below average performance in equation 1), but nothing that is statistically significant at conventional confidence levels. For the 1984 survey, which allowed a somewhat finer disaggregation of establishment performance, there is one coefficient which approaches significance. Establishments in the non-union sector (see Table 4) which reported financial performance 'a lot below average' paid clerical workers approximately 10% below (with a t -statistic of 1.76) those reporting an average performance. A similar phenomenon can be seen in the Table 5 results for foremen, but there the t -statistic never exceeds 1.4. It is conceivable that adverse financial conditions only reduce pay in non-union workplaces: unions are often thought to prevent downward pay flexibility. There is also the difficulty—discussed in Blanchflower, Oswald and Garrett (1990)—that higher wage rates produce lower profitability, *ceteris paribus*, and this simultaneity problem cannot be untangled adequately with cross-section data. Our main finding, nevertheless, is that there is no strong evidence from these data that white-collar pay depends significantly upon the financial performance of the employer. Blanchflower, Oswald and Garrett (1990), by contrast, find significant effects using manual workers' pay data.

The second Workplace Industrial Relations Survey (WIRS2) obtained information on the oligopolistic position of each establishment. Tables 4 and 5 include this as a dummy variable, 'Few competitors', defined as an establishment with five or fewer competitors in the market for its main product or service. This variable has no discernible effect on the wages of clerical employees or foremen. Blanchflower, Oswald and Garrett (1990) conclude that manual workers receive approximately a 5% differential if they work for an oligopolist.

If neither financial performance nor oligopoly power matters, it is puzzling that, as Table 1 shows, managers *cite* establishment prosperity as so important. We cannot resolve this difficulty without additional data. Hence the evidence must be thought of as inconclusive.

We note here only a number of further results. First, there is some

evidence that employees are paid more in establishments where their own kind are numerically important. For example, Table 2 shows that the percentage of clerical workers enters positively in the wage equation for those workers. This effect is much more marked in the unionised sector of the economy. Second, foremen in union establishments apparently earned in 1984 a considerable differential (of 13%) if they were employed in a pre-entry closed shop workplace. In the case of clerical workers the post-entry closed shop conferred a significant wage premium (of 7%) in 1980, but not in 1984.⁶ Third, there are occasional signs of effects from the existence of profit sharing and employee share ownership schemes; but none is statistically significant once industry dummy variables are included. Fourth, the age of the establishment matters only in the equations for middle management (Table 3), where there is a premium of 12%–18% for those in workplaces of between 5 and 10 years old. Fifth, Table 2 shows that in 1980 clerical workers received a small positive wage differential if they were employed in an establishment which expanded during 1979–1980.⁷

4. Evidence from the British social attitudes surveys

The early results are based upon establishment data. As complementary evidence, and to provide a check on the broad nature of the results, we also estimate earnings equations using the four individual-based British Social Attitudes Surveys of 1983–1986.⁸

An augmented Mincerian framework was adopted. Thus conventional controls such as age and its square, schooling, gender and marital status were included. In addition, variables were incorporated if the individual expected employment at his or her workplace to change over the succeeding year and/or whether he or she expected to be made redundant over that period. Two further variables were employed to distinguish individuals who had experienced periods of unemployment or self-employment over the preceding five years. Finally, industry and time dummies were also added. The dependent variable was taken to be the log of gross weekly earnings.

⁶ Following a referee's suggestion, we have calculated the overall union (private sector) relative wage effects for each of the four groups. They are as follows:

Clerical	1980	3%*
Middle Managers	1980	13%
Clerical	1984	3%
Foremen/Supervisors	1984	1%*

* not significant at 5% level.

Details of these equations are available from the authors.

⁷ The positive and significant effect of outside wages in most equations is consistent with both competitive theory and models which stress comparability effects (for example, Oswald (1979)).

⁸ Blanchflower (1989) also uses these data.

Table 6 reports the results. Equation (9) uses data on 468 private sector individuals who reported that unions were recognised at their place of work; equation (10) uses data on 637 private sector non-manual workers who reported that unions were not recognised.

As before, both the regional wage and the regional unemployment rate (logged) are entered as independent variables. The wage in the employee's region works strongly with a large coefficient in the non-union sector. Unemployment, as in the WIRS equations of Tables 2–5, enters with a small negative coefficient. It is insignificant, however, in a way reminiscent of the results above for middle managers and foremen. The elimination of the regional wage produces better defined, and quantitatively larger, estimates of an unemployment effect (see Appendix D); but earlier objections apply again.

The BSA data sets do not contain information on employers' financial performance. However, there is a variable giving the employee's estimate of his or her establishment's likely employment change over the following year. In the non-union sector, for employment expected to grow, this has a significant impact upon earnings. It is associated with a pay premium of approximately 11 per cent. In so far as this is an adequate indicator of pressure within the firm, the findings are somewhat more positive than those based upon establishment data.

An estimate of the union membership differential was made by combining the union and non-union samples (this equation is not reported). This procedure gave an estimate of approximately 3%, with a *t*-statistic of 0.72, for the union wage gap. In contrast, the coefficient on the separate union recognition variable (0.1086) was highly significant, with a *t*-statistic of 3.01. This is likely to be biased upwards by the omission of plant size variables.

Perhaps the most striking difference between the equations is the coefficient on regional wages. In the non-union sector the elasticity is over unity: a one per cent rise in outside wages raises the worker's pay by 1.2 per cent. In the union sector the elasticity is just over 0.3, so in this sense external market conditions have a much smaller impact than in the non-union sector. Blanchflower, Oswald and Garrett (1990) study a theoretical framework in which this may occur.

Workers with a history of unemployment earn less, *ceteris paribus* in the union sector. The effect is approximately -10%. The coefficient is approximately zero in the non-union equation.

Men earn a pay premium in both sectors. Part-time employment results in reduced earnings. Supervisory staff are paid between 19% and 25% more, after controlling for other variables. A spell of self-employment in the preceding five year period is (weakly) associated with higher wages in the union sector and lower wages in the non-union sector. As is traditional, earnings are a concave and increasing function of individuals' age.

Finally, it is appropriate to compare our results with those of Layard, Metcalf and Nickell (1978), who use 1973 data (on males) drawn from the

TABLE 6
Wage Equations—Non-manuals in 1983–1986 (pooled)

	<i>Union</i> (9)	<i>Non-union</i> (10)
Employment rise expected	0.0714 (1.48)	0.1080 (2.24)
Employment fall expected	-0.0095 (0.23)	0.0110 (0.12)
Unemployed in last 5 yrs	-0.0998 (1.99)	-0.0120 (0.23)
Redundancy expected	0.0038 (0.04)	-0.1187 (0.90)
Regional unemployment	-0.1402 (1.44)	-0.0339 (0.28)
Regional wage	0.3285 (1.35)	1.2075 (4.60)
Male	0.3968 (9.47)	0.4296 (8.81)
Age	0.0650 (5.66)	0.0342 (3.07)
Age ² × 10 ³	-0.6909 (4.99)	-0.3985 (3.04)
Part-time	-0.9461 (14.53)	-0.9263 (14.92)
Separated	0.0490 (0.48)	0.2886 (2.28)
Widow	0.1307 (0.74)	0.3555 (2.00)
Married	-0.0.317 (0.50)	0.1734 (2.43)
School (year)	0.0837 (6.48)	0.0505 (3.63)
Union membership	0.0097 (0.27)	0.0688 (0.69)
Supervisor	0.1884 (5.02)	0.2509 (5.43)
Self-employed in last 5 yrs	0.2206 (1.93)	-0.1890 (1.82)
Year dummies	Yes	Yes
Industry dummies	Yes	Yes
Constant	4.8910 (3.43)	1.0176 (0.65)
Adjusted R ²	0.7116	0.6525
F	40.74	42.18
N	468	637

Notes: (1) unionism defined on the basis of union recognition.
 (2) *t*-statistics in parenthesis.

Base: private sector.

Source: 1983–1986 British Social Attitudes Surveys.

General Household Survey.⁹ The authors do not discuss their non-manual results in detail, but their Table 1 shows that

- (i) influences on manual and non-manual pay are normally qualitatively similar but quantitatively noticeably different
- (ii) the one exception to this rule is the non-manual union coverage effect, which has the wrong sign and is highly significant
- (iii) plant size and concentration have no effect on wages
- (iv) the explanatory power of the non-manual wage equation is fairly high (adjusted $R^2 = 0.51$).

Although the authors' results are not wholly inconsistent with our own, we differ especially on (ii) and (iii), because our work suggests if anything a positive union differential and also that plant size is highly significant. In most respects the different kinds of data sets used here and in Layard, Metcalf and Nickell (1978) make the two studies complementary.

5. Conclusions

For some decades a predominant concern of labour economists and industrial relations researchers has been the question of what forces shape manual workers' wage rates. In a country like Britain, however, in which the majority of the labour force are now white-collar workers, the traditional question is no longer the only or most obvious one.

The purpose of this paper has been to investigate the determinants of non-manual pay. Although there are different ways in which this can be done, and no single method is likely to be sufficient, our approach has been to tabulate questionnaire evidence and to estimate regression equations using two large establishment surveys and a set of individual employee surveys. The paper presents cross-section private sector wage equations for clerical workers, middle managers and foremen based upon the 1980 and 1984 Workplace Industrial Relations Surveys (WIRS1 and WIRS2), and equivalent equations for non-manuals based upon the 1983–1986 British Social Attitudes Surveys (BSA).

One broad finding is that the factors which influence white-collar pay are similar to those which affect blue-collar pay.¹⁰ Some may interpret this as an encouraging result, because it suggests that, if only fortuitously, habits of thought developed during the study of manual workers may hold good for the analysis of non-manual labour markets. The pay of both groups, for example, depends (in qualitatively similar ways) upon variables such as the size of the workplace, the proportion of part-time employees and the proportion of female employees. Moreover, as with manual workers, Britain's white-collar employees earn more if they work for a foreign-owned enterprise.

⁹ Shah (1983) examines professional earnings using 1973 GHS data, and finds effects from education and experience.

¹⁰ We do not, however, claim that the two wage equations have the same coefficients.

A particular objective of the analysis has been to examine whether white-collar wage rates respond to 'external' economic variables such as the level of unemployment. Following the methodology developed in Blanchflower, Oswald and Garrett (1990), we find some evidence that establishment wages are depressed by high unemployment in the establishment's geographical region. Using WIRS this external effect is statistically significant for clerical workers, but insignificant for middle managers and foremen. Using BSA it is consistently weak. However, in both cases these unemployment elasticities are much better defined if the regional wage is omitted from the set of explanatory variables.

Quantitatively, the responsiveness of remuneration to unemployment is small.¹¹ According to most of our estimates the wage of white-collar workers falls by less than one tenth¹² in response to a doubling of unemployment.

The effects of 'internal' pressure upon white-collar pay are less pronounced. We find little econometric evidence that an establishment's financial prosperity or oligopolistic position affects the remuneration of its clerical and supervisory employees. However, Table 1 makes it clear that managers routinely cite financial performance as an important influence upon pay. It may therefore be premature to write off the effect of internal pressure upon the wage rates of Britain's white-collar employees.

APPENDIX A

Key to WIRS variables

Independent variables

% Part-time	The % of workers who were part-time.
% Foremen/supervisors	The % of the workforce who were foremen/supervisors.
% Clerical/admin/sec.	The % of the workforce who were clerical/administrative/clerical workers.
% Junior tech./prof.	The % of the workforce who were junior technical/professional.
% Senior tech./prof	The % of the workforce who were senior technical/professional.
Majority male	The majority sex of the skill group were male (a dummy variable).
Shiftworking	A dummy variable for the existence of shift work at the establishment.
Outworkers	A dummy variable if the establishment had used outworkers over the preceding 12 months.
Single independent	A dummy variable for a single establishment organization.
Performance (a lot/little) above average	A dummy variable where the manager reported that an establishment had performed (a lot/little) better than average compared with other establishments/firms in the same industry.
Performance (a lot/little) below average	A dummy variable where the manager reported that the establishment had performed (a lot/little) below average compared with other establishments/firms in the same industry.

¹¹ We believe that Appendix D's estimates are biased upwards because of the omission of regional fixed effects.

¹² This is similar to the estimates of responsiveness of manual pay which emerge from Blanchflower, Oswald and Garrett (1990). Oswald's (1986) review of the small literature concludes with a similar estimate.

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.
UK-owned	A dummy variable if the establishment was United Kingdom—owned.
Employers' Association	A dummy variable if the establishment was a member of an Employers' Association.
Manning levels	A dummy variable if non-manual unions negotiated over manning levels.
Pre-entry closed-shop	A dummy variable if all or some non-manual workers were required to be union members before starting work.
Post-entry closed-shop	A dummy variable if all or some non-manual workers were required to be union members after starting work.
Operating under 3 yrs	A dummy variable if the establishment had been engaged in its main activity for less than 3 years.
Operating 3–5 yrs	A dummy variable if the establishment first engaged in its main activity 3 years ago or more/less than 5 years ago.
Operating 5–10 yrs	A dummy variable if the establishment first engaged in its main activity 5 years ago or more/less than 10 years ago.
Operating 10–25 yrs	A dummy variable if the establishment first engaged in its main activity 10 years ago or more/less than 25 years ago.
Operating 25+ yrs	If an establishment first engaged in its main activity 25 years or more ago—the excluded category.
Employment change—1 year	Percentage change in employment at the establishment, 1979–1980 (1983/1984).
Employment change—4 years	Percentage change in employment at the establishment, 1980–1984.
Employment change—5 years	Percentage change in employment at the establishment, 1975–1980.
Employee share ownership	A dummy variable for the existence of a share ownership scheme in the establishment.
Profit sharing	A dummy variable for the existence of a profit sharing scheme at the establishment.
Value added bonus	A dummy variable for the existence of a value added bonus scheme at the establishment.
Regional unemployment rate	The percentage of the workforce who were unemployed in each region—in natural logarithms. (Source: Regional Statistics)
Regional wage rate	The gross average weekly wage rate in each region—in natural logarithms. (Source: New Earnings Survey).
Few competitors	A dummy variable where there were 5 or less competitors in the market for the main product or service of the organisation.
No. of employees	Total number of workers employed at the establishment (full and part-time).
Industry dummies	40 (1, 0) dummy variables.
<i>Dependent variables</i>	
a) WIRS1	
Clerical wage	Typical level of gross (weekly) pay of clerical workers (in natural logarithms).
Middle manager wage	Typical level of gross (weekly) pay of middle managers (in natural logarithms).
b) WIRS2	
Clerical wage	Gross (weekly) earnings inclusive of any overtime of a typical clerical worker (in natural logarithms).

Foremen wage Gross (weekly) earnings inclusive of any overtime of a typical supervisor/foreman forewoman (in natural logarithms).

APPENDIX B

The following coefficients on the unemployment variable are derived from the equations reported in Tables 2 to 5 excluding the regional wage. The other coefficients in the equations were unaffected.

WIRS1 1980	Coefficient	t-statistic
Clerical workers-union	-0.059	2.09
Clerical workers-non-union	-0.081	2.08
Middle managers-union	-0.071	1.18
Middle managers-non-union	-0.115	2.33
WIRS2 1984		
Clerical workers-union	-0.118	4.63
Clerical workers-non-union	-0.103	2.47
Foremen/supervisors-union	-0.063	1.57
Foremen/supervisors-non-union	-0.085	1.52

APPENDIX C

British social attitudes survey series, 1984-1986

This series of surveys, core-funded by the Sainsbury Family Trusts, was designed to chart movements in a wide range of social attitudes in Britain and is similar to the General Social Survey carried out by NORC in the United States. The data were collected by Social and Community Planning (SCPR) and derive from annual cross-sectional surveys from a representative sample of adults aged 18 or over living in private households in Great Britain whose addresses were on the electoral register. The first three surveys involved around 1800 adults; the numbers were increased to 3000 in 1986.

The sampling in each year involved a stratified multi-stage design with four separate stages of selection. First, in each year approximately 120 (150 in 1986) parliamentary constituencies were selected, with probability of selection proportionate to size of electorate in the constituency. At the next stage a similar number of polling districts were chosen also with probability of selection proportionate to the size of the electorate. Then, thirty addresses were selected at a fixed interval on the electoral register. Finally, at each sampled address the interviewer selected one respondent using a random selection procedure (a Kish grid). The majority of sample errors for each survey lie in the range 1.0 to 1.5; errors for subgroups would be larger. For further details of the survey designs, non-responses etc. see *British Social Attitudes Technical Report, 1984, 1985, 1986*. Merger of the data files from each of the surveys was performed at the University of Surrey by the authors.

Key to BSA Variables

Male	A (1, 0) dummy variable for gender.
Age	The respondent's age at the time of interview.
Part-time	A (1, 0) dummy variable if the respondent reported that they normally worked less than 30 hours per week.
Separated	A (1, 0) dummy variable if the respondent was separated or divorced.
Widow	A (1, 0) dummy variable if the respondent was widowed.
Married	A (1, 0) dummy variable if the respondent was married or living as married.
Single	If the respondent had never been married—excluded category.
School	Number of years of schooling.

Union recognised	A (1, 0) dummy variable if trade unions or staff associations at the place of work recognised by management for negotiating pay and conditions.
Employment rise expected	A (1, 0) dummy variable if the respondent expected their workplace to increase its number of employees over the coming year.
Employment fall expected	A (1, 0) dummy variable if the respondent expected their workplace to decrease its number of employees over the coming year.
Employment constant	If the respondent expected their workplace would keep constant its number of employees over the coming year—excluded category.
Supervisor	A (1, 0) dummy variable if the respondent was a supervisor.
Union member	A (1, 0) dummy variable if the respondent was a member of a trade union or a staff association.
Non-manual	A (1, 0) dummy variable if the respondent's occupation was non-manual.
Self-employed in previous 5 years	A (1, 0) dummy variable if the respondent reported that they had ever been self-employed over the previous five years as their main job.
Unemployed in previous 5 years	A (1, 0) dummy variable if the respondent reported that they had ever been unemployed and seeking work in the preceding five years.
Redundancy expected	A (1, 0) dummy variable if the respondent expected that during the next year they would be declared redundant.
Regional unemployment	Unemployment rate in the Standard Region entered in log form.
Regional wage rate	The gross average weekly wage rate in each region entered in log form.
Year 84/85/86	(1, 0) year dummies
Industry dummies	Nine (1, 0) dummy variables at the one digit SIC level.

APPENDIX D

The following coefficients on the unemployment variable are derived from the equations reported in Table 6 excluding the regional wage. The other coefficients in the equations were unaffected.

BSA 1983–1986	Coefficient	<i>t</i> -statistic
Non-manual workers-union	-0.2255	3.03
Non-manual workers-non-union	-0.3951	4.19

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