

Unions and the Incidence of Performance
Linked Pay Schemes in Britain*

by

P A Gregg

National Institute of Economic and Social Research

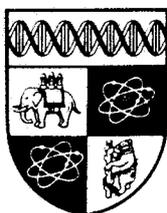
and

S J Machin

University of Warwick

Number 286

WARWICK ECONOMIC RESEARCH PAPERS



DEPARTMENT OF ECONOMICS

UNIVERSITY OF WARWICK
COVENTRY

**Unions and the Incidence of Performance Linked Pay Schemes in
Britain.***

P.A.Gregg

National Institute of Economic and Social Research, 2 Dean Trench Street,
London, SW1P 3HE, UK.

and

S.J.Machin.

University of Warwick, Coventry, CV4 7AL, UK.

ABSTRACT

This paper examines the relationship between trade unions and the incidence of share ownership, profit sharing and value added schemes in Britain. The first two schemes are more common in the union sector whilst the third occurs more in non-union establishments. A distinction is made between weak and strong unions and it is found that performance linked pay schemes are in general less likely to be present if an establishment has a strong union rather than a weak one.

* The authors would like to thank participants in a Warwick Labour Economics Workshop, Martyn Andrews, Saul Estrin, Peter Law, Geoff Stewart and, in particular, Paul Geroski, Ben Knight and Mark Stewart for a number of helpful comments. The second author would also like to acknowledge financial support from the ESRC.

This paper is circulated for discussion purposes only and its contents should be considered preliminary.

1. Introduction.

Discussion of the merits of performance linked remuneration, operating through share ownership, profit sharing or value added schemes, has received a growing amount of attention in the recent economic literature.¹ However, at present, there exists little British empirical work analysing the determinants of these schemes at the microeconomic level. Blanchflower and Oswald(1987a) have made a start in this area using the Workplace Industrial Relations Survey of 1984 which provides a useful source of information pertinent to a study of alternative compensation arrangements operating in British establishments. The attraction of this data is that it is a nationally representative cross-section and yields detailed information on establishment characteristics. In particular the data is rich on details of trade union organisation : thus the main issue to be pursued in this paper is to explicitly examine the extent to which the degree of unionisation is related to the probability of operating a scheme. The layout of the paper is as follows. Section 2 briefly considers the theoretical background concerning union attitudes to the introduction of performance linked pay. It also discusses why different schemes may be viewed as more or less desirable than others and why they may be expected to have different determinants. Section 3 describes the data and the econometric methods used in the analysis. Section 4 presents estimates of the union influence on the probability that an establishment has a sharing scheme and the final section highlights the key conclusions resulting from the analysis.

2. Theoretical Background.

Existing British empirical work analysing performance related pay generally tests the effects of profit sharing or share ownership on various economic variables like wages and employment (Estrin and Wilson(1986), Bradley and Estrin(1987)), share prices (Richardson and Nejad(1986)) and investment, employment and financial performance (Blanchflower and Oswald(1987b,1987c)). The evidence from these studies is fairly inconclusive. For example, Estrin and Wilson find that profit sharing significantly reduces remuneration and increases

¹ Much of this interest has been generated by the work of Weitzman((1984),(1985) and elsewhere). A comprehensive review of the literature to date can be found in Estrin, Grout and Wadhvani(1987).

employment in a small sample of engineering firms. Similarly Bradley and Estrin's study of the John Lewis Partnership, a company which has engaged in profit sharing for a number of years, finds higher employment (but no effect on remuneration) compared to its four main competitors in the retail trade. Richardson and Nejad provide evidence to show that share prices are higher (although only at the 10% significance level) in companies in the multiple stores sector which have employee share ownership schemes. However, Blanchflower and Oswald use the more representative Workplace Industrial Relations Surveys of 1980 and 1984 but fail to detect any discernible effects on levels of employment or on managerial perceptions of capital investment and financial performance. Thus evidence on the economic impact of flexible remuneration schemes is fairly mixed. However, given the increased number of schemes linking pay to performance in British companies, and the present Government's enthusiasm for these schemes, it is also interesting to analyse the determinants of sharing schemes and indeed to model the management based decision on whether to introduce these schemes.

The impact of unions on the incidence of sharing schemes is likely to manifest itself in a number of ways and may be best considered in terms of the objectives of management, union leaders and the rank and file membership, all of whom will be attracted to these schemes if the perceived net gains from their introduction are positive. It is clear however that different objectives apply to different groups and in many cases a potential benefit to one group will represent a potential cost to another. From a managerial viewpoint these potential gains are likely to come about through improved economic performance, a less adversarial industrial relations climate and through greater motivation, loyalty to the company and increased effort on the part of workers. Obviously to the extent that unions restrict performance or promote non-cooperative relations between workers and management these schemes will be more attractive to managers in unionised firms. From a worker's viewpoint dissatisfaction with his or her current pay might prompt participation in these schemes in the hope of improving their overall remuneration. However, this could create a conflict of interests with union leaders who may view these schemes suspiciously in that they herald a new industrial relations climate in which the role of the union is confined to bargaining over shares. Thus if unions view flexible payment systems unfavourably and as

shifting control from them to management it seems reasonable that they will oppose their introduction through their ability to influence managerial objectives : this will be especially true if their members are satisfied with their current pay and also wary of any proposed change in the payment system. The influence of unions will be on the management based decision on whether to introduce a scheme and as such is likely to operate through any threats of what they could do to economic performance or worker-management relations if a scheme were to be introduced against their wishes.² This threat effect will be more credible if unions are strong and, in the empirical analysis to follow, a strong union is defined as one which operates a closed shop. This practice is further justified by the second element dictating union ability to resist which is whether their members are content with their current earnings. This is more likely to be true if union induced wage effects are greater and, since Stewart(1987) provides evidence that union wage premiums are larger in the presence of the closed shop, it seems likely that a strong union, as defined by the existence of a closed shop, may have more support from its members and be more able to resist the implementation of such schemes if it so wishes.³

It is also interesting to see whether the determinants of different flexible pay schemes vary and indeed whether unions are more likely to welcome or oppose one type of scheme more than another. It is possible to shed some light on this question by examining whether different explanatory variables are statistically important in incidence equations for different schemes. There are several theoretical reasons for expecting this to be the case. As Estrin, Grout and Wadhvani(1987) point out, share ownership schemes are likely to weaken workers' monopoly power in the long run. They argue that this may result in a reduced role for unions in the wage setting process and shift power from unions to management. This provides a greater incentive for

² The potential for unions to do this is considerable : see the large body of evidence amassed by the collective voice school in the U.S. who suggest that unions reduce profitability (see Freeman(1983), Clark(1984), Salinger(1984) and Karier(1985)) may raise or have a neutral impact on productivity (Brown and Medoff(1978), Allen(1984)and Clark(1984)) and influence a large number of non-wage issues , as summarised in Freeman and Medoff(1984). Unfortunately British work has generally focussed on union wage effects and little is known of the effects of British unions on economic performance.

³ This is not to say that all unions actively oppose these schemes : for example, the electricians' union has encouraged both their uptake and introduction. An alternative view proposed by Mitchell(1987) also suggests that a 'share bargaining' union can take on a new monitoring role in the operations of the firm through its ability to ensure that management do not cheat on their part of the bargain and thus it may be management and not unions who are reluctant to introduce these schemes.

managers to introduce these schemes in the union sector. However, for the cash based profit sharing and value added schemes which are more likely to be treated in conjunction with and not independent of wage negotiations it may prove harder to take the wage setting initiative from unions. This suggests that there are different reasons underlying the introduction of cash or share based pay schemes. A second reason for expecting differential determinants is that the legislation of the 1978, 1980 and 1984 Finance Acts offers tax incentives for employers and employees who participate in share option or profit sharing schemes. No such tax benefits are available for value added schemes. Thirdly, the performance measure used in each scheme is different : whilst share option and profit sharing schemes are based on financial measures, value added schemes are based on output measures. This suggests that the question of introducing the latter schemes may be more appropriate within individual establishments whilst the former require some measure of share prices or an accounting measure of profitability and are thus likely to be more company based. However, given that profit centres do exist in most large companies discussion of whether to introduce profit sharing schemes may be feasible at a lower level than that of the organisation. Therefore it is considered that establishment variables may be of most importance for value added schemes, of some importance to profit sharing but that they will be less important than organisation variables for share ownership schemes.

3. Data and Modelling Strategy.

The Workplace Industrial Relations Survey of 1984 consists of a sample of 2019 establishments drawn from all sectors of British industry with the exception of coal mining and agriculture. The survey includes establishments with 25 or more employees in both 1981 and 1984 : this is because the sampling frame used was the 1981 Census of Employment. Large establishments were deliberately oversampled to guarantee their presence and a weighting system exists to allow for the correction of this sampling bias and to correct for the likelihood that the number of employees in any of the smaller firms may have dropped below 25 between 1981 and 1984. The questions regarding performance linked pay were asked in private sector establishments plus nationalised industries and state held limited companies. This paper concentrates on the private

sector establishments.

The relevant question regarding the incidence of flexible remuneration schemes is as follows :

"Does (the company/organisation that owns) this establishment operate any of the following schemes for any of the employees here ?

A share ownership or share option scheme ?

A profit sharing scheme ?

A value added bonus ? "4

The discussion in Section 2 suggests that an employer will introduce a scheme if the perceived benefits from its introduction outweigh any perceived costs (such as threats by hostile unions concerning what they may do to production). This can be characterised by the following latent variable model

$$S_i^* = X_i' \beta + \epsilon_i \quad (1)$$

where S_i^* is the perceived net benefits of introducing a scheme in the i^{th} establishment, X_i is a vector of independent variables, β is a parameter vector and ϵ_i a random error term.

S_i^* is however not directly observable but instead we do observe whether or not an establishment operates a share ownership, profit sharing or value added scheme. This can be represented by a dichotomous variable S_i where $S_i = 1$ if an establishment operates a scheme and $S_i = 0$ otherwise. The unobservable variable S_i^* can be related to the observable variable S_i in the following way

$$S_i = \begin{cases} 1 & \text{if } S_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

Since S_i is to be used as a dependent variable standard least squares estimation methods are no longer appropriate (see Maddala(1983)). Consequently an estimation technique which allows

⁴ Since the focus of this study is on employee share ownership the definition of a share ownership scheme used in the analysis does not include establishments where such schemes are available for management alone.

for the discrete nature of S_i is required. In the context of this model the probability of having a scheme is $P[S_i = 1] = \Phi(X_i'\beta)$ where Φ is the standard normal distribution function and thus the appropriate probit likelihood function is

$$L = \prod_{S_i=1} \Phi(X_i'\beta) \prod_{S_i=0} 1 - \Phi(X_i'\beta) \quad (3)$$

Since the focus of interest in the analysis is the relationship between unionisation and the probability of having a scheme it may be of importance to include interactions between a union variable (U_i) and the other independent variables, say Z_i . Clearly if interactions are upheld by the data their inclusion suggests bias in the union effects deduced from a non-interactive specification. Thus the more general fully interactive model may be written as

$$S_i^* = Z_i'\gamma + U_i'\delta + (U_i * Z_i)'\theta + \epsilon_i \quad (4)$$

In this more general model the union effect becomes $\hat{D}_i = \hat{\delta} + Z_i'\hat{\theta}$. The average union effect is $\hat{\bar{D}} = \hat{\delta} + \bar{Z}'\hat{\theta}$ where a bar denotes a mean value. By partitioning the estimated covariance matrix to obtain $\hat{J} = Var(\hat{\alpha})$ where $\hat{\alpha} = [\hat{\delta}, \hat{\theta}]$ an asymptotic standard error for the average union effect can be calculated as $ase(\hat{\bar{D}}) = (\bar{M}'\hat{J}\bar{M})^{1/2}$ where $\bar{M} = [1, \bar{Z}]$.

The union effects considered above analyse the influence of unions on S_i^* . It may also be interesting to calculate probability figures which allow comparison of the magnitude of union effects for different schemes. In terms of equation (4) these can be calculated as

$$\hat{P}^* = P[S_i = 1 | U_i = 1] - P[S_i = 1 | U_i = 0] = \Phi(\bar{Z}'\hat{\gamma} + \hat{\delta} + \bar{Z}'\hat{\theta}) - \Phi(\bar{Z}'\hat{\gamma}) \quad (5)$$

Equation (4) represents the most general fully interactive model which allows all variables to have different effects in the union and non-union sectors. Thus the modelling strategy is to start from the general model incorporating all economically reasonable interactions and to simplify it to a more parsimonious form. Whether different schemes have different determinants can be evaluated by seeing which variables have a significant impact on the probability of having a share ownership, profit sharing or value added scheme. The general vector of independent variables to be used in the analysis can be split into three main groups (more detailed information plus the weighted means of the variables are given the Data Appendix) :

(i) Organisation variables.

The data set gives information on various characteristics of the organisation to which the establishment belongs, a number of which are relevant to a study of the incidence of sharing schemes. Firstly, the number of employees in the organisation is available as a grouped variable and can be modelled using a set of organisation size dummy variables (O2-O5) as defined in the Data Appendix. Secondly, two dummy variables (FINORGA and FINORGL) indicating the extent to which the organisation gives information on its financial position to its employees can be included. Finally variables indicating whether the organisation is a limited company (PLC) or is foreign owned (FOREIGN) are available for use in the analysis.

(ii) Industry variables.

A single industry variable to be considered is the proportionate growth in employment in the establishment's operating industry from 1980 to 1984 (GROWTH).⁵

(iii) Establishment variables.

The Workplace Industrial Relations Survey yields information on a number of features of the establishments taking part in the survey, some of which may be expected to influence the probability of operating a scheme. Firstly, workforce characteristics are likely to be of importance as determinants of sharing schemes and the data set has relevant information on the proportion of the workforce that is manual (MPROP), supervisory staff (SFPROP)⁶, female (FPROP) or part-time (PPROP). Secondly, establishment characteristics which could be included are variables indicating whether the establishment has a Joint Consultation Committee (JCC) or is a member of an employers' association (EMPA), is a Head Office or Administrative Centre (HEAD), or whether the dominant mode of bargaining occurs at plant level (PLANT).⁷ Thirdly, although the

⁵ Some kind of industry risk measure would, on theoretical grounds, be more appropriate. However a lack of suitable industry level information meant that calculation of such a measure did not prove feasible.

⁶ The nature of the survey data means that some of these definitions are not mutually exclusive: for example, the manual proportion MPROP is defined as the sum of the proportions of skilled, semi-skilled and unskilled workers in the establishment and the non-manual proportion is the sum of the proportions of supervisory, clerical and administrative, junior professional, senior professional and managerial workers. If all the separate categories were entered in each incidence equation (using the managerial category as the base) the null hypothesis of equal coefficients on the manual and non-manual categories could not be rejected with one exception. This latter case necessitated the inclusion of SFPROP in the profit sharing equation.

⁷ Other bargaining variables indicating whether multiple unions engaged in separate or joint bargaining

data is relatively weak on economic variables, variables appropriate for use are a dummy variable indicating whether demand for the establishment's product has been rising (DRISE) in the previous twelve months and dummy variables indicating whether the ratio of labour costs to sales is 25% or above but below 50% ($25 \leq LC < 50$), 50% or above but below 75% ($50 \leq LC < 75$) or 75% or above ($75 \leq LC$). Finally, given the evidence of Stewart(1987) who found that greater union non-union wage differentials from the 1980 Workplace Industrial Relations Survey were present in establishments with closed shops, two mutually exclusive union variables were defined. Firstly, a strong union variable equal to one if the establishment has a closed shop for either manual or non-manual workers and zero otherwise (CLOSED). Secondly, a weak union variable was defined as equal to unity if manual or non-manual unions are recognised for bargaining purposes but there are no workers in a closed shop and equal to zero otherwise (UNION).

4. Results.

The objective of this analysis is to focus on the determinants of schemes that link pay to performance using establishment level data, paying particular attention to the role played by unions. Probit estimates of the incidence of share ownership, profit sharing and value added schemes are reported in Table 1. The models presented are the parsimonious interactive specifications obtained using the methods discussed in the previous section : for some estimates of non-interactive incidence equations for profit sharing alone, for the presence of a profit sharing or value added scheme and for the presence of any of the three schemes see Blanchflower and Oswald(1987a). In order to compare the magnitude of the impact of different variables across schemes the estimated coefficients are also converted to probability figures and these are presented in Table 1.⁸ To confirm that the omitted variables were deleted on statistically accept-

were also considered but their inclusion was never statistically upheld in any specification.

⁸ These effects are calculated as $\partial P[S_i = 1] / \partial X_{ij} = \beta_j \phi(X_i' \beta)$ for the j^{th} element in the X_i vector (ϕ is the standard normal density) and, for the continuous variables in X_i , are evaluated at the mean of $\phi(X_i' \beta)$. For dummy variables the reported probabilities are a 0-1 effect which is calculated as $P[S_i = 1 | A_i = 1] - P[S_i = 1 | A_i = 0] = \Phi(Y_i' T + \lambda) - \Phi(Y_i' T)$ for some dummy variable A_i (with coefficient λ) in the $X_i (= [Y_i, A_i])$ vector. These 0-1 effects are also evaluated at mean values.

TABLE 1

| Probit Estimates of the Determinants of Flexible Pay Schemes. | | | | | | |
|---|------------------|---------------------|------------------|---------------------|------------------|---------------------|
| | SHARE OWNERSHIP | | PROFIT SHARING | | VALUE ADDED | |
| | Probit Estimates | Probability Effects | Probit Estimates | Probability Effects | Probit Estimates | Probability Effects |
| Constant | -2.550(0.276) | - | -0.928(0.270) | - | -1.366(0.289) | - |
| ORGANISATION VARIABLES | | | | | | |
| O2 | 0.503(0.188) | 0.162 | 0.0003(0.167) | 0.0001 | - | - |
| O3 | 1.034(0.180) | 0.357 | -0.038(0.171) | -0.001 | - | - |
| O4 | 1.154(0.185) | 0.405 | -0.246(0.185) | -0.058 | - | - |
| O5 | 1.311(0.200) | 0.470 | 1.401(0.386) | 0.482 | - | - |
| FINORGA | 0.606(0.131) | 0.186 | 0.266(0.139) | 0.071 | 0.495(0.196) | 0.095 |
| FINORGL | 0.443(0.134) | 0.138 | 0.073(0.141) | 0.019 | -0.139(0.142) | -0.023 |
| PLC | 0.826(0.221) | 0.175 | 0.536(0.198) | 0.111 | 0.633(0.253) | 0.079 |
| FOREIGN | -1.253(0.164) | -0.240 | -0.789(0.166) | -0.154 | - | - |
| INDUSTRY VARIABLES | | | | | | |
| GROWTH | 0.685(0.388) | 0.165 * | 0.743(0.404) | 0.176 * | - | - |
| ESTABLISHMENT VARIABLES | | | | | | |
| MPROP | -0.637(0.188) | -0.153 * | -1.302(0.305) | -0.309 * | - | - |
| FPROP | - | - | -0.843(0.293) | -0.200 * | -0.686(0.286) | -0.124 * |
| SFPROP | - | - | 4.012(1.120) | 0.951 * | - | - |
| PPROP | - | - | -0.599(0.288) | -0.142 * | -0.495(0.272) | -0.090 * |
| EMPA | 0.220(0.113) | 0.066 | - | - | - | - |
| JCC | 0.938(0.204) | 0.275 | 0.193(0.108) | 0.050 | - | - |
| HEAD | -0.259(0.130) | -0.070 | - | - | - | - |
| DRISE | - | - | 0.390(0.105) | 0.099 | - | - |
| PLANT | - | - | -0.390(0.128) | -0.093 | - | - |
| 25≤LC <50 | - | - | -0.072(0.114) | -0.018 | 0.162(0.123) | 0.029 |
| 50≤LC <75 | - | - | -0.207(0.153) | -0.050 | -0.064(0.169) | -0.011 |
| 75≤LC | - | - | -0.836(0.400) | -0.141 | 0.545(0.286) | 0.072 |
| EMPLOY/100 | - | - | - | - | -0.105(0.052) | -0.019 * |
| UNION | 0.598(0.176) | 0.179 | 0.084(0.205) | 0.022 | -0.294(0.167) | 0.050 |
| CLOSED | 0.540(0.208) | 0.171 | -0.405(0.349) | -0.095 | -0.456(0.201) | -0.069 |
| INTERACTIONS | | | | | | |
| UNION*JCC | -0.655(0.245) | -0.160 | - | - | - | - |
| CLOSED*JCC | -0.871(0.270) | -0.191 | - | - | - | - |
| UNION*O5 | - | - | -0.955(0.413) | -0.158 | - | - |
| CLOSED*O5 | - | - | -1.383(0.447) | -0.178 | - | - |
| UNION*MPROP | - | - | 0.532(0.370) | 0.126 * | - | - |
| CLOSED*MPROP | - | - | 1.134(0.541) | 0.269 * | - | - |
| UNION*FINORGA | - | - | - | - | -0.431(0.257) | -0.062 |
| CLOSED*FINORGA | - | - | - | - | -0.791(0.300) | -0.093 |
| UNION*EMPLOY/100 | - | - | - | - | 0.095(0.053) | 0.017 * |
| CLOSED*EMPLOY/100 | - | - | - | - | 0.120(0.052) | 0.022 * |
| logL | -462.39 | | -443.04 | | -364.13 | |
| N | 1093 | | 1047 | | 1097 | |
| ρ ² | 0.307 | | 0.194 | | 0.064 | |
| Mean of dep. variable | 0.299 | | 0.219 | | 0.114 | |
| Proportion correctly classified | 0.800 | | 0.819 | | 0.887 | |

(cont.)

Notes.

(i) The dependent variable is a 0-1 dummy indicating the existence of a share ownership, profit sharing or value added scheme.

(ii) Asymptotic standard errors are in parentheses.

(iii) Dummy variables indicating missing information on organisation size, existence of an employer's association, the proportion of the workforce that is female, demand conditions and labour costs as a proportion of sales are included where appropriate. In all cases their estimated coefficients are as expected relative to their sample means.

(iv) $\hat{\rho}^2$ is McFadden's (1974) pseudo- R^2 which is defined as $\hat{\rho}^2 = 1 - (\log L / \log L_0)$ where $\log L$ is the maximised log likelihood with respect to all the parameters of the independent variables and $\log L_0$ is the maximised log likelihood with respect to the constant alone.

(v) * denotes that a probability effect is a mean effect for a continuous variable. All other reported probabilities are 0-1 effects.

TABLE 2

| Likelihood Ratio Tests of the Significance of Omitted Variables. | | | | | | |
|--|-----------------|-------------|----------------|-------------|-------------|-------------|
| | SHARE OWNERSHIP | | PROFIT SHARING | | VALUE ADDED | |
| | r | $\chi^2(r)$ | r | $\chi^2(r)$ | r | $\chi^2(r)$ |
| Omitted organisation variables | - | - | - | - | 7 | 3.44 |
| Omitted industry variables | - | - | - | - | 1 | 0.001 |
| Omitted establishment variables | 15 | 16.99 | 4 | 5.15 | 11 | 15.47 |
| Omitted interactions | 8 | 6.97 | 14 | 12.10 | 6 | 7.58 |

Notes

(i) Due to different sample sizes in each equation in Table 1 dummy variables indicating missing information are included where appropriate.

(ii) r denotes the number of zero restrictions being tested.

(iii) The omitted interactions are economically plausible interactions with an overall union recognition dummy (i.e. the sum of UNION and CLOSED). Conclusions are unaltered in all cases if the significance of interactions with UNION and CLOSED are tested.

statistically acceptable grounds likelihood ratio statistics testing the addition of various groups of the deleted variables against the null of the reported models are presented in Table 2 : their insignificance at either 5% or 10% significance levels suggests the specifications in Table 1 are the preferred models.⁹

The results in Tables 1 and 2 provide strong evidence to suggest that different kinds of sharing schemes have different determinants. The organisation variables are of most importance for share ownership, whilst both organisation and establishment variables are important for profit sharing. On the other hand, the incidence of value added schemes is best explained by establishment level variables.¹⁰ Table 1 also confirms that several interactions with the weak and strong union variables are upheld by the data : the relevant χ^2 statistics, compared to the null of a non-interactive specification, are 11.30 , 19.52 and 27.92 for share ownership, profit sharing and value added respectively, all of which are significant at any reasonable level of significance. It is also interesting that different interactions apply for different schemes thus suggesting that unions may view different schemes in different ways.

In terms of the distinctions made in Section 2 there are several noticeable differences between the determinants of different schemes. Share ownership and profit sharing schemes are more likely to be present in establishments belonging to large organisations¹¹ (by some 47% and 48% respectively relative to the base group) thus suggesting that there exists a greater need for schemes as a way of generating company allegiance and loyalty in larger organisations where problems of X-inefficiency and poor communication channels between management and workers are more pronounced. They are also more likely to be present in establishments belonging to U.K. owned limited companies : only the limited company result carries over to the value added equation where ownership of the organisation proves irrelevant and compounds the fact that introduction of these schemes is much more an establishment based issue. In all three schemes (except in

⁹ The variables were also all insignificant when added individually (or if necessary with a missing value dummy) to the specifications in Table 1.

¹⁰ The least satisfactory of the three sets of results is the value added equation : this is in no small part because the data set does not contain any variables reflecting production technology on an industry wide basis.

¹¹ Although for profit sharing this effect is confined to the non-union sector due to the presence of the interaction with O5 : the implications of this are discussed in greater detail below.

the union sector for value added) the extent to which the organisation is prepared to yield financial information to its employees is positively related to the incidence of these schemes. Whether this is simply a proxy for progressive management or whether this additional information means workers are more prepared to shoulder some of the risk associated with variable wages is not clear. As a whole, the organisation variables are much more important for the two schemes that offer tax incentives : the same is true of the industry growth variable which is insignificant for value added but suggests that the incidence of the other two schemes is greater in growing industries.

Establishments with a large non-manual component of their workforce are also more likely to have share ownership or profit sharing schemes. This reflects the idea that non-manual wages are in general less flexible (due to a lack of overtime or bonus payments) and thus schemes may be introduced as a way of gaining wage flexibility through a kind of 'manualisation' of the wages of non-manual labour. The negative coefficients on the part-time and female proportions for the cash based schemes are also as expected given the lower expected job tenure and attachment to work associated with these two groups. The only case in which the manual non-manual split is not sufficient to model the occupational pattern across establishments is in the profit sharing equation where the proportion of supervisory workers SFPROP exerts a positive impact on the probability of having a scheme. This reflects the increased role of these workers to define necessary standards of performance and to make sure they are understood by the workforce. The employer's association variable may be viewed as a proxy for 'progressive management' and it is those establishments which have such a function which are more likely to have a share ownership scheme. Further evidence for the differential determinants story is provided by the appearance of the Head Office, demand conditions and plant level bargaining variables in separate equations. Similarly plant size is only of importance in the value added equation where larger non-union establishments are less likely to operate a scheme. Finally, the labour cost variables, which were retained statistically due to the individual significance of $75 \leq LC$, are of considerable interest. If labour costs as a proportion of sales are high this means that performance related payments made to workers will have to be relatively large. This might be viewed as giving workers some degree

of control and in the case of profit sharing this seems to be unacceptable to management since $75SLC$ exerts a negative effect on the probability of operating a scheme. On the other hand, it seems plausible that greater effort and motivation can be obtained from workers if higher payments are made. Thus if substantial portions of added value are paid out as bonuses, as reflected by the positive coefficient on $75SLC$ in the value added equation, any potential productivity gains might be more likely to occur.

Interpretation of the interactions in Table 1 is also interesting since they tend to strengthen the idea that different schemes have different determinants. In the share ownership equation the set of interactions between the union variables and the Joint Consultation Committee variable are both negative and suggest that JCC's act as a complement to share option schemes in the non-union sector (where the coefficient on JCC is strongly positive) but not in the union sector. Since the presence of a JCC may be viewed as an obvious collective voice function then this implies that where unions and JCC's co-exist collective voice effects may be strong and thus unions may be more able to resist the introduction of share ownership schemes. However, in the non-union sector JCC may be a proxy for a progressive management which wants to obtain collective voice effects but without union presence at the workplace. In the profit sharing specification interactions with the manual proportion variable MPROP and the large organisation dummy O5 are upheld by the data. Both the weak and strong interactions with O5 are negative and suggest that unionised establishments belonging to larger organisations are less likely to have a profit sharing scheme. This seems intuitively appealing since, on the opposite side of the coin, non-union establishments tied to large organisations have no collective voice function provided by unions and thus profit sharing may be attractive in the hope of reducing X-inefficiency and to improve internal organisation procedures (via greater effort, more company loyalty and so on). The interactions with MPROP are positive although the only the strong union interaction is individually significant. Therefore, in the case of profit sharing, a unionised establishment operating a closed shop is, *ceteris paribus*, more likely to have a profit sharing scheme if it has a large proportion of manual employees. This can be construed as a means of reducing manual wage rigidity in the union sector. It could also be viewed as a way of limiting the role of unions in the wage setting

process since, for the most part it is the pay of manual workers which is set by collective bargaining. On the other hand, it seems that any discussion of a 'manualisation' of the wages of non-manual workers via these flexible payment schemes is confined to the non-union sector for profit sharing. In the case of value added, union effects are negative except for larger establishments in the union sector. The negative effect is more pronounced if a lot of financial information is given to establishments with strong unions : this suggests that management are reluctant to introduce schemes if they give information for fear of exploitation of the scheme by unions.

Turning to the total impact of the main variables of interest, namely the union variables, overall weak and strong union effects and associated probabilities calculated from the parsimonious models are reported in Table 3. The results for share ownership and profit sharing are broadly in line with one another : if unions are weak a scheme is more likely to be present. The weak union effects in Table 3 are, for the tax incentive schemes, positive and statistically significant whilst, at the 5% level of significance the strong effects are insignificantly different from zero. A unionised establishment which does not have a closed shop is, *ceteris paribus*, 8.1% or 7.1% more likely to have a share ownership or profit sharing scheme than an otherwise comparable (i.e. with mean characteristics) non-union establishment. The corresponding figures for a strong union are 5.4% and 2.1%.¹² This implies that strong unions may, relative to weaker unions, actually be able to resist the implementation of these two forms of flexible remuneration via their latent threat effect to prevent the realisation of any potential gains.

For value added schemes however both weak and strong union effects are negative and statistically significant. The respective probabilities imply that unionised establishments with and without workers in a closed shop are 8.5% and 5.6% less likely to have a scheme. Thus, manage-

¹² It was suggested to us that these union effects may simply be industry effects. Despite the obvious overparameterisation problems resulting from their inclusion the models were re-estimated including a set of industry dummies to explore this idea. The relevant $\chi^2(8)$ statistics testing their joint significance were 14.83, 19.22 and 4.89 compared to a 5% critical value of 15.50. They made little difference to the union effects and probabilities : the only noticeable change was that the weak union effect in the profit sharing equation was no longer significant at the 5% level but it retained its significance at the 10% level. As a matter of interest the weak union probabilities with industry dummies were 6.9%, 5.9% and -5.1% for share ownership, profit sharing and value added respectively. The corresponding probabilities for strong unions were 5.1%, 1.9% and -7.8%

TABLE 3

| Weak and Strong Union Effects on the Incidence of Flexible Pay Schemes. | | | | | | |
|---|------------------|-------------|------------------|-------------|-------------------|-------------|
| | SHARE OWNERSHIP | | PROFIT SHARING | | VALUE ADDED | |
| | \hat{D} | \hat{P}^* | \hat{D} | \hat{P}^* | \hat{D} | \hat{P}^* |
| Weak Union | 0.418 (0.140) | 0.081 | 0.292 (0.145) | 0.071 | -0.309 (0.132) | -0.056 |
| Strong Union | 0.300 (0.164) | 0.054 | 0.098 (0.168) | 0.021 | -0.540 (0.162) | -0.085 |

Notes

(i) These effects are calculated from the parsimonious models in Table 1 using the methods set out in Section 3.

(ii) Evaluated at weighted means.

(iii) Asymptotic standard errors are in parentheses.

ment in unionised establishments appear to favour share ownership or profit sharing schemes. One possible explanation is that unionised establishments generally belong to large organisations who are simply trying to obtain the tax advantages associated with these two schemes which are not available for value added schemes. This view, whilst perhaps part of the story, is not entirely convincing given the results presented earlier. Firstly, if this were the case one would expect the incidence of the two tax advantage schemes to be explained in a similar way : the evidence in Table 1 that share ownership and profit sharing schemes have a number of different determinants fails to support this notion. Secondly, if unions reduce profitability (as U.S. evidence suggests - no British evidence is yet available) there may be more incentive for management in unionised establishments to introduce schemes linked to financial measures in the hope that negative union profit effects may be at least partially offset. Thirdly, the fact that management are far less tempted to introduce value added schemes in the presence of unions may reflect the experience of the 1950's and 1960's when unions were able to exploit similar schemes, such as payment by results systems, through their ability to regulate effort and to hold on to some degree of control in the workplace due to their role in the collective bargaining process. Thus it appears to be the case that management are reluctant to introduce value added schemes for a fear of (at least partial) loss of control but that they are more confident of obtaining any desirable effects from the other two schemes whilst simultaneously retaining, or even strengthening, workplace control.

5. Conclusions.

This paper uses the nationally representative Workplace Industrial Relations Survey of 1984 to analyse the determinants of flexible payment schemes operating in British establishments. Several interesting findings emerge from the analysis. Unionised establishments are more likely to have share ownership or profit sharing schemes but are less likely to operate value added schemes. In general these schemes are all less likely to be present in the union sector if unions are strong. This reflects the greater credibility of a strong union's threat effect about how it may undermine managerial perceptions of gains accruing from these schemes. It is also evident that different models apply for different schemes since organisation variables are of great importance

to the explanation of the incidence of share ownership schemes, establishment variables are of importance to value added schemes whilst both are of importance for profit sharing.

DATA APPENDIX.

| Descriptions and Weighted Means of Variables. | | | | |
|---|---|-----------------|----------------|-------------|
| | | Weighted Means | | |
| Variable | Description | SHARE OWNERSHIP | PROFIT SHARING | VALUE ADDED |
| O2 | Organisation to which establishment belongs has between 500 and 1999 employees | 0.126 | 0.124 | 0.126 |
| O3 | Organisation to which establishment belongs has between 2000 and 9999 employees | 0.149 | 0.151 | 0.148 |
| O4 | Organisation to which establishment belongs has between 10000 and 49999 employees | 0.106 | 0.110 | 0.106 |
| O5 | Organisation to which establishment belongs has more than 50000 employees | 0.085 | 0.088 | 0.084 |
| FINORGA | (Base group is less than 500 employees) Management gives a lot of information about the financial position of the organisation | 0.262 | 0.260 | 0.261 |
| FINORGL | Management gives a little information about the financial position of the organisation | 0.233 | 0.239 | 0.234 |
| PLC | (Base group is no information) Whether organisation of which the establishment is part is a Limited Company | 0.927 | 0.932 | 0.929 |
| FOREIGN | Whether the organisation of which the establishment is part is partly or wholly foreign owned | 0.097 | 0.099 | 0.097 |
| GROWTH | Proportionate growth in employment in the establishment's operating industry 1980-1984 (Source : Unpublished data from the Department of Employment(DoE) and DoE Gazette, various issues) | -0.043 | -0.044 | -0.043 |
| MPROP | Proportion of employees in the establishment who are manual workers | 0.549 | 0.551 | 0.551 |
| FPROP | Proportion of full time employees in the establishment who are female | 0.276 | 0.281 | 0.276 |

(cont.)

| | | | | |
|-----------|--|-------|-------|-------|
| SFPROP | Proportion of employees in the establishment who are supervisory workers or foremen | 0.049 | 0.050 | 0.049 |
| PPROP | Proportion of part time employees in the establishment | 0.174 | 0.178 | 0.173 |
| EMPA | Whether the establishment is a member of an employer's association | 0.258 | 0.261 | 0.257 |
| JCC | Whether the establishment has a Joint Consultative Committee | 0.275 | 0.280 | 0.275 |
| HEAD | Whether the establishment is a Head Office or other administrative centre | 0.171 | 0.169 | 0.170 |
| DRISE | Whether demand for the establishment's product has been increasing in the previous twelve months | 0.629 | 0.627 | 0.629 |
| PLANT | (Base group is stable or falling demand) Whether plant level bargaining was most important in determining last pay rise | 0.132 | 0.136 | 0.132 |
| 25≤LC <50 | (Base group is company or industry level bargaining) Labour costs as a percentage of sales are 25% or above but below 50% | 0.396 | 0.395 | 0.396 |
| 50≤LC <75 | Labour costs as a percentage of sales are 50% or above but below 75% | 0.199 | 0.205 | 0.199 |
| 75≤LC | Labour costs as a percentage of sales are 75% or above | 0.034 | 0.035 | 0.034 |
| EMPLOY | (Base group is less than 25%) Number of employees in the establishment | 102.2 | 102.1 | 101.9 |
| UNION | Whether the establishment has a manual or non-manual union recognised for bargaining purposes but none of its members are in a closed shop | 0.375 | 0.378 | 0.378 |
| CLOSED | Whether unions are recognised and at least some members are in a closed shop | 0.153 | 0.151 | 0.152 |

References

- Allen,S.G.,1984, Unionised constructors are more productive, *Quarterly Journal of Economics* 99, 251-74.
- Blanchflower,D.G. and A.J.Oswald,1987a, A picture of profit sharing in Britain, mimeo.
- Blanchflower,D.G. and A.J.Oswald,1987b, Shares for employees : a test of their effects, Centre for Labour Economics Discussion Paper No.273.
- Blanchflower,D.G. and A.J.Oswald,1987c, Profit-related pay : Prose discovered, Centre for Labour Economics Discussion Paper No.287.
- Bradley,K. and S.Estrin,1987, Profit sharing in the retail trade sector : the relative performance of the John Lewis Partnership, Centre for Labour Economics Discussion Paper No.279.
- Brown,C. and J.L.Medoff,1978, Trade unions in the production process, *Journal of Political Economy* 86, 355-78.
- Clark,K.B.,1984, Unionisation and firm performance : the impact on profits, growth and productivity, *American Economic Review* 74, 893-919.
- Estrin,S., P.Grout and S.Wadhvani,1987, Profit sharing and employee share ownership, *Economic Policy* 4, 13-62.
- Estrin,S. and N.Wilson,1986, The micro-economic effects of profit sharing : the British experience, Centre for Labour Economics Discussion Paper No. 247.
- Freeman,R.B.,1983, Unionism, price-cost margins and the return to capital, National Bureau of Economic Research Working Paper No.1164.
- Freeman,R.B. and J.L.Medoff,1984, What do unions do ? (Basic Books).
- Karier,T.,1985, Unions and monopoly profits, *Review of Economics and Statistics* 67, 34-42.
- McFadden,D.,1974, Conditional logit analysis of qualitative choice behaviour, in P.Zarembka, ed., *Frontiers in econometrics* (Academic Press : New York and London), 105-42.
- Maddala,G.S.,1983, Limited dependent and qualitative variables in econometrics (Cambridge University Press).
- Mitchell,D.J.B.,1987, The share economy and industrial relations, *Industrial Relations* 26, 1-17.
- Richardson,R. and A.Nejad,1986, Employee share ownership schemes in the U.K. : an evaluation, *British Journal of Industrial Relations* 24, 233-50.
- Salinger,M.A.,1984, Tobin's q, unionisation and the concentration-profits relationship, *Rand Journal of Economics* 15, 159-70.

Stewart,M.B.,1987, Collective bargaining arrangements, closed shops and relative pay, *Economic Journal* 97, 140-56.

Weitzman,M.L.,1984, *The share economy* (Cambridge : Harvard University Press).

Weitzman,M.L.,1985, The simple macroeconomics of profit sharing, *American Economic Review* 75, 937-53.