

# **The Determinants of Pay Levels and Fringe Benefit Provision in Britain**

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Abstract

The ability of trade unions to raise pay levels is well established, but the contraction of the union sector in Britain calls this into question. Analysis of the 1998 Workplace Employee Relations Survey shows that there is still a union premium for some employees covered by collective bargaining and that this effect spills over to other employees in the same workplaces. Employer and workplace characteristics generally have a greater impact on pay than union bargaining. Circumstances where the union effects are strongest are identified. Some similar effects are shown for the provision of fringe benefits.

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## 1 Introduction

Within the last twenty years the British labour market has changed from one where pay-setting was largely a joint affair between employers and trade unions to one where employers mostly act on their own accord. In the era when collective bargaining was the norm, many other employment conditions besides pay were jointly regulated: hours, overtime, holidays and so forth. With the continuous decline in collective bargaining over pay since the 1970s, these are also now more commonly a matter for management decision.

This major shift in the institutional structures through which pay and other employment conditions are determined raises a number of questions that research can usefully address. In the past, much work focused upon the size of the ‘union wage premium’, but in current circumstances it seems more relevant to look more broadly at the structures and processes by which employers set the pay and other conditions of their employees. It may be that trade unions still have an important role for the minority of employees that they represent. Or perhaps other forms of employee ‘voice’ have become salient? And what can be said about how other employment terms are settled?

In this paper we have three aims:

- to describe the main features of the structures and processes of pay-setting in Britain,
- to examine the impact of these structures and processes upon the levels of pay that employees receive, and
- to see whether similar effects occur in relation to other terms of employment.

The layout of the paper is as follows. In Section 2 we briefly outline some of the theoretical starting points for examining how pay is determined and how differences in pay levels emerge. In Section 3 we outline some of the major features and recent developments in the British economy which may have a bearing on these matters. Section 4 discusses the large-scale survey datasets that provide the foundation for our empirical work and in Section 5 we use these to describe the structures of pay determination in Britain.<sup>1</sup> After some brief description in Section 6 we present the analysis of the determinants of pay levels, separately for the private and public sectors. Fringe benefits are examined in Section 7 and some conclusions drawn in Section 8.

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<sup>1</sup> In a separate paper we describe the current processes of pay determination and examine their impact on the size of recent pay settlements (Forth and Millward, 2000b).

## 2 Theories of pay determination<sup>2</sup>

Empirical studies of pay can draw on theoretical insights from across the social sciences. No single perspective has an over-riding claim to virtue and our approach is to draw from any framework that appears to have something useful to say about pay and how it might be related to other variables that exist in or can be derived from or added to the dataset we are using. We review them briefly here, focusing on the elements of the theory that relate to employers' behaviour and the effect that employees may have on the outcome, their current level of pay. The discussion serves to identify a range of factors that should play a role in our empirical analysis.

### *Neo-classical labour market theory*

A conventional starting point in economics is the neo-classical model of the labour market. Faced with a supply of workers willing to be employed (each with their own preferences which determine how much labour they are willing to supply at given wage levels), the employer (normally a 'firm') decides how many and which types of workers to employ at wage levels at which it can trade profitably in its chosen product market. For a given type of labour the firm will hire workers until the wage it has to pay the next potential worker becomes unprofitable. Workers will offer themselves for employment until the next potential recruit considers the wage an insufficient inducement to do the job. Under perfect competition these processes produce a single equilibrium wage where supply and demand are equal. In this situation the wage is 'determined by the market' and all the firm can do in the short term to maximise profits is to hire increasing numbers of workers up to the point where their wage is equal to the value of the marginal product of labour – the additional added value the firm gains from its least productive worker. For any given type of worker the theory assumes that a uniform wage is offered. The theory predicts higher wages for workers who are temporarily in short supply.

Neo-classical labour market theory also predicts higher wages for workers with higher 'marginal product' but says little about what generates the higher marginal product. There is a broad notion of 'skill' which implicitly equates with it in many instances. This leads to the prediction that employees with greater educational qualifications, longer periods of vocational training and shorter periods of unemployment or inactivity (when skills might deteriorate) will have higher wages than those who lack them. Another strand of economics, human capital theory, sheds some light on the notion of skill. It sees workers, or potential workers, as making investments in education and training in the expectation that they will raise their value in the labour market (because they can make higher-value inputs to the firm). Differences in ability, motivation and willingness to forego current income while undergoing training each put limits on the numbers of people acquiring any given level of 'skill'. This leads to the prediction of a wage hierarchy that closely corresponds with educational and training investments.

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<sup>2</sup> Besides works explicitly referenced, this section draws on a number of labour economics textbooks such as Borjas (1996) and the more specialised volume on the economics of trade unions by Booth (1995).

### *Imperfectly competitive labour and product markets*

Relaxing the assumption of perfect competition leads to different predictions. In the case where the firm is a labour-market monopsonist (the only employer in an isolated labour market), the theory of discriminating monopsony predicts that workers will receive only their 'reservation wage' if the firm chooses to pay different workers different amounts; where a uniform wage is paid, the overall level of labour demand will be lower than in a competitive market and the wage will be less than the value of the worker's marginal product. A variant of this static model is the dynamic monopsony model of Burdett and Mortensen (1989), adduced as a possible explanation for the commonly observed correlation between wages and size of firm. This model also assumes that firms are not price-takers in the labour market and so have some choice about the wage levels they set. Those that pay higher wages have lower quit rates and find recruitment easier and less costly, enabling them to expand. The model has a unique equilibrium in a state where firms are distributed through a range of sizes and there is a positive relationship between wages and firm size. From this Green et al. (1996) derive the proposition that the employer-size wage effect will be greatest in segments of the labour market that are more monopsonistic. They infer that if trade unions reduce the equilibrium level of profits there will be a weaker employer-size wage effect in the union sector.

In the case where the firm is a monopolist or near-monopolist in its product market, the 'excess profit' or surplus gives the firm the freedom to pay above the wage that would be determined by the market in the case of perfect competition. The monopolistic firm may choose to pay higher wages for its own reasons<sup>3</sup> (thus modifying its profit-maximising objective) or it may be induced to do so by a trade union representing all or some of its employees. In this situation of bi-lateral monopoly, where both the firm and the trade union have some degree of monopoly power, neither wages nor the level of labour demand are precisely determined by the market and the actual levels of wages and employment are both set as a result of bargaining. In prescribed circumstances this is economically efficient in the sense that one party can be better off without making the other party worse off, hence the label 'efficient bargaining model'. In the 'right-to-manage' variant of the bilateral monopoly model, the firm chooses the level of employment and the bargaining is concentrated on the wage level, generating a prediction of higher wages than would occur in the case of perfect competition. It also predicts that the extra wage arising from the union's bargaining activity increases with the power or strength of the union, generally conceived as being its ability to impose costs on the employer through strikes and other sanctions.

Other models stemming from the union bargaining model include various seniority models and 'insider-outsider theory'. In most seniority models the union's majority voting procedure is assumed to produce bargaining preferences that reflect the utilities of the median member in terms of seniority. This leads to a neglect of the interests of the least senior workers who are most vulnerable to dismissal; union-employer bargaining determines the wage while the employer determines the level of employment. The model

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<sup>3</sup> For example, sacrificing profits for growth, since directors' pay is related to firm size in the real world.

predicts a wage that is correlated with profits, the two not causally related but determined simultaneously (Carruth and Oswald, 1989). Other 'median voter' models take other differences besides seniority as generating the union's bargaining objectives: age and gender differences produce varying preferences for fringe benefits that are age or gender related.

In 'insider-outsider' models, which may or may not involve a trade union, the costs of labour turnover to the firm give insiders some market power and the ability to capture some of the firm's surplus. While primarily aimed at explaining the persistence of unemployment, the model also emphasises the indeterminacy of wages, the resulting discretion that employers have in setting wages and the possibility that workers (notably the more skilled or those represented by unions) might capture some of the surplus in terms of higher wages.

### ***Efficiency wage theory***

A separate line of development from neo-classical labour market theory is 'efficiency wage theory'.<sup>4</sup> This also abandons the conception of the spot market with a single wage for a given type of labour and acknowledges that employers can choose different wage levels to elicit different levels of effort. Some firms pay above the competitive market rate, perhaps because monitoring the worker's output is difficult, as in larger workplaces, or because replacement costs are high, while others do not. The higher pay adduces higher levels of effort and greater loyalty to the firm, thus reducing turnover. Thus higher pay will be observed where labour turnover rates are lower.

Out of efficiency wage theory has developed the theory of dual or segmented labour markets. This, at its simplest, proposes a primary sector where a worker's effort is hard to measure and monitoring is costly, plus a secondary sector where output is measurable and supervision easy. In the primary sector, firms offer high wages, good working conditions, secure employment and promotion opportunities and in return obtain higher levels of labour productivity. In the secondary sector firms offer low wages, poor conditions, insecure employment and little chance of promotion and they obtain lower levels of productivity. The ability of workers to transfer from the secondary to the primary sector is limited by their record of working in the secondary sector and by the closed 'internal labour markets' of firms in the primary sector. It is reinforced by employers' lower valuations of work that is generally done by secondary workers. One predicted outcome of the model is that workers in the primary sector are paid on age-related scales as a long-term work incentive.

Segmentation theory generates the hypothesis that secondary workers will receive lower wages if they are mostly working alongside other secondary workers. Hence job segregation by gender, family position, age, ethnicity and so on will depress wages for the generally disadvantaged group. The 'crowding' of secondary workers into a restricted set of jobs can be observed at various levels – 'job groups' within a workplace, the

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<sup>4</sup> This is discussed at length in Akerlof and Yellen (1986).

workplace itself, occupation and industry. Each of these forms of segmentation could contribute to the lower wage levels of secondary workers.

### ***Principal agent theory***

A rather different starting point to theorising about pay determination comes from principal-agent theory. This sees the employment contract as an incomplete contract between employer (principal) and worker (agent), with uncertainty about the precise nature of the tasks to be performed and provision for future contingencies. The goals of employer and worker are assumed to diverge, principally over the level of worker effort. Where effort and output are closely connected (as in simple repetitive jobs which produce complete units of output), performance-related pay is likely to be an element of the contract offered by the employer. Where output is unmeasurable, time rates are likely to predominate. However, the 'transaction costs' associated with tailoring individual employment contracts to individual employees, plus the costs of monitoring output, may outweigh the benefits for the employer of differentiating contracts and so standardised contracts, including uniform wage rates, will be used. According to Brown et al. (1998) the standardisation of contracts, including uniform wage or salary levels, within a firm is most likely for whole occupational groups, the critical factor being the homogeneity of jobs. This provides another rationale for expecting differences in pay levels between occupational groups.

A further feature of principal-agent theory is its recognition that employees may bring social norms to bear upon the terms of the contract. Some social norms, such as the notion of a fair 'rate for the job' and an equal division of group bonuses, will create pressure for uniform pay within a firm or workplace for similar jobs. Indeed, employers frequently harness employees' notions of fairness to produce an internal wage structure that is acceptable to existing employees, using the technique of job evaluation. Its value to the employer is that, 'in a bargaining setting so common in labour market exchanges, it is a relatively inexpensive method of arriving at agreeable prices ... removing from the province of bargaining the potentially factious issue of wage differentials within an organisation' (Pencavel, 1991).

### ***Equity theory***

The application of norms of fairness through job evaluation formalises the predictions of equity theory, emanating from social psychology. Here the 'target relationship' sought by individuals is equality between their own reward per unit of input (effort, investment) and their cognition of others' rewards per unit of input. Naturally, only some 'others' are seen as salient in these comparisons and these are most likely to be in the same work-group, workplace or firm (Brown et al., 1998). However, employers have little influence over which other individuals their employees choose as salient 'others' in their equity assessments, so they may include similar workers in the external labour market. Such comparisons are particularly likely to be brought to bear in union bargaining. And when the union is dominated by less skilled employees, as with general rather than craft unions,

the pressure from the union is generally to favour the lower paid and to compress wage differentials among covered workers.

The crystallisation of social norms through job evaluation also has a bearing on the occupational wage structure. The ‘inputs’ that form components of the equity calculation are variously defined in different occupations. In manual occupations it is common to prioritise physical effort, dexterity and skill in using tools and machines, whereas in non-manual occupations greater priority is accorded to literacy, communication, information processing, responsibility and so on. There is a broad correspondence between the ‘inputs’ forming the foundation of social norms of equity and the ‘investments’ that increase human capital. This supports the notion that wage levels are related to different levels of skill, education and training.<sup>5</sup> The pay premium for supervisory and managerial jobs, compared with workers they supervise, also rests upon a widely-held norm that responsibility for other peoples’ work should be rewarded.

### *Compensating wage differentials*

Social norms about work inputs also extend to deprivations which the worker has to suffer in the course of the job. Poor working conditions such as excessive dust, noise, physical discomfort and risk of injury may be regarded as requiring ‘compensating differentials’, as are working hours that impinge on leisure or domestic activities (night-shift-working and very long hours, for example).<sup>6</sup> Where an employer cannot attract a supply of workers who attach little importance to these deprivations, a higher equilibrium wage is predicted. Similarly, jobs that provide other ‘amenities’ besides pay (fringe benefits, pleasant working conditions) are predicted to pay a lower wage in a competitive labour market. This, of course, is at odds with dual labour market or segmentation theory, which predicts that better conditions and higher pay go hand in hand.

The theory of compensating differentials can be extended to encompass discrimination on grounds of race, gender and so on. It sees an employer’s prejudice against one type of worker as ‘taste discrimination’, involving a disutility from hiring such workers. For equilibrium to be attained, the labour market has to generate compensating differentials to ‘compensate’ prejudiced employers for their disutility in hiring the workers they dislike. Thus the preferred workers have higher wages than the disliked workers. However, discrimination by workers about who they work with does not, according to the theory, contribute to wage differentials.

Finally, we should note that much of the economic theory of wage determination rests on the assumption of a profit-maximising employer, whether in competitive or non-competitive markets. This clearly is either irrelevant or in need of major modification when dealing with the public sector. Here the employer’s ‘objective function’ is more

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<sup>5</sup> Empirical support for this assertion is given in Ashton et al. (2000).

<sup>6</sup> Some of these factors are associated with workplace size; hence a predicted association between workplace size and pay levels.



difficult to discern and may contain budgetary constraints, manpower targets, and ‘good employer’ policies that impact on wage levels. Public perceptions of the value of public sector workers may also have an impact upon the level of their wages. These considerations are not the stuff of simple analytical models. We should also note that where theory addresses the possibility of trade unions playing a role in wage determination it generally does so on the simplistic assumption that employers are either in a ‘union’ or ‘non-union’ sector. Pencavel (1991) is rare among economists in seeking to theorise about the interactions between unionised and non-unionised markets, but offers little in the way of a testable model. Another restriction on realistic theorising is the assumption, probably in part reflecting the constraints imposed by US labour laws, that employers are either ‘union’ or ‘non-union’ in the sense that whole firms are either covered by union bargaining or they are not. This, as we shall see in later sections, is particularly inappropriate in Britain.

What, then, has this brief review of the various theories of pay determination suggested in terms of factors to include in our analysis? The following list was the starting point for our empirical work.

- occupation, skill levels, qualifications and training
- occupational shortages and ease of replacement
- time out of employment
- size of workplace and organisation
- number of product market competitors
- union strength (membership density, recognition, presence of representatives, bargaining scope, rights of accompaniment and appeal in procedures)
- profitability or financial performance
- primary job characteristics (employment security, pensions or sick pay)
- age-related or service-related pay
- gender and race concentration at workgroup, workplace, occupation or industry levels
- union coverage in terms of vertical range of occupations
- unpleasant conditions (indicated by illness rate, compulsory long hours, injury rates, shift working)

The actual variables used in the analysis that represent these factors are described in Appendix A.

### **3 The context of pay setting**

The various theoretical starting points outlined above are not novel and many have informed empirical work for years if not decades. Important features of the economy and the world of work have changed since the theories gained currency and we therefore briefly review some of those changes to inform our choice of analytical variables later in the paper.

In the late 1990s a number of features of the British labour market that had particular relevance to pay setting were either unusual or especially noteworthy. Most fundamental,

perhaps, was the lack of legal regulation of pay levels. There was no statutory incomes policy in force, as there had been for much of the early post-war period; and statutory minimum wage regulation by Wages Councils had been abolished a few years before the end of the decade in every industrial sector except agriculture. This lack of legal regulation, plus the demise of collective bargaining which we outline below, meant that managements in the late 1990s had almost unprecedented freedom with respect to the setting of employees' pay levels. The introduction of the statutory national minimum wage at the end of the decade curtailed this freedom with respect to the very lowest paid workers, but in broad terms the picture remained one of non-interference by the state in the setting of pay.

Many employers were, however, constrained in their pay-setting behaviour by existing and mostly long-standing voluntary agreements to regulate pay jointly with trade unions. To describe the extent of such arrangements, and changes in it, we draw on a recently published analysis of the Workplace Industrial Relations Survey series (Millward et al., 2000:184-212). That analysis uses nationally representative survey data covering workplaces throughout the economy with 25 or more employees (employing around 70 per cent of employees in employment) with the most recent survey being in 1998. In it, workplaces were classified according to the dominant mode of pay setting, that is the arrangement applying to the majority of the workforce at each establishment, from management information about how the pay of each occupational group was determined.<sup>7</sup> It showed that collective bargaining between employers and trade unions was the dominant mode of pay setting in only 29 per cent of workplaces in 1998, compared with 60 per cent in 1984. In most workplaces in 1998, the majority of employees had their pay set by management. Collective bargaining remained the norm in the public sector, with 63 per cent of workplaces having this as their main method of pay setting, down from 94 per cent in 1984. In the private sector only 16 per cent of workplaces had collective bargaining for most employees, a dramatic fall from 41 per cent in 1984. The extent of bargaining declined in virtually every industry and type of workplace.

Translating these results into figures for employees, only 40 per cent of employees covered by the surveys in 1998 had their pay set by collective bargaining, compared with 70 per cent in the mid 1980s.

There were equally stark changes in the locus of collective bargaining. In the period up to the early 1980s multi-employer agreements were widespread and employers' associations took an active part in negotiating wages. This had all changed by 1998, with multi-employer bargaining becoming less common than single-employer bargaining (at company or workplace level) and employers' associations having little role to play in setting wage levels. Multi-employer bargaining was the main arrangement in only 3 per cent of private sector services workplaces and 6 per cent of those in manufacturing, a precipitous fall from earlier times.

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<sup>7</sup> Further detail on the data used for this characterisation of workplaces is given in Section 4.

Another feature of collective bargaining structures, where they remained in place, was their simplicity compared with those of earlier periods. Representation and bargaining arrangements in Britain have until recent years commonly involved several, or even many, unions in a workplace or organisation, often negotiating for different groups of employees in separate negotiations. But in 1998 ‘single-table bargaining’ was clearly the most common arrangement, occurring in over three quarters (77 per cent) of workplaces where collective bargaining was the main method of pay setting, compared with only two fifths (40 per cent) in 1990 and fewer in earlier years (Millward et al., 2000: 203-4). In the private sector in 1998, 87 per cent of workplaces where collective bargaining affected the majority of employees had single-table bargaining, a massive increase since the 1980s.

The above description of the shrinking structures of collective pay determination has a further nuance. While trade unions may in the past have secured an agreement with an employer to negotiate the pay and conditions of a group of employees, the current reality may be that the negotiations are merely a device for legitimating, to the employees represented, the new level of pay that the employer wished to implement. In earlier work (Millward et al., 2000:159-167) we drew attention to the substantial number of workplaces (some 14 per cent in 1998) where unions were formally recognised by management for negotiating pay, but where the most recent pay review had not been negotiated with the ‘recognised’ unions; such instances were virtually non-existent in earlier years. It is for that reason that our description of pay determination structures here has not been based upon the extent of union recognition but upon the detailed management reports of the extent to which specified occupational groups were affected by collective bargaining.<sup>8</sup> However, the possibility remains, in cases where collective bargaining was reported, that the most recent pay review did not involve real negotiations with union representatives but something less influential, such as mere consultation. We address this question in a companion paper (Forth and Millward, 2000b) where we examine the more detailed information about recent pay settlements. Since comparable information is not available for earlier periods we merely note here the likelihood that the general weakening of the trade union movement in terms of membership, recognition and a wide range of other indicators suggests that situations where unions have little impact on the size of pay settlements to which they are formally a party is likely to have increased.

The decline of collective bargaining had indirect as well as direct effects. Pay settlements in essentially non-union workplaces (those where the majority of employees did not have their pay settled by collective bargaining) became even less likely to be influenced by linkages or comparisons with increases that were negotiated or implemented elsewhere. Economic conditions and the financial performance of the workplace or firm became much more salient to pay settlements (Millward et al., 2000:208-11).

So much for the extent and influence of the institutional structures which had dominated the British labour market in earlier decades, but now still do so in only a few distinct

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<sup>8</sup> The matter is further discussed in Bryson and Wilkinson (2001).

sectors. But what of other conditions that might have an impact on pay setting arrangements and pay levels, as suggested by the various theories noted in the previous section?

First, let us take measures of product market competition.<sup>9</sup> In the private sector, increasing numbers of workplaces served product markets with many competitors: according to workplace managers the proportion having more than five competitors in their main product market increased from 58 per cent in 1984 to 64 per cent in 1998.<sup>10</sup> A similar trend is evident in terms of the increasing internationalisation of product markets. The proportion of workplace managers saying that their main product market was international (rather than local, regional or national) rose from 18 per cent in 1984 to 23 per cent in 1998. A further indicator of the internationalisation of industry and commerce is the extent of foreign ownership in Britain. At workplace level this increased from 6 to 13 per cent of private sector establishments over the period 1980 to 1998, with similar rates of increase in service industries and manufacturing (Millward et al., 2000:32-4).

While the foregoing evidence points to some increase in the degree of competition in the product markets served by industry and commerce, there are perhaps clearer indications of changes in the degree of competition in the labour market. Overall unemployment in 1998 stood at its lowest level for nearly 20 years after substantial rises in the early 1980s and 1990s. Regional differences became accentuated, at least in the late 1990s: the unemployment rate in the most favoured region (the South East, excluding London) was only 36 per cent of the rate in the least favoured region (the North East of England) in 1998, compared with 53 per cent of it in 1995.<sup>11</sup> Occupational differences in labour demand were very substantial, remaining much as they were in the early 1990s, however. In 1998 professional workers had an unemployment rate only 18 per cent of the rate for unskilled workers, little changed from the comparable figure for 1992.<sup>12</sup>

Several of the theories mentioned in Section 2 imply a relationship between pay levels and workplace size or the size of the enterprise. If the distribution of workplaces by size had changed radically in recent years we might modify the emphasis given to workplace size as an explanatory variable in modelling wage levels at the present time. In fact, in so far as there are comparable data over time, there is little evidence that the size distribution of workplaces has changed in the economy as a whole. The evidence from the WIRS series shows no detectable change in the size distribution of workplaces between 1980 and 1998, when workplaces with 25 or more employees are considered (Millward et al.,

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<sup>9</sup> Unfortunately, there are no official government statistical sources that cover the whole of the private sector, or the whole of industry and commerce, that provide a satisfactory time series on these matters.

<sup>10</sup> Authors' calculations from the Workplace Industrial Relations Survey, 1984, and Workplace Employee Relations Survey, 1998.

<sup>11</sup> Based on regional rates of unemployment derived from claimant counts given in *Labour Market Trends*. Comparable earlier figures are not available.

<sup>12</sup> Based upon unemployment rates (ILO definition) by previous occupation for the United Kingdom, derived from the relevant Labour Force Surveys, reported in *Labour Market Trends*. Comparable earlier figures are not available.

2000:25-30). If the overall size distribution did change over this period it must have been in the lower end of the distribution (less than 25 employees) not covered by the WIRS series. There were, however, changes within sectors. Broadly speaking, manufacturing workplaces became smaller. By contrast, private service sector workplaces became larger, as well as constituting a larger portion of the economy. Nevertheless, the size distribution of both workplaces and organisations remain highly skewed, with a high proportion of all employees working in larger workplaces and organisations.<sup>13</sup> If workplace or employer size affected wage levels in the past – through monopsony effects, compensating differentials, efficiency wages or whatever – we should still expect it to do so now.

A feature of employing organisations that has clearly changed over recent decades is the extent of foreign ownership, as noted earlier. No single theory of wage determination assigns a critical role to foreign ownership, but if (for example) foreign firms have greater available economic rents, or pay high wages as part of a union exclusion strategy, then the case for including this characteristic in our analysis is at least as strong now as in earlier times.

Broadly speaking, however, the greatest area of change in Britain in recent decades that is likely to have had an impact on pay is the severe contraction of trade union representation, particularly in the private sector. A demonstrable union wage premium was evident in the 1980s and still evident in 1990, although of small magnitude (Stewart, 1995). In particular circumstances where unions were powerful and product market rents were available, the wage for unionised workers was substantially higher than elsewhere. It is clear that union representation dwindled in extent over the whole period and, on balance, that union strength diminished in workplaces where they still had a presence (Millward et al., 2000). Since the balance of evidence also points to increases in product market competition, and hence a diminished availability of product market rents, the combination of circumstances generating the substantial union wage premia observed in the early 1980s may well have become rarer as the 1980s and 1990s progressed. Thus a central question for our empirical analysis is whether unions, by 1998, continued to raise the pay of the workers they represented.

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<sup>13</sup> Consistent time-series data on the size of employing organisations across the whole economy are not available for Britain. Employment concentration statistics for production industries were available from official government sources until 1992, but were then discontinued. There is, however, some evidence from the WIRS series that more workplaces in 1998 were independent of any larger organisation and, given that larger organisations generally have multiple sites, more employees are now working for smaller organisations than was previously the case (Millward et al, 2000:30-32).

## 4 Data and Methods

### *Data sources*

In the remainder of the paper, we examine current pay-setting arrangements and wage levels in Britain using the Workplace Employee Relations Survey of 1998 (Department of Trade and Industry, 1999), hereafter referred to as WERS98.<sup>14</sup> This nationally representative sample survey of workplaces with 10 or more employees covered all sectors except agriculture and coal-mining and included both private and publicly-owned establishments. With appropriate weighting to compensate for the complex sampling design, these survey results can be generalised with confidence to the population of workplaces in Great Britain employing 10 or more employees in 1998. These 340,000 or so establishments employed roughly 18.6 million employees, 82 per cent of employees in England, Scotland and Wales.<sup>15</sup>

We use two linked elements of the 1998 survey for our analysis of pay levels. One is the management interview, carried out face-to-face with the most senior workplace manager responsible for personnel or employee relations; a mandatory pre-interview self-completion questionnaire obtained further information that might require recourse to records. Interviews were conducted in 2191 workplaces between October 1997 and June 1998 with a response rate of 80.4 per cent. Most of the questioning was about the workplace as a whole.<sup>16</sup> However, for some practices where intra-establishment variation was anticipated, there was more focused questioning about up to nine occupational groups. Questions about the determination of pay were treated in this way. Other questions were asked about only the largest occupational group, including details of their most recent pay settlement, the subject of a companion paper.<sup>17</sup>

The other main element of the survey used here was the Survey of Employees, administered within workplaces where a management interview had been achieved. This short, anonymous self-completion questionnaire was distributed to a simple random sample of 25 employees (or all employees in workplaces having 10-24) in the 1880 cases (85 per cent) where management permitted it; of the 44,283 questionnaires distributed

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<sup>14</sup> The survey was funded by the Department of Trade and Industry, the Economic and Social Research Council, the Advisory, Conciliation and Arbitration Service and the Policy Studies Institute (from funds provided by the Leverhulme Trust). The survey datasets are available from The Data Archive, University of Essex, UK.

<sup>15</sup> Calculated from employees' reports of the size of their workplace in the 1998 Labour Force Survey, with minor adjustments for indefinite responses and the inclusion of workplaces with 10 employees in the lowest size band in the LFS but not in WERS98.

<sup>16</sup> The pre-interview self-completion questionnaire included a question on the establishment's overall distribution of gross annual earnings for full-time employees, separately for men and women. These data are not analysed in this paper.

<sup>17</sup> Forth and Millward, 2000b.

28,237 (64 per cent) usable ones were returned.<sup>18</sup> With some corrective weighting for non-response bias, these data are thought to be representative of the population of employees in Great Britain employed in all but the very smallest workplaces.

The WERS98 Survey of Employees contained a detailed question asking respondents how much they were 'paid for their job at [the sampled workplace] before tax and other deductions were taken out'. They responded by ticking one of twelve boxes corresponding to bands of weekly pay.<sup>19</sup> The results have a very low item non-response rate (1 per cent) and correspond plausibly with the distribution of gross weekly pay given by the 1998 New Earnings Survey.<sup>20</sup> The WERS98 Survey of Employees wage data thus provide a sound dependent variable for the statistical modelling of gross weekly pay. A question on usual weekly hours enables us to transform this into gross hourly pay, as discussed below, and there are further questions on overtime hours, payment for overtime hours and a number of fringe benefits.

The employee survey also contains information on the personal characteristics of the employee, their family situation, the nature of their job, their recent work experience and their relationships with supervisors and management. These provide sufficient data for the main human capital control variables required for modelling differences in hourly earnings, as well a number of important potential explanatory variables.

The management interview data, to which each employee can be linked via unique workplace identifiers, provide a rich source of further control and explanatory variables. Some of these refer directly to the occupational group to which the employee belongs (sometimes only for the largest occupational group at the workplace) while others are

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<sup>18</sup> Unlike the main management interview data, where sample non-response bias was not detected, the employee survey did exhibit non-response bias. A logistic regression model identified certain industries and sizes of workplace and a number individual employee characteristics as significant predictors of non-response. The weighting scheme developed, and used in this paper, compensates for these biases (Airey et al., 1999).

<sup>19</sup> The bands of weekly gross pay, based upon the overall distribution of gross weekly earnings given by the most recent New Earnings Survey, were as follows: less than £50, £51-80, £81-140, £141-180, £181-220, £221-260, £261-310, £311-360, £361-430, £431-540, £541-680, £681 or more. Equivalent amounts of annual gross pay were given in parenthesis. The following guidance was also given, "If your pay changes before tax from week to week because of overtime, or because you work different hours each week, think about what you earn on average." By implication, variable pay arising from bonuses or commission was to be treated similarly.

<sup>20</sup> The New Earnings Survey covers employees in workplaces as small as 1 employee. However, excludes significant numbers of part-time employees with low weekly earnings (predominantly women) and is also subject to sampling errors. The NES distribution of weekly pay for employees (male and female) is based on adult rates of pay for those whose pay for the survey pay-period was not affected by absence. It was compiled from Tables F15 and F16 (Office of National Statistics, 1999). The pay period for the survey was generally March or April 1998, compared with a median interview date of February 1998 for WERS98. Comparisons between the WERS and NES hourly pay distributions are not made because the NES only records paid hours, whereas WERS records all hours worked, whether paid or unpaid.

general to the workplace as a whole (often the non-managerial workforce as a whole). In broad terms, there are some data that can be used to capture variables relevant to each of the main theories of wage determination. However, the particular strength of the WERS data, compared with all other national datasets that include pay, is the detail they contain on the structures and processes of pay determination.<sup>21</sup>

### *Methods of analysis*

The statistical modelling of pay levels reported in Section 6 was carried out using the survey estimation procedures in Stata, version 6 (StataCorp, 1999a). These procedures employ a robust variance estimator and make allowance, when calculating point estimates and standard errors, for the complex sample structure (multi-stage with clustering at the lowest level) that the employee survey of WERS98 entailed. The form of estimation is interval regression, a generalisation of the tobit model for censored data, initially developed by Stewart (1983) for the banded earnings data in a predecessor of the survey dataset used here.<sup>22</sup>

Since the observations include employees whose hours of work vary from under 10 to over 60 hours per week, it is clear that any associations could be strongly influenced by differences in hours worked. In our view, hourly pay is the preferred dependent variable, since it more closely reflects the marginal product of labour and the employee's return to effort. But simply putting an hours variable into a weekly wage equation is unsatisfactory because some employees simultaneously decide how many hours they will work and whether they will accept a job at a specified rate of pay. We avoid this problem, as have many analysts in the past, by converting the dependent variable into one of gross hourly pay. The WERS98 weekly earnings data are banded and so dividing by the total number of hours worked per week (including overtime and extra hours) gives a banded variable for hourly pay. The resulting variable can be treated in the same way as the weekly pay variable, even though the bands vary across observations. See Appendix B for details of the estimation methodology.

Before reporting these analyses, however, we provide a descriptive account of the institutional structures of pay determination that is uniquely available from WERS98.<sup>23</sup> It is drawn almost entirely from the reports of managers, since the lengthy face-to-face interview with managers was considered a far more appropriate instrument for collecting

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<sup>21</sup> The main drawbacks of the WERS98 employee survey data, compared with the best of alternative British datasets on individuals, are: the exclusion of employees in the very smallest workplaces; the lack of detailed job descriptions or occupational coding; and the lack of work history data.

<sup>22</sup> The Stata procedures are based on the method of maximum likelihood, rather than Stewart's ordinary least squares approximation.

<sup>23</sup> A very brief account of some these data was given in the WERS98 sourcebook (Cully et al., 1999: 106-9). That account was restricted to workplaces with 25 or more employees. Here we use the full dataset including workplaces with 10-24 employees.



such data than the brief self-completion questionnaire given to employees.<sup>24</sup> Where possible our account refers to the proportions of employees affected by particular arrangements, based on aggregating more detailed information about the various occupational groups present at each workplace. Often, however, the questions were more general and it is unreasonable to assume that all employees in the workplace were covered by the feature in question. In such circumstances our account is based upon the proportions of workplaces, rather than employees.

## **5 The current structure of pay determination**

We begin by looking at the prevalence of different forms of pay determination across the economy. This discussion includes an examination of the extent of the unionised and non-unionised sectors and of the degree to which unionised and non-unionised pay setting arrangements coexist at workplace level. We then go on to look in more detail at the form of unionised and non-unionised arrangements. Throughout, distinctions are drawn between pay setting arrangements in the private and public sectors and, within the private sector, between establishments engaged in manufacturing and service activities.<sup>25</sup>

### *The incidence of pay determination arrangements among employees*

WERS98 collected information on the way in which pay was set for each of the nine broad occupational groups in an establishment by presenting the management respondent with a list of seven alternative forms of pay determination and asking them to choose the method that “most closely characterises the way that pay is set” for members of each group. The results are presented in Table 1, having calculated the total proportion of employees to which each arrangement applied.

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<sup>24</sup> In a linked survey of worker representatives a few questions about pay determination were also asked in WERS98. The most senior representative of the largest recognised trade union at a workplace was interviewed. The data are referred to later, where relevant.

<sup>25</sup> Private sector manufacturing accounted for 13 per cent of all establishments with 10 or more employees in 1998, and for 22 per cent of all employees working in such establishments. Private sector services accounted for 62 per cent of establishments and 47 per cent of employees. The public sector accounted for the remaining 25 per cent of establishments and the remaining 30 per cent of employees.

**Table 1 Incidence of pay determination arrangements amongst employees, by sector of ownership, 1998**

Column percents

	All establishments	Private sector		Public sector	
		All	Manufacturing		Services
Proportion of employees whose pay was determined by:					
<b>Collective bargaining</b>	<b>42</b>	<b>30</b>	<b>47</b>	<b>22</b>	<b>68</b>
<i>Level of negotiations:</i>					
Multi-employer	16	5	5	5	42
Single-employer	17	16	19	14	21
Workplace-level	8	10	23	4	5
<b>Not collective bargaining</b>	<b>58</b>	<b>70</b>	<b>53</b>	<b>78</b>	<b>32</b>
<i>Level of decision-making:</i>					
External to organization	7	..	..	..	22
Management at higher level in organization	18	23	11	29	6
Management at workplace level	28	39	39	39	3
Level not known	3	4	2	6	..
Negotiation with individual	3	4	2	4	*
<i>Weighted base (workplaces)</i>	<i>2109</i>	<i>1590</i>	<i>272</i>	<i>1318</i>	<i>519</i>
<i>Unweighted base (workplaces)</i>	<i>2087</i>	<i>1453</i>	<i>284</i>	<i>1169</i>	<i>634</i>

Base: employees in establishments with 10 or more employees.

Bases given at foot of table refer to numbers of establishments used in calculation of employee-weighted figures.

Table 1 shows that, in 1998, the pay of around two fifths (42 per cent) of all employees in establishments with 10 or more workers was determined by negotiation between managers and trade unions. Three in ten private sector employees (30 per cent) were covered by such a process of collective bargaining, although the proportion was much higher in manufacturing (47 per cent) than in services (22 per cent). Collective bargaining coverage was considerably higher - at 68 per cent - in the public sector. For most other employees, changes in their basic pay were ultimately determined on a unilateral basis by their employer although, in a number of public sector occupations such as teaching and

nursing, this decision was often made by central government following recommendations from pay review bodies.<sup>26</sup>

As well as being less commonly subject to collective agreement, the determination of private sector pay at the end of the 1990s was also much less centralised than in the public sector. Indeed, the most common type of pay setting arrangement amongst private sector employees was for their pay to be determined unilaterally by management at their own workplace. Two fifths (39 per cent) of private sector employees had their pay set in this way (Table 1). Almost one quarter (23 per cent) had their pay set unilaterally by management at a higher level in their organization – a common arrangement in the service sector - whilst one in six (16 per cent) were covered by single-employer collective bargaining. A further tenth were covered by collective bargaining at their own workplace – a practice distinctly more prevalent in manufacturing than services. Finally, multi-employer collective bargaining and individual negotiations each set the pay of around one in twenty private sector employees.

In stark contrast to the private sector, multi-employer collective bargaining was the most common arrangement among public sector employees: 42 per cent of all public sector workers had their pay set in this way, representing almost two thirds of those covered by collective bargaining. Single-employer bargaining and extra-organizational arrangements (such as pay review bodies) each accounted for around one fifth of employees; workplace-level bargaining and unilateral determination by management at a higher level in the organization each accounted for around one in twenty.

### ***The combinations of pay determination arrangements found within workplaces***

Although Table 1 shows that there is much variety in the way that the pay is set, the fact that particular methods of pay determination are more prevalent in certain sectors clearly suggests that the type of arrangement used to set an employee's pay is principally governed by the nature of their workplace rather than their job. In fact, there is a great degree of homogeneity across occupations within the same workplace. In 1998, around two thirds (68 per cent) of workplaces used the same type of arrangement to set pay for all occupational groups present at the establishment.<sup>27</sup> In most other cases (28 per cent), only two different methods were used. Private service sector workplaces were the most

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<sup>26</sup> Data on the nature of pay determination in the public sector were edited prior to the analysis in order to promote consistency in the recording of multi-employer bargaining and pay review body structures (which we do not classify as collective bargaining). Generally speaking, in cases where respondents had recorded the pay of schoolteachers, nurses and professions allied to medicine as being subject to 'multi-employer bargaining', pay determination arrangements were recoded to 'pay review body'. Conversely, in cases where the pay of police officers and police support staff was recorded as being subject to a 'pay review body' system, arrangements were generally recoded as multi-employer bargaining. Exceptions were made, where possible, to account for the prospect that decentralized pay determination arrangements may apply in some grant-maintained schools and NHS trusts.

<sup>27</sup> This is not to say that all employees are covered by a single pay review process, although this may be so in some cases.

likely to have a homogenous system of pay determination. Three quarters (74 per cent) did so, compared with 55 per cent of private manufacturing establishments and 57 per cent of public sector workplaces.

The different combinations of pay determination arrangements employed by workplaces are set out in Table 2. Particular configurations clearly predominate in different sectors of the economy. In private sector manufacturing, the most common configuration was for the pay of all employees to be set through unilateral management decision at workplace level. Two fifths (40 per cent) of all establishments in the sector set pay in this way. However, they were generally small workplaces and, together, employed only one fifth (21 per cent) of all employees in the sector. The next most common arrangement among private sector manufacturing establishments was to engage in collective bargaining for some employees but for management to set the pay of others without bargaining. One fifth (21 per cent) of establishments had this type of arrangement, but they were larger than average and together accounted over two fifths (44 per cent) of all employees in the sector. Such marked differences in the size of workplaces with different configurations of pay arrangements were not seen in other sectors, where workplace and employee estimates were broadly in line with each other.

**Table 2 Combination of pay determination arrangements amongst workplaces, by sector of ownership, 1998**

Column percents

	All establishments	Private sector			Public sector
		All	Manufacturing	Services	
<b>All collective bargaining</b>	<b>17</b>	<b>7</b>	<b>5</b>	<b>8</b>	<b>48</b>
All multi-employer collective bargaining	9	2	2	3	28
All single-employer collective bargaining	8	4	1	5	19
All workplace-level collective bargaining	1	1	2	1	*
All collective bargaining, different levels	*	*	*	*	1
<b>No collective bargaining</b>	<b>65</b>	<b>81</b>	<b>71</b>	<b>83</b>	<b>13</b>
All set external to organization	1	..	..	..	3
All set by management at higher level in organization	19	23	5	27	5
All set by management at workplace level	24	32	40	30	1
All set by negotiation with individual	4	5	5	5	0
All set by management, level not known	2	3	*	4	..
Some set external to organisation, some set by management at workplace/higher levels	1	..	..	..	3
Some set by management at higher levels, some set at workplace level	5	7	11	6	*
Some set by management at workplace/higher levels, some set by individual negotiation	5	7	9	7	*
Other combinations where no collective bargaining	3	3	1	4	0

cont.

Table 2 cont.

<b>Mixture of collective bargaining and other methods</b>	<b>18</b>	<b>11</b>	<b>24</b>	<b>9</b>	<b>39</b>
Some collective bargaining, some set external to organization	7	..	..	..	27
Some collective bargaining, some set by management at workplace/higher levels	8	9	21	7	5
Some collective bargaining, some set by individual negotiations	1	1	1	1	*
Other combinations	3	1	2	1	6
<i>Weighted base</i>	<i>2109</i>	<i>1590</i>	<i>272</i>	<i>1318</i>	<i>519</i>
<i>Unweighted base</i>	<i>2087</i>	<i>1453</i>	<i>284</i>	<i>1169</i>	<i>634</i>

Base: establishments with 10 or more employees.

In private sector services, the most common configuration amongst workplaces was, again, for the pay of all employees to be set through unilateral management decision at workplace level. Almost one third (30 per cent) of workplaces had this type of arrangement. In a further 27 per cent of establishments, the pay of all employees was set by unilateral management decision at a higher level within the organization. No other configuration accounted for more than one in ten establishments.

In the public sector, workplaces were most likely to set pay solely through multi-employer collective bargaining (28 per cent) or through the combined use of collective bargaining and external methods such as pay review bodies (27 per cent). Health and education are two primary examples of public sector activities in which this latter combination of statutory pay review and collective bargaining is prevalent. This follows the transfer of pay setting for certain medical professionals and school teachers to pay review bodies in the late 1980s and early 1990s, whilst other staff remained covered by collective agreements (Kessler and Bayliss, 1998: 138-47). What is also clear from the table is that the configurations of pay determination arrangements that were popular in the private sector were comparatively rare among public sector workplaces.

Table 3 shows the proportion of workplaces in which each of the different individual pay determination arrangements were used for at least some employees. Collective bargaining featured among the pay determination arrangements of around one fifth (19 per cent) of all private sector workplaces with 10 or more employees. In around one third of these workplaces (7 per cent overall), the whole of the workforce was covered by collective bargaining. A majority was covered in 8 per cent of establishments; a minority was covered in only 3 per cent. Employees in large private sector establishments were more likely to have their pay set by collective bargaining than those in smaller workplaces.

**Table 3 Incidence of pay determination arrangements amongst workplaces, by sector of ownership, 1998**

Cell percents

	All establishments	Private sector			Public sector
		All	Manufacturing	Services	
Any multi-employer collective bargaining	20	6	11	5	62
Any single-employer collective bargaining	13	9	4	9	27
Any workplace-level collective bargaining	4	5	15	3	2
Any collective bargaining	35	19	29	17	87
Any set external to organization	10	..	..	..	40
Any set by management at higher level in organization	33	38	31	40	17
Any set by management at workplace level	40	52	74	47	3
Any set by negotiation with individual	11	15	17	14	2
Any set by management, level not known	6	8	2	9	..
Any of the above	83	93	95	92	52
<i>Weighted base</i>	<i>2109</i>	<i>1590</i>	<i>272</i>	<i>1318</i>	<i>519</i>
<i>Unweighted base</i>	<i>2087</i>	<i>1453</i>	<i>284</i>	<i>1169</i>	<i>634</i>

Base: establishments with 10 or more employees.

Collective bargaining took place in the vast majority (87 per cent) of public sector workplaces. It represented the sole type of arrangement, covering the whole workforce, in one half of all establishments (48 per cent), covered a majority in one fifth (19 per cent) and a minority in one fifth (19 per cent). No clear relationship existed between bargaining coverage and workplace size in the public sector.

In view of recent case study evidence of the individualisation of employment contracts (Brown et al., 1998), it is worth drawing particular attention to our workplace-level estimates of the prevalence of individual negotiations. Table 3 shows that around one in seven private sector workplaces (15 per cent) set the pay of some employees through individual negotiation. When compared with private sector establishments that did not

engage in individual negotiations, these workplaces were less likely to be part of a larger organization (34 per cent, compared with 65 per cent) and were also less likely to recognise trade unions (12 per cent, compared with 22 per cent). The owners of the establishment were also more likely to have day-to-day involvement in the management of the workplace (35 per cent, compared with 20 per cent). Each of these characteristics suggests that individual negotiations are more likely to take place in workplaces with a greater level of informality, as one might expect.

Among private sector workplaces that undertook individual negotiations, around one third (5 per cent of all private sector establishments) used this approach for all of their employees. A further fifth (3 per cent of all private sector workplaces) did so only for managers or senior administrators. Where individual negotiations were not universal across the establishment, it was most common for other employees to have their pay set unilaterally by management at workplace level.

### *The nature of unionised pay determination*

Table 3 shows that in 1998 around one third (35 per cent) of workplaces with 10 or more employees negotiated over pay for at least some of their workforce. But where negotiations take place over pay, the nature of joint regulation can differ greatly between workplaces. Of particular interest in terms of our analysis of pay levels are the complexity of bargaining arrangements and the strength of union organization.

### *The complexity of collective bargaining arrangements*

In workplaces where some employees were covered by collective bargaining and some employees were also members of recognised unions (83 per cent of those workplaces engaging in collective bargaining), WERS98 asked managers about the complexity of their bargaining arrangements. Where a single union is recognised for the purposes of negotiating pay, bargaining arrangements are generally straightforward. However, where two or more trade unions are recognised, the employer is faced with a choice: either single or multiple bargaining units. Single-table bargaining presents fewer opportunities for unions to attempt 'leap-frogging' or pursue divergent wage policies. As noted in Section 3, this type of arrangement became increasingly common over the course of the 1990 within unionised workplaces with 25 or more employees.

Of those workplaces where some employees were covered by collective bargaining and some employees were also members of recognised unions, around two fifths (38 per cent) had two or more recognised trade unions. Multi-unionism was slightly more common in the public sector (40 per cent) than in the private sector (33 per cent). Three fifths of establishments with multiple unions (23 per cent of the total) operated single table bargaining, whilst two fifths (15 per cent of the total) conducted negotiations with multiple bargaining units. A similar split in the incidence of single and multi-unit bargaining was found in both private sector services and the public sector. However, single table negotiations were less common in private manufacturing, where there was little difference in the relative incidence of the two forms of multi-union bargaining.



### *Indicators of the strength of trade union organization*

All other things being equal, the success of the trade union as it seeks to extract higher wages for its members will depend upon the strength of its hand in negotiations with the employer. One commonly accepted indicator of union strength is the density of union membership within the unit in question (i.e. the proportion of all employees in that unit that are members of the union). A higher density of membership provides greater legitimacy to the union's role as an appropriate representative of the workforce and also provides a larger bank of support that can be marshalled in defence of a claim. Yet the use of membership density as a measure of union strength in the analysis of earnings is widely acknowledged as problematic because of the potential endogeneity of union status with respect to wages (see, for example, Booth, 1995: 172-3). We therefore look to two alternative measures of union strength that are less contentious: the presence of a local representative of the union and the securing of strong management support for union membership.<sup>28</sup>

Since we have argued that a union's strength derives in large part from its base of members within the workforce, one can expect a 'strong' union to possess a functioning structure through which it communicates with its members and services their daily needs. This structure is commonly provided by lay representatives of the union. In a decentralised system of bargaining, such local representatives may be involved in negotiating pay, but even when pay negotiations take place at higher levels, the local representative can be expected to play an important role in organizing support for the union's claim and generally maintaining the membership base. Accordingly, the presence of lay representatives of recognised trade unions at workplace level may be used as one indicator of the relative strength of a union when it approaches the bargaining table.

Focusing again on workplaces where some employees were covered by collective bargaining and recognised unions had members, local representatives of those unions were present in two thirds (60 per cent) of all cases. This proportion did not differ between the private and public sectors but, within the private sector, representatives were much more common in manufacturing than service industries. Almost all of the relevant private sector manufacturing establishments (94 per cent) had local union representatives among their workforce, compared with around half (48 per cent) of the equivalent establishments in private sector services. This could reflect a number of differences between the two parts of the private sector, including the higher levels of union membership in manufacturing than in services, the more decentralised system of bargaining and the larger average size of workplaces.

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<sup>28</sup> A third alternative measure, the scope of bargaining over non-pay issues, is not discussed here. This is because the data provided by WERS98 are indicative only of the scope of bargaining at workplace level with local representatives, and also because the high level of disagreement between managers and worker representative respondents prohibits the compilation of a useful summary measure at even this level.

Our second indicator of strength concerns situations in which the union has secured assistance from management in promoting union membership amongst the workforce, manifest in its most overt form as a 'closed shop'. This indicator of strength has perhaps been most notably used by Stewart in his analysis of union wage premiums using data from the predecessors to WERS98 (Stewart, 1987, 1995). Since 1990, it has been unlawful for an employer to discriminate on the grounds of union membership or non-membership. However, some instances of the closed shop remain and, in a number of other workplaces, management strongly recommends union membership to employees.

In 1998, managers in almost one fifth (17 per cent) of private sector manufacturing workplaces where pay bargaining took place reported that at least some of their employees had to be union members in order to get or keep their jobs. A further 5 per cent reported that they strongly encouraged at least some employees to be union members. Instances of compulsory membership were comparatively rare in private sector services and the public sector, with less than one per cent of managers reporting such arrangements. However, 10 per cent of managers in private sector services and 32 per cent of those in the public sector reported that they strongly encouraged membership among some sections of their workforce.

The low incidence of compulsory arrangements means that we are unable to examine their impact on pay separately from cases of strong encouragement. And as Stewart has already remarked, the distinction between a closed shop and strong encouragement has become somewhat blurred since 1990 (Stewart, 1995: 148-9). However, it is perhaps notable that, only in private sector manufacturing was management support for union membership associated with higher average union membership density. This suggests that the presence of compulsory arrangements may be indicative of a particularly strong form of unionism in the few workplaces where they do persist.

### *The nature of non-union pay determination arrangements*

Whereas little over a third of workplaces with ten or more employees engage in collective bargaining, over four fifths (83 per cent) engage in some form of non-union pay setting (Table 3). In this section, we examine the extent of joint consultation over pay and the role played by non-union representatives when pay is not subject to negotiation with trade unions.

### *The incidence of joint consultation over pay*

If pay is not subject to collective bargaining, employees may still possess a voice over pay issues if their employer discusses pay with employee representatives on a joint consultative committee. In 1998, one tenth of all workplaces with at least some non-union pay setting had a joint consultative committee that discussed 'pay issues' (taken to include such topics as wage reviews, bonuses, regrading and job evaluation).<sup>29</sup> This proportion was notably higher in private manufacturing industries (14 per cent) and the public sector (16 per cent) than in private sector services (7 per cent). A further 13 per cent of all workplaces had a joint consultative committee that discussed issues other than pay, whilst the remainder have no such joint committee.

Where pay is subject to joint consultation, it is usually the case that many other issues are handled in the same way. Very high proportions of workplaces said that, as well as pay, their consultative committee(s) also discussed employment security, welfare services and facilities, working practices, health and safety; or future plans. The proportions were 80 per cent or more in each case. However, the forum for such consultation is usually a single committee for which pay is only one consideration. Three fifths (59 per cent) of those workplaces that engaged in joint consultation over pay channelled all of their joint consultation through one multi-issue committee. Only 5 per cent did so through a single committee dedicated to pay.

### *The role of non-union representatives*

An alternative form of non-union voice is provided by non-union employee representatives. The label 'non-union representatives' implies no connection with trade unions, but we do include the small number of representatives of non-recognised unions under this heading since they share the important distinction of representing employees' interests through means other than collective bargaining.

Overall, non-union representatives were present in just over one tenth (12 per cent) of workplaces with at least some employees that were not covered by collective bargaining. The figure was highest (33 per cent) in the public sector, where representatives of non-recognised unions were much more prevalent. They were present in one in six (16 per cent) of private manufacturing establishments with uncovered employees, and just 7 per cent of relevant establishments in private sector services. For many of these representatives, however, their involvement in pay determination extended only as far as being informed about the issue. The proportion reported to be involved in a consultative, or even negotiating, capacity stood at around 40 per cent in private sector services and the public sector, although it was much higher (around 75 per cent) in private sector manufacturing.

Only a very small proportion of those representatives with such extensive roles were the representatives of non-recognised unions. And so in view of the lack of legal protection

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<sup>29</sup> Union representatives were present on around one third of these committees.

afforded to employee representatives that are not acting in a union capacity, it is plausible to expect that they may be relatively powerless (Terry, 1999:28). However, the fact that some managers report that they do at least consult with non-union representatives over pay and conditions suggests that the potential does exist for non-union structures to impact directly upon pay.

Having considered the changing context of pay determination and described something of the current institutional structure in Britain, we now go on to look in detail at the individual and workplace determinants of pay levels. The bulk of the analysis that follows reports our multivariate analysis of the employee pay data from WERS98, with a focus on the estimation of ‘voice’ effects. But we begin with a short description of how pay levels differ, on average, across a small number of principal employee, job and workplace characteristics.

## **6 The individual and workplace determinants of pay levels**

### *Descriptive analysis*

In Table 4 we present a series of estimated mean gross hourly wages calculated from bivariate interval regressions on the grouped dependent variable described in Section 4. The first row shows that employees in the private sector earned an (estimated) average of £5.87 per hour, some 20 per cent less than the average of £7.03 in the public sector. Occupational wage hierarchies are clear in both sectors, although there are differences between the two sectors, most notably in respect of Personal or Protective Service occupations. Private sector employees within this broad occupational group earned an average of £3.75 per hour compared with £6.35 per hour in the public sector. The public sector figure is boosted, however, by the inclusion of employees such as police and prison officers alongside less well-paid employees such as security guards and caretakers.

**Table 4 Estimated mean gross hourly pay, by individual and workplace characteristics, 1998**

	<b>Private sector</b>	<b>Public sector</b>
	£ per hour	£ per hour
All employees	5.87	7.03
<b>Occupation:</b>		
Manager, Administrator	10.78	11.58
Professional	10.28	10.26
Technical, Assoc. Professional	8.43	7.96
Clerical and secretarial	5.74	6.11
Craft and skilled	6.32	6.10
Personal or Protective Service	3.75	6.35
Sales	4.37	3.87
Operative or assembly	5.31	4.89
Unskilled	3.74	4.48
<b>Age of employee:</b>		
Under 20 years	3.02	3.70
20-24 years	4.58	5.49
25-29 years	5.60	6.72
30-39 years	6.75	7.26
40-49 years	6.40	7.55
50 or more years	5.82	6.78
<b>Gender of employee:</b>		
Male	6.69	7.94
Female	4.94	6.47
<b>Contracted hours:</b>		
Full-time (30 hours or more per week)	6.48	7.49
Part-time	4.30	6.04
<b>Size of workplace:</b>		
10-24 employees	4.90	6.21
25-49 employees	5.23	6.38
50-99 employees	5.47	6.79
100-199 employees	5.75	7.49
200-499 employees	5.97	7.75
500 or more employees	7.67	7.12

cont.

Table 4 cont.

<b>Pay determination arrangement:</b>		
Collective bargaining	6.38	6.82
Not collective bargaining	5.63	7.83
Multi-employer collective bargaining	5.42	6.89
Single-employer collective bargaining	6.57	6.62
Workplace-level collective bargaining	6.58	7.28
External to organization	..	8.51
Set by management at higher level in organization	5.57	6.55
Set by workplace-level management	5.66	7.66
Set by management, level not known	5.85	..
Negotiation with individual	6.18	3.77
<i>Weighted base</i>	<i>18,215</i>	<i>8,335</i>
<i>Unweighted base</i>	<i>17,318</i>	<i>9,266</i>

Base: all employees in establishments with 10 or more employees

The well-known non-linear association between age and pay is shown, with mean gross hourly pay rising until 30-39 years in the private sector (40-49 years in the public sector) before declining slightly among older workers. The gender pay gap between men and women is also clearly evident, although the gap is smaller amongst public sector employees than in the private sector. Part-time employees are shown to receive lower hourly returns, on average, than full-time employees, yet our econometric analysis shows that this is wholly a function of other employee, job and workplace characteristics. In contrast, the positive association between earnings and size of establishment remains after controlling for other factors, at least in the private sector.

Finally, we show estimates of mean gross hourly pay for employees covered by different pay determination arrangements. There is a raw premium of 13 per cent for private sector employees covered by collective bargaining, whereas covered employees in the public sector earn only 87 per cent of the average among those whose pay is set by other methods. One reason is that the pay of a substantial number of professional workers in the public sector is now set by pay review bodies, rather than by collective agreement. Their average gross hourly pay of £8.51 contributes substantially to the mean of £7.83 for those not covered by collective bargaining.

This last point illustrates the importance of considering a wide range of potentially intervening factors when examining the impact of institutional structures upon pay. The purpose of our econometric analysis is to jointly consider a number of employee, job and workplace characteristics, assessing the independent impact of each, in order to be able to come to reliable conclusions about the impact of different forms of employee representation upon levels of gross hourly pay. Our procedure is to establish a 'base model' with employee, job and workplace characteristics and then to experiment with

different formulations of employee ‘voice’, each added separately to the base model. We do this separately for the private and public sectors, anticipating that different base models would be justified.

### ***Econometric results***

#### *The private sector base models*

In Table 5 we give the results of successively more elaborate models of hourly wages in the private sector, building up from a model that simply shows the impact of occupation on hourly earnings to fuller models that include a wide range of individual, workplace and industry variables. The reported results are given in the form of estimated marginal effects, rather than raw regression coefficients.<sup>30</sup>

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<sup>30</sup> In simple terms, positive values imply that gross hourly earnings are higher than for the reference category; negative values imply that they are lower. More specifically, a value of 1.5 would imply that average earnings for that group are 250% of those for the reference group, after controlling for all other factors included in the model; a value of -0.5 would imply that average earnings are only 50% of those for the reference group.

**Table 5 Marginal effects on gross hourly earnings in the private and public sectors in Britain, 1998**

	Private sector					Public sector
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<b>Occupation:</b> <b>(Ref.: Unskilled: low autonomy)</b>						
Manager, Administrator: H	1.997**	1.283**	1.219**	1.117**	0.908**	1.025**
Manager, Administrator: L	1.661**	1.075**	1.001**	0.895**	0.692**	0.914**
Professional: H	1.843**	1.084**	1.046**	0.981**	0.766**	0.948**
Professional: L	1.656**	1.015**	0.977**	0.900**	0.720**	0.856**
Technical, Assoc. Professional: H	1.306**	0.824**	0.805**	0.747**	0.545**	0.592**
Technical, Assoc. Professional: L	1.210**	0.789**	0.766**	0.706**	0.487**	0.529**
Clerical, Secretarial: H	0.618**	0.434**	0.522**	0.480**	0.293**	0.332**
Clerical, Secretarial: L	0.488**	0.349**	0.429**	0.376**	0.196**	0.230**
Craft, Skilled Service: H	0.791**	0.624**	0.532**	0.485**	0.322**	0.166**
Craft, Skilled Service: L	0.624**	0.510**	0.428**	0.393**	0.239**	0.157**
Personal or Protective Service: H	0.079	0.035	0.062	0.124**	0.126**	0.306**
Personal or Protective Service: L	- 0.035	- 0.052	- 0.015	0.062	0.057	0.290**
Sales: H	0.331**	0.262**	0.317**	0.266**	0.261**	- 0.065
Sales: L	0.096**	0.081**	0.133**	0.093**	0.097**	- 0.146*
Operative or Assembly: H	0.462**	0.378**	0.307**	0.254**	0.100**	- 0.025
Operative or Assembly: L	0.415**	0.334**	0.279**	0.224**	0.089**	0.043
Unskilled: H	0.033	0.022	0.022	0.030	0.000	0.025
Unclassifiable	0.168**	0.131**	0.141**	0.104*	0.034	0.140*
<b>Human capital variables</b>						
Highest educational qualification: (Ref.: None)						
Degree		0.381**	0.358**	0.337**	0.283**	0.325**
A level or equivalent		0.213**	0.191**	0.178**	0.164**	0.164**
O level or equivalent GCSE		0.129**	0.119**	0.106**	0.098**	0.118**
CSE or equivalent GCSE		0.071**	0.060**	0.049**	0.053**	0.052**
Vocational qualification, NVQ		0.000	- 0.018	- 0.019	- 0.015	- 0.006
Employer-provided training in last 12 months: (Ref.: None)						
Less than 1 day		0.022	0.027	0.009	0.008	0.041
1-2 days		0.066**	0.065**	0.046**	0.046**	0.042**
2-5 days		0.102**	0.092**	0.060**	0.050**	0.096**
5-10 days		0.111**	0.094**	0.061**	0.039*	0.101**
10 or more days		0.071**	0.067**	0.025	0.008	0.074**

Note on occupational categories: H = high autonomy; L = low autonomy.

cont.



Table 5 cont.

Age: (Ref. in private sector: Under 20 years; Ref. in public sector: Under 25 years)						
20-24 years		0.197**	0.217**	0.192**	0.177**	..
25-29 years		0.422**	0.426**	0.378**	0.323**	0.111**
30-39 years		0.564**	0.547**	0.483**	0.421**	0.203**
40-49 years		0.564**	0.573**	0.515**	0.464**	0.275**
50 or more years		0.531**	0.550**	0.512**	0.457**	0.270**
Length of service: (Ref.: Less than 1 year)						
1-2 years		0.033*	0.035*	0.031*	0.026	- 0.039
2-5 years		0.074**	0.078**	0.060**	0.062**	0.013
5-10 years		0.116**	0.124**	0.093**	0.089**	0.057**
10 or more years		0.192**	0.184**	0.119**	0.120**	0.095**
<b>Personal and family characteristics</b>						
Gender and dependent children: (Ref.: Male with no child under 12)						
Female and child under 12			- 0.143**	- 0.065**	- 0.057**	- 0.026
Female and no child under 12			- 0.156**	- 0.079**	- 0.068**	- 0.087**
Male and child under 12			0.079**	0.079**	0.078**	0.030*
Ethnic minority			0.023	0.016	- 0.052	- 0.031
Disability			- 0.046	- 0.054*	- 0.060**	- 0.028
<b>Further job characteristics</b>						
Contracted hours: (Ref.: Full-time)						
Part-time (< 30 hours per week)				- 0.012	0.054*	0.056**
Not reported				0.006	0.021	0.049*
Temporary or fixed-term job				- 0.096**	- 0.084**	- 0.035
Overtime working: (Ref.: No overtime)						
Job requires overtime working				- 0.018	- 0.016	0.004
Job entails voluntary overtime				- 0.051**	- 0.055**	- 0.058**
Gender job segregation: (Ref.: Equality)						
Only men				0.074**	0.060**	0.069**
Mainly men				0.052**	0.023	0.074**
Mainly women				- 0.076**	- 0.044**	- 0.035*
Only women				- 0.099**	- 0.068**	- 0.085**
Occupational pension provided				0.114**	0.041*	- 0.011
Extra-statutory sick pay provided				0.124**	0.098**	0.040*
Job security or no-redundancy guarantee				0.122*	0.058	0.037*
Performance-related pay				0.069**	0.049**	- 0.039*

cont.

Table 5 cont.

<b>Workplace characteristics</b>						
High Involvement Management index: (Ref.: Traditional)						
Mixed approach					0.010	0.030
High Involvement Management					0.068**	0.062
Unclassified					- 0.001	- 0.002
Work arranged in shifts					0.017	- 0.034*
Size of workplace: (Ref.: 10-24 employees)						
25-49 employees					0.028	- 0.020
50-99 employees					0.029	- 0.021
100-199 employees					0.049	0.028
200-499 employees					0.075**	0.045
500 or more employees					0.173**	0.030
Size of enterprise: (Ref.: 10-499 employees)						
500-1999 employees					- 0.009	0.018
2000-9999 employees					- 0.009	- 0.015
10000-49999 employees					- 0.001	- 0.028
50000 or more employees					- 0.050*	- 0.051*
Not reported					0.087*	- 0.029
Age of workplace: (Ref.: 5 years or less)						
6-10 years					0.063*	0.006
11-20 years					0.040	0.023
21 or more years					0.032	0.038
Foreign owned					0.102**	..
Percentage employees female at establishment – private sector: (Ref.: 0-24 per cent)						
25-64 per cent					- 0.035	..
65 per cent or more					- 0.049*	..
Percentage employees female at establishment – public sector: (Ref.: 0-60 per cent)						
60-85 per cent					..	- 0.037*
85 per cent or more					..	- 0.028

cont.

Percentage employees part-time at establishment – private sector: (Ref.: None)						
1-29 per cent					- 0.048*	..
30 per cent or more					- 0.141**	..
Percentage employees part-time at establishment – public sector: (Ref.: 0-40 per cent)						
40-60 per cent					..	0.017
60 per cent or more					..	- 0.069**
Percentage employees manual at establishment: (Ref.: 0-9 per cent)						
10-69 per cent					- 0.065**	- 0.006
70 per cent or more					- 0.100**	0.059*
Percentage employees sustaining work-related injuries in last 12 months: (Ref.: None)						
1-3 per cent					- 0.028	- 0.023
4 per cent or more					0.020	- 0.034
Not reported					- 0.063*	- 0.010
Percentage employees absent due to work-related illness in last 12 months: (Ref.: None)						
1-3 per cent					0.005	0.001
4 per cent or more					0.005	0.051*
Not reported					- 0.022	- 0.016
Industrial activity in the private sector: <sup>31</sup>						
Wholesale, Retail and Repairs					- 0.079**	..
Hotels and Restaurants					- 0.143**	..
Transport, Storage and Communication					- 0.031	..
Financial Intermediation					- 0.004	..
Real Estate, Renting and Business Activities					- 0.049	..
Education, Health and Community Services					- 0.044	..

cont.

<sup>31</sup> Reference category is: Manufacturing; Electricity, Gas and Water Supply; Construction.

Table 5 cont.

Industrial activity in the public sector: <sup>32</sup>						
Transport, Storage, Post and Telecommunications					..	- 0.031
State Regulation and Administration					..	0.051*
Community Services and Social Security					..	0.147**
Primary and Secondary Education					..	- 0.084**
Higher and Adult Education					..	- 0.063*
Health					..	0.070*
Social Work					..	- 0.054
Other Social and Personal Services					..	- 0.032
Intensity of competition: (Ref: Many competitors)						
None/Organization dominates market					0.008	..
Few competitors					- 0.024	..
Not reported					0.049*	..
Product market state: (Ref.: Mature)						
Growing					- 0.025	..
Declining					- 0.033	..
Turbulent					- 0.042*	..
Establishment's financial performance: (Ref.: About average for industry)						
A lot better than average					0.027	0.029
Better than average					0.005	- 0.005
Below average / A lot below average					0.069	- 0.032
Not reported					0.009	0.001
Tight labour market					0.077**	0.001
London					0.197**	0.201**
<i>Observations</i>	17318	16889	16477	15837	14913	7799
<i>Measure of fit:</i>						
<i>Percentage of employees correctly classified within original bands of gross weekly pay</i>	31%	33%	33%	35%	38%	39%

Key to statistical significance of marginal effects: \* significant at 5% level; \*\* significant at 1% level.

Note on occupational categories: H = high autonomy; L = low autonomy.

<sup>32</sup> Reference category is: Manufacturing; Electricity, Gas and Water Supply; Construction; Wholesale, Retail and Repairs; Hotels and Restaurants; Real Estate, Renting and Business Activities.

Model 1 includes only the 18 occupational categories discussed above, plus a small ‘unclassifiable’ group. The reference category is unskilled manual workers<sup>33</sup> with low autonomy. This simple model accords well with the wage hierarchy of occupations given from other surveys such as the New Earnings Survey. It shows, for example, low-autonomy operative and assembly workers as earning around 40 per cent more than unskilled workers with low autonomy and managers with high autonomy earnings 200 per cent more than them, or three times the amount. In each broad occupational group the ‘high-autonomy’ sub-group earns more than the ‘low-autonomy’ subgroup, adding support to the use of this self-assessed variable for drawing finer occupational distinctions than the pure occupational coding in WERS98 permits. The wage hierarchy by occupation shown in Model 1 is highly stable; only the sizes of the occupational differentials vary, generally becoming smaller as more explanatory variables are added.

In Model 2 we include four variables representing indicators of increased human capital: qualifications, employer-funded training, and experience, which is captured by age and length of service at the current workplace. These all perform in line with the predictions of human capital theory. Moreover, they substantially reduce the size of the raw occupational differentials shown in Model 1, indicating that higher levels of qualifications, training and so on explain a good deal of the wage differences between occupations.

A small number of personal and family characteristics are added to the specification in Model 3. The first aims to capture two effects: the association between gender and pay, and the impact of childbearing on the pay of women. Child-rearing activity may reduce the employment continuity of mothers of younger children, and hence their current human capital assets; and responsibility for young children may restrict women’s job choices in terms of nearness to the home and hours of work that permit child supervision. The results show that – compared with men with no children under 12 – women earn about 15 per cent less than men when their human capital assets are taken into account, whether or not they have young children. It appears that difference between women with young children and those without them is already accounted for by the control for length of service, or it may be that the geographical restriction on job choices is not important in terms of wages.<sup>34</sup> Or it may be that gender segregation at job level, discussed below, accounts for it. By contrast, men with younger children earn around 8 per cent more than otherwise comparable men without young children. This might be regarded as an incentive effect arising from family financial responsibilities. The two personal characteristics, being a member of an ethnic minority and having a disability, show no significant wage disadvantage when occupation and human capital indicators are taken into account.<sup>35</sup>

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<sup>33</sup> These are labelled ‘other occupations’ in the 1990 Standard Occupational Classification.

<sup>34</sup> For younger women, it may be the case that employers assume they are likely to have children, whether they currently have them or not, and so do not discriminate against those that have.

<sup>35</sup> People with disabilities do, however, experience disadvantage in terms of acquiring jobs (Burchardt, 1999).

Model 4 adds a number of job characteristics to Model 3 (besides occupation which is already included). In this model part-time jobs yield similar hourly earnings to otherwise similar full-time jobs filled by employees with similar human capital. Temporary or fixed-term contract jobs pay about 10 per cent less than similar permanent jobs filled by similar employees. This accords with the predictions of ‘insider-outsider’ theory as well as other union-bargaining models. Two variables representing different types of overtime working are also entered in this model, compulsory overtime and voluntary overtime. Employees who work additional hours voluntarily have a lower hourly wage than those in jobs that do not entail extra-contractual hours. Many of these employees are paid for their extra hours, but the additional unpaid hours worked by others result in a lower hourly return for the group as a whole. There appears to be no compensating differential, on average, in jobs that entail compulsory overtime.

A further feature of Model 4 is the inclusion of four indicators of the gender concentration of the work-group of the employee. Confirming the pattern of results of earlier analysis of workplace wage levels (Millward and Woodland, 1995) this shows that employees earn significantly more if, within their establishment, their job is primarily done by men. The comparison group here is jobs done equally by men and women. Relative to them, ‘only men’ jobs pay a premium of around 7 per cent and ‘only women’ jobs carry a penalty of around 10 per cent. These results accord well with the predictions of labour market segmentation theory.

The last group of variables included in Model 4 is intended to identify specific non-wage terms and conditions. The first three variables represent the availability of enhanced employment conditions – occupational pensions, extra-statutory sick pay and general job security guarantees. The fourth variable indicates that the employee’s remuneration is governed (at least in part) by a performance-related pay scheme. These are all associated with higher earnings, fitting with ‘efficiency wage’ theory and its notion that employers offer fringe benefits or performance-related remuneration as well as higher pay in an attempt to elicit higher levels of effort and long-term loyalty. The addition of these various job characteristics to the model leaves the impact of the previously-included variables virtually unchanged.

Our final private sector ‘base model’, prior to examining the impact of wage-setting institutions and employee voice, is Model 5. This adds to Model 4 a wide range of characteristics of the employee’s workplace and its organisational and economic environment.<sup>36</sup> The first is an indicator of the extent to which the employer pursues a High Involvement approach to the management of their workforce, as opposed to a more traditional, Taylorist approach. As in earlier work (Forth and Millward, 2000a), High Involvement Management is found to be associated with higher pay for employees.

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<sup>36</sup> The standard errors on these variables will be downwardly biased because the variables take the same value for each employee within the same workplace (Moulton, 1990). However, since on average the number of sampled employees per workplace is small it is likely that the biases are of little consequence.

There is a premium associated with working in large and very large establishments, but none from working in large enterprises. In fact, our results show a small disadvantage from working in the very largest enterprises, a result that contradicts many analyses of the ‘firm-size wage effect’ (Oi and Idson, 1999; Troske, 1999).<sup>37</sup> The results show no relationship between pay levels and the age of the workplace, thus ruling out one possible explanation for the establishment-size effect, namely that ‘employers who pay their workers “well” are more likely to survive and grow’ (Brown and Medoff, 1989). However, employees in foreign-owned establishments are found to earn around 10 per cent more than those in workplaces that are domestically owned. In a separate model, not shown in Table 5, we established that this premium was confined to workplaces owned by non-EU enterprises.<sup>38</sup>

A series of variables that control for the composition of the workforce at the establishment show that pay is generally lower in establishments with higher proportions of women, part-time workers and employees in manual occupations. In contrast, the premiums associated with dangerous work or unhealthy working conditions are not large enough to be statistically significant.

These and other controls have accounted for most of the pay differentials that are generally seen across industry sectors, apart from the two cases of Wholesale and Retail and Hotels and Restaurants, sectors often renowned for their low rates of pay. Further variables that control for the intensity of competition faced by the employer in the product market, the state of the product market and the establishment’s financial performance show largely non-significant effects. However, there are clear relationships between the state of the labour market and the level of pay. Employers in tight labour markets (Travel-to-Work Areas where the ratio of claimant unemployed to unfilled vacancies is less than or equal to 3.0) pay higher wages, as do those situated in London, where national employers often include an explicit allowance for the relatively high cost of living.

The further job characteristics added to Model 5 have little impact on the variables already included in Model 4. One variable that becomes significant, compared with earlier models, is whether employees have a disability; Model 5 shows these employees as having a significant wage penalty of around 6 per cent. There is also a weakening of two of the fringe-benefit variables.

Before turning to our public sector base models, it is appropriate to take a measure of how well our private sector base models fit the data. We do this by comparing the weekly wage predicted for each individual employee by the model (the predicted hourly wage multiplied by hours worked) with the weekly wage observed for that employee in the

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<sup>37</sup> We note, however, that much of this literature conflates workplace, company and organisation size and that the theoretical concept of the ‘firm’ has ambiguous referents in the real world.

<sup>38</sup> Deficiencies in the data on foreign ownership preclude identifying precisely the countries of origin involved.

survey.<sup>39</sup> This provides us with a figure for the percentage of employees correctly classified by the model within the 12 original bands of weekly pay. This figure is shown in the final row of Table 5. Our simplest specification containing only the detailed occupation classification (Model 1) correctly classifies 31 per cent of private sector employees; this compares with a figure of 18 per cent for a model containing only a constant term. The percentage of employees correctly classified rises to 33 per cent when the human capital variables are added (Model 2). There is no marked improvement from the addition of the small number of personal and family characteristics (Model 3), but the figure rises to 35 per cent after the addition of further job characteristics (Model 4). Finally, the addition of numerous workplace characteristics (Model 5) raises the figure to 38 per cent. It is also worth noting that in 71 per cent of cases Model 5 generates a predicted wage that is within £1.00 of the observed interval.

### *The Public Sector base models*

The modelling sequence described above for the private sector was repeated for public sector workplaces and the final model in this sequence, equivalent to Model 5 with inappropriate variables removed<sup>40</sup>, is shown as Model 6 in Table 5. There are many similarities, but also some differences which merit comment. Beginning with the human capital variables, the occupational differentials for the five occupations at the top of the classification are all positive and of similar size or larger than was the case in the private sector. Fewer occupations at the lower end of the classification have a premium over low-autonomy unskilled workers. Qualifications, training, age and length of service all behave in the same general way as in the private sector, although the public sector appears to give greater additional rewards for degrees and for longer periods of employer-provided training. In terms of personal and family characteristics, the results suggest a small male/female differential and no extra disadvantage for women with young children.<sup>41</sup> The wage penalty associated with disability in the private sector is not apparent in the public sector.

Fewer job characteristics have an impact than in the private sector. Temporary jobs carry no wage penalty in the public sector, there are no very clear ‘efficiency wage’ associations with fringe benefits and no premium attached to performance-related pay. Public sector jobs that entail voluntary overtime produce a significantly lower hourly wage, as in the private sector. Part-time jobs pay somewhat higher hourly wages than full-time jobs, other things equal. Gender segregation within the workplace has a similar effect as in the private sector, with jobs done exclusively by women paying much less than those done exclusively by men.

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<sup>39</sup> The more common indicators – the log likelihood and the associated likelihood ratio test – cannot be implemented since the “likelihood” that is computed in estimation does not reflect the features of the complex survey design and so does not accurately represent the distribution of the sample (StataCorp, 1999b: 328).

<sup>40</sup> These were foreign ownership, intensity of competition and product market state.

<sup>41</sup> The penalty of some 9 per cent for women without children under 12 is puzzling and will be investigated further.



Public sector pay is also responsive to fewer workplace and contextual characteristics than is the case in the private sector. Workplace size does not affect pay in the public sector, although the very largest organisations possibly pay less than smaller ones, as in the private sector. Unlike the private sector, pay levels are unaffected by the presence of high involvement management practices in the public sector. Workplaces with a relatively high concentration of part-time employees pay lower hourly wages or salaries, although the effect appears smaller than in the private sector. Compensating differentials for hazardous working conditions are not apparent. Unlike the private sector, there is no evidence of higher pay in tight labour markets, but there is a similar-sized premium attached to jobs in the London area. Compared to other parts of the public sector, there is evidence of a substantial premium of around 15 per cent for jobs in general community services<sup>42</sup> and possibly of a premium in central government and the health services while there is a penalty attached to jobs in state schools and, less clearly, other areas of education.

In summary, the results justify the separate modelling of the public sector and show pay levels responding similarly to the human capital characteristics of employees. They are also responsive to some job and workplace characteristics, though fewer than in the private sector.

The fit of the public sector base model is comparable to the final private sector model, with 39 per cent of employees being correctly classified within the original bands of weekly pay observed in the survey.<sup>43</sup>

#### *The impact of wage-setting institutions and employee voice in the private sector*

We now return to our analysis of the private sector and report a number of analyses that explore different elements of the institutions of pay setting, described in Section 5. All of these analyses are refinements of our final base model, Model 5. The results shown in Table 6 omit these numerous ‘control variables’ and focus on the independent variables of interest in this section. Our analysis remains at the level of the individual, although many of the later specifications take into account the workplace-level characteristics attached to each employee.

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<sup>42</sup> Classes 75.2 and 75.3 of the Standard Industrial Classification, covering Foreign Affairs, Defence activities, Justice and judicial activities, Public security, law and order activities, Fire services and Compulsory social security.

<sup>43</sup> This compared with 23 per cent correctly classified by a model containing only a constant term.

**Table 6 Alternative models of ‘voice’ effects on earnings in the private sector in Britain, 1998**

**Part 1: Employee voice through union bargaining**

Model	Variable	Marginal effect	Per cent of employees
A	<b>Whether pay set by collective bargaining</b>		
	(Ref.: Employee not covered by collective bargaining)		
	Employee covered by collective bargaining	0.030	29
B	<b>Nature and level of pay determination</b>		
	(Ref.: Employees whose pay is set by workplace-level management)		
	Set by management at higher level in organization	0.036	23
	Set by management, level not known	0.067*	4
	Negotiation with individual	-0.016	4
	Workplace-level collective bargaining	0.047	10
	Single-employer collective bargaining	0.056*	16
Multi-employer collective bargaining	0.044	5	
C	<b>Coverage of collective bargaining within employee’s workplace</b>		
	(Ref.: Employees in workplaces not covered by collective bargaining)		
	1-39 per cent of employees covered by collective bargaining	-0.021	4
	40-59 per cent	0.009	3
	60-69 per cent	0.020	2
	70-79 per cent	0.123**	4
	80-89 per cent	0.102*	4
	90-99 per cent	0.072**	11
100 per cent	0.017	12	

Cont.

Table 6, Part 1 cont.

<b>D</b>	<b>Interaction of individual and workplace-level coverage of collective bargaining (simple)</b>		
	(Ref.: Employees in workplaces not covered by collective bargaining)		
	Employee not covered by collective bargaining, but others at workplace covered	0.041	8
	Employee covered by collective bargaining	0.040*	29
<b>E</b>	<b>Interaction of individual and workplace-level coverage of collective bargaining (disaggregated)</b>		
	(Ref.: Employees in workplaces not covered by collective bargaining)		
	Employee not covered; workplace coverage 1-69 per cent	-0.04	5
	Employee not covered; workplace coverage 70-99 per cent	0.14*	3
	Employee covered; workplace coverage 1-69 per cent	0.030	3
	Employee covered; workplace coverage 70-99 per cent	0.081**	14
	Employee covered; workplace coverage 100 per cent	0.017	11
<b>F</b>	<b>Complexity of collective bargaining arrangements</b>		
	(Ref.: Employees in workplaces not covered by collective bargaining)		
	Single union recognized for employees covered by collective bargaining	0.005	16
	Multiple bargaining units	0.132**	8
	Single-table bargaining	0.118**	12
<b>G</b>	<b>Interaction of individual coverage and complexity of collective bargaining arrangements</b>		
	(Ref.: Employees in workplaces not covered by collective bargaining)		
	Employee not covered; single union recognized for employees covered by collective bargaining	0.012	3
	Employee not covered; multiple unions recognized	0.144**	4
	Employee covered; single union recognized	0.014	12
	Employee covered; multiple unions recognized	0.114**	15

Cont.

Table 6, Part 1 cont.

	<b>Interaction of individual coverage and presence of local representative of recognized trade union</b>		
	(Ref.: Employees in workplaces not covered by collective bargaining)		
<b>H</b>	Employee not covered; employees covered by collective bargaining do not have local representative	0.003	2
	Employee not covered; covered employees have local rep.	0.065	6
	Employee covered; covered employees do not have local rep.	-0.015	5
	Employee covered; covered employees have local rep.	0.064**	23
	<b>Management encouragement of union membership</b>		
	(Ref.: Employees in workplaces not covered by collective bargaining)		
<b>I</b>	At least some employees covered by collective bargaining but management does not strongly encourage union membership for any groups of workers	0.029	36
	At least some employees covered by collective bargaining and management strongly encourages union membership for at least some groups of workers	0.114**	3

**Table 6, Part 2: Employee voice outside union bargaining**

Model	Variable	Marginal effect	Per cent of employees
<b>J</b>	<b>Interaction of individual coverage and joint consultation over “pay issues”</b>		
	(Ref.: Employee not covered by collective bargaining; No joint consultation over “pay issues” at workplace)		
	Employee not covered; JCC discusses “pay issues”	-0.032	11
	Employee covered; no joint consultation over “pay issues”	0.030	22
	Employee covered; JCC discusses “pay issues”	-0.001	7
<b>K</b>	<b>Interaction of individual coverage and presence of non-union employee representatives</b>		
	(Ref.: Employee not covered by collective bargaining; No non-union rep. at workplace)		
	Employee not covered; non-union rep. present, but no role in determining “pay or conditions”	-0.058*	5
	Employee not covered; non-union rep. present with involvement in determining “pay or conditions”	-0.03	6
	Employee covered; no non-union rep. at workplace	0.021	26
	Employee covered; non-union rep. present, but no role in determining “pay or conditions”	0.016	1
	Employee covered; non-union rep. present with involvement in determining “pay or conditions”	0.030	2

Key to statistical significance of marginal effects: \* significant at 5% level; \*\* significant at 1% level.

The simplest characterisation of an employee’s pay-setting arrangement that allows an employee ‘voice’ effect is whether or not the employee is covered by collective bargaining between the employer and a trade union (to which the employee may or may not belong). Model A in Table 6 shows that employees covered by collective bargaining arrangements have pay levels some 3 per cent higher than those not covered by such arrangements, but this difference is not statistically significant. There is thus no general ‘union wage premium’ in the private sector, when other factors affecting pay levels are taken into account, but the small positive coefficient suggests that in particular circumstances there might be.

Union bargaining theory predicts that a clear union premium emerges only where monopoly rents are combined with union representation, as indeed Stewart (1990) showed empirically for Britain in the 1980s with respect to semi-skilled manual workers. We investigated this with the WERS98 data and found no support for it: there was no

significant union premium for employees covered by collective bargaining in workplaces with few or no competitors in their main product market.<sup>44</sup>

Our assessment of the theoretical literature on union wage bargaining leads us to expect that any union premium is most likely to be found where unions bargain with a single employer; it seems implausible that multi-employer negotiations, which invariably take place within a single industry, would give rise to a premium because multiple employers in the same industry are unlikely to all have monopoly rents to share with employees. Model B uses our earlier classification of methods of pay determination and supports this expectation: employees covered by multi-employer bargaining have no demonstrable premium over employees whose pay is unilaterally determined by management at workplace level. Model B also shows that neither employees covered by workplace level bargaining nor those whose pay is set by management at company level have higher pay. Only those whose pay is collectively bargained at company or organisation level appear to gain a premium – only a modest one in general and not an especially robust result.

The next aspect of institutional pay-setting arrangements that we explored was the depth of their coverage. Here our workplace-level measures, based upon information supplied by management, greatly illuminated the impact of union bargaining. Model C shows that where less than 70 per cent of employees at a workplace are covered by the union/management bargaining arrangements (at the workplace or a higher level) pay is no higher than for employees in workplaces where no-one was covered by collective bargaining.<sup>45</sup> However, where 70-79 per cent of employees are covered the premium over uncovered workers is a significant and substantial 12 per cent. Higher categories of coverage (80-89 and 90-99 per cent) also show a premium, although possibly a smaller one. The model also shows that there is no premium where coverage is 100 per cent, a possibly surprising result.

This pattern of results with respect to the extent of collective bargaining coverage makes sense from a union power perspective if it is assumed that all groups of employees in a workplace are not equally powerful with respect to the employer, whether through differential access to ‘insider’ power, the power to disrupt production or whatever. Where the union only represents a small minority of employees at a workplace they are unlikely to have the collective strength to negotiate substantial pay improvements. At some point, and our 70 per cent coverage threshold is clearly not a precise measure of this point (which will vary across workplaces), the union or group of unions becomes capable of exerting some power with respect to the employer and gaining a wage premium for the employees it represents. However, if the union tries to represent all employees (including workplace managers) it is diluting the power of the more powerful employees by trying

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<sup>44</sup> A more stringent test, focusing on clear monopoly situations (‘no competitors’), was not possible because there were too few cases where employees were covered by collective bargaining for robust results.

<sup>45</sup> This reference category contains a small number of cases where management reported that there were recognised unions but elsewhere in the interview stated that no employees were covered by collective bargaining. In separate analysis we established that there was no significant wage premium for employees in these workplaces with vestigial union recognition.

to extend its benefits to employees who, on their own, would not be able to negotiate a premium. The tapering off of the premium as coverage approaches 100 per cent adds weight to this interpretation.

Models D and E show the combined effect of the individual and workplace coverage variables. In the simpler case, Model D, the reference category is employees in workplaces with no collective bargaining. Compared with them, employees who themselves are covered by collective bargaining arrangements have a premium of around 4 per cent (significant at the 5 per cent level). Employees who work in workplaces where some employees are covered by collective bargaining, but they are personally not covered by the arrangements, may receive a similar premium, but this result is not statistically significant. The combination of results suggests that there might be some spill-over from covered to uncovered workers in the same establishments. If so, this would accord with analysis presented elsewhere which shows that most employers award a uniform pay increase to covered and uncovered workers within the same workplace (Forth and Millward, 2000b).

Model E confirms the suggestion of spill-over effects from covered to uncovered workers in certain situations. This model shows that, compared employees in workplaces with no collective bargaining, employees in workplaces with high coverage (70-99 per cent) and who themselves are covered by the bargaining arrangements typically have around 8 per cent higher hourly pay. The only other category of employees with a premium, although less precisely determined, is uncovered employees in these same workplaces. This is the first clear evidence of a 'spill-over effect', whereby union bargaining also benefits those it does not directly represent.<sup>46</sup> We further explored the matter by examining which groups of employees were not covered in cases where coverage was in the range that most clearly generated a wage premium, cases where it lay between 70 and 99 per cent. In the great majority of these cases it was managers and professional employees who were the beneficiaries. These employees appear to have sufficient 'insider power' to maintain customary differentials with their subordinates without having to be represented by a union. It is perhaps ironic that managers, in particular, benefit from the successful wage bargaining activity of their unionised subordinates. There is even a suggestion in the results, both in this and later models, that they benefit to an even greater extent, although the difference in the size of the marginal effects (14 per cent for non-covered employees versus 8 per cent for covered employees) is not statistically significant.

In Model F we start from the base model again and begin to examine the effects of the complexity of union representation arrangements. Compared with those in workplaces without any recognised unions, employees in workplaces with multiple recognised unions have a clear pay advantage of some 12 per cent.<sup>47</sup> It seems to matter little whether the

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<sup>46</sup> This is not to be confused with the 'free-rider' phenomenon whereby non-members of a union benefit from union bargaining.

<sup>47</sup> In preliminary work multi-union workplaces had very similar coefficients on separate dummy variables for single and multiple bargaining units; these two categories were therefore combined. The possibility that

unions bargain jointly or separately. However, employees in workplaces with a single recognised trade union have hourly pay which is indistinguishable from that of comparable employees in non-union workplaces. We interpret this as a reflection of the relative weakness of single-union representation – union membership was typically lower in such cases than in multi-union workplaces. Model G combines the distinction between single union and multi-union representation at workplace level with whether or not employees are individually covered by the bargaining arrangements. Only those in multi-union workplaces have a clear wage advantage of around 11 per cent and it is of similar size for both covered and uncovered workers.

In Models H and I we leave the complexity of bargaining arrangements on one side and examine two measures of union strength at workplace level.<sup>48</sup> The distinction between employees who are individually covered by collective bargaining and those who are not is maintained in model H. Here employees covered by collective bargaining and who have a representative of a recognised trade union at their workplace are the only ones with a clearly-defined pay premium of around 6 per cent. Employees in these same workplaces but who are not covered by the bargaining arrangements may have a similar premium over employees in non-union workplaces, but this is not a robust result. In Model I the individual-level measure of coverage is dropped in favour of the workplace-level variable (because of small numbers in one of the interaction categories) and this is interacted with a measure of management's endorsement of union membership. Where this endorsement is present and at least some employees are covered by collective bargaining, hourly pay is around 11 per cent higher than for employees in workplaces where no-one is covered by bargaining. Those in workplaces without management endorsement of union membership have no wage advantage.

In our final two private sector models we leave union-based collective bargaining to one side and explore whether other manifestations of employee 'voice' have an impact on pay levels. In Model J the measure of employee voice is whether there is at the employee's workplace a joint consultative committee that discusses pay issues with management. Such arrangements appear to have no discernible impact upon pay levels, whether the individual employee is covered by bargaining or not.<sup>49</sup> Indeed, the results suggest that the union impact through collective bargaining is negated by parallel consultation about pay issues. Model K shows no wage advantage from non-union representation, even where managers report that non-union representatives are normally involved in determining pay or conditions of employment.

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the multi-union effect simply reflects the presence of craft unions in mature industries is discounted by the control for workplace age, which in aggregate reflects the maturity of industries.

<sup>48</sup> A third obvious measure of union strength at workplace level, membership density, was omitted from these analyses because of its potential endogeneity with respect to earnings. Another possibility, the scope of union bargaining at workplace level, was examined but rejected as the data were not considered to provide a usable measure.

<sup>49</sup> In a minority of cases joint consultative committees that discussed pay contained union representatives, but they had no different impact on pay levels than committees without union representatives.



### *The impact of wage-setting institutions in the public sector*

Our descriptive analysis of the arrangements for pay determination in Section 5 has already made it clear that these are markedly different from those in the private sector. Whereas in the private sector most employees have their pay unilaterally determined by their own employer, in the public sector 63 per cent of employees have their pay negotiated by trade unions at a level above the workplace and a further 22 per cent have their pay set by a higher authority, usually central government after the recommendations of a Review Body. This implies that we should not expect to gain as much from an analysis of employee and workplace-level data as we have been able to in the private sector. WERS98 does contain some characteristics of the organisations to which public-sector workplaces belonged, but many fewer than about the workplace itself. Since most public sector bargaining takes place at organisation or multi-employer level, a more illuminating analysis would require more information about the individual organisations in the public sector than WERS98 contains. In theory, further characteristics could be imputed from other sources, but this would require knowing the identity of the organisations to which the surveyed workplaces belonged. Such information is not contained within the publicly available datasets as it would breach the undertakings of anonymity given to respondents.

Starting from our public sector base model (Model 6 in Table 5) we first added an employee-level variable capturing the simple distinction between collectively-bargained pay and pay that was determined by other means. In this model, controlling for all the variables included in the base model, there was no significant difference between pay that was collectively bargained and pay that was not bargained. When we added the further distinction between workers covered by collective bargaining and those in the same workplaces but not covered by bargaining there were again no differences. It was only when we came to include the different levels at which pay was set in the public sector that we detected any differences in public sector pay for otherwise similar employees and jobs. Here, unlike the private sector, where management determination at workplace level was our large reference category, we chose multi-employer bargaining as our reference category, accounting for nearly a half of public sector employees. Compared with workers in this reference category, those whose pay was determined by bargaining at a higher level than the workplace in their own organisation had hourly pay of around 4 per cent less. This modest difference, not quite significant at the 1 per cent level, could be a symptom of the abandonment of multi-employer bargaining in several parts of the public sector as part of the previous government's policy of decentralising pay determination, leaving some employers a greater freedom to contain pay increases. But there may well be other explanations and it is, in any case, not an especially robust difference. Put simply, public sector pay levels appear to be largely unaffected by the particular mechanism through which they are decided. There is no clear effect arising from trade union activity, nor did we find any other type of employee 'voice' to have any impact on pay in the public sector.

## **7 Fringe benefits**

In Section 2 we briefly mentioned fringe benefits in relation to a number of theoretical ideas about the determination of pay. On the one hand, fringe benefits might be used by employers in competitive labour markets to compensate for poor wages. On the other hand, better benefits and higher wages might go together, either as part of an ‘efficiency wage’ policy designed to elicit worker loyalty and effort, or as a result of unions successfully pressing for benefits as well as higher wages. In representing the preferences of typical members they naturally tend to give greater weight to the preferences of older, relatively permanent employees who have a greater desire for fringe benefits, especially those that accumulate through length of service (Freeman, 1981).

In our empirical modelling of pay levels in Section 6 we included a number of fringe benefits for which there are data in WERS98 among our set of control variables in our base models. Where these showed an association with hourly pay it was a positive one, implying that the ‘efficiency wage’ effects were more widespread than higher wages compensating for poor fringe benefit provision.

In this section we model the factors that affect the availability of fringe benefits at workplace level in much the same way as we modelled pay in Section 6. There are some important differences, however. First, the analysis is at workplace level because we have no data on the receipt of fringe benefits from the WERS98 Survey of Employees. Instead we use data from the WERS98 Management Interview on the provision of fringe benefits to the largest occupational group of employees, excluding managers, at each sampled workplace.<sup>50</sup> The percentage distribution of these largest occupational groups among private sector workplaces is as follows:

Professional	7
Technical, Associate Professional	5
Clerical, Secretarial	16
Craft, Skilled services	16
Personal or Protective Service	10
Sales	21
Operative or Assembly	14
Unskilled	11

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<sup>50</sup> In a small number of cases, the group selected for questioning in the interview was not, in fact, the largest non-managerial group present at the establishment, as required in the design. The single private sector case in which managers were chosen was dropped from our analysis. In a further six cases, Professionals were the largest group present, but the computer program incorrectly selected the next largest occupation for questioning; these cases were retained.

Typically the largest occupational group in a private sector workplace contained 60 per cent of the whole workforce, or 67 per cent of the non-managerial workforce.

We focus on two benefits: employer-provided pensions; and sick pay in excess of statutory requirements.<sup>51</sup> Since the information is simply provision or non-provision, the dependent variables are dichotomous and the appropriate estimation procedure is logistic regression.

As the modelling is conducted at workplace level, the base model contains only the occupation of the largest occupational group and a set of occupational-group and workplace-level control variables. (Variable definitions are given in Appendix C.) These controls include the gender composition of the largest occupational group, the degree to which it involves part-time work, the size and industrial activity of the workplace, and so on. We did, not, however, include any measure of the typical level of hourly pay for employees in the group whose fringe benefit provision was being examined. This was for two reasons. First, there is no direct measure of this in WERS98 and both the workplace pay distribution and a possible aggregation of employees' pay data were felt to be insufficiently accurate indicators.<sup>52</sup> Secondly, we consider it plausible that fringe benefit provision is either introduced or abandoned far less frequently than the generally annual adjustment of pay levels.<sup>53</sup> This makes it reasonable to assume that employers provide fringe benefits largely irrespective of current pay levels, even though they might have taken account of wage levels at the time of their introduction.

Our analysis of fringe benefit provision is further distinct from our analysis of pay levels in that it focuses solely on the private sector. This is primarily because the employer pension schemes and extra-statutory sick pay are extremely common among public sector establishments, thereby limiting the worth of any analysis of voice effects.

### *Employer pension schemes*

Just over half (55 per cent) of all private sector establishments with 10 or more employees provided a pension scheme to members of the largest occupational group within their workforce in 1998 (Table 7). This compared with over nine tenths (93 per cent) of all establishments in the public sector. Within the private sector, there was hardly

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<sup>51</sup> The survey also asked about: company cars or car allowances; private health insurance; and four weeks or more paid annual leave. We focused on pensions and sick pay, partly because they had been analysed in relation to union representation in an earlier survey (Casey, 1994) and partly because the first two other benefits mentioned above were concentrated in certain occupations or industries. In the case of annual holidays, entitlement above the specified threshold was very widespread, leaving little room to explain its variation.

<sup>52</sup> The statistical issues involved in aggregating data from the WERS98 Survey of Employee up to workplace level are discussed in Forth and Kirby (2000).

<sup>53</sup> In a nationally representative survey of pension schemes among organisations with 20 or more employees in 1996, nearly 80 per cent of defined benefit schemes and nearly 40 per cent of defined contribution schemes were at least eight years old (Forth and Millward, 1999:44).

any difference in the incidence of provision between manufacturing and service industries. But non-manual occupations were generally more likely to enjoy provision than manual groups.

**Table 7 Provision of fringe benefits to largest non-managerial occupation, by sector of ownership, 1998**

Cell percents

	All establishments	Private sector			Public sector
		All	Manufacturing	Services	
Employer pension scheme	65	55	58	55	93
Sick pay in excess of statutory requirements	64	60	56	61	75
<i>Weighted base</i>	<i>2184</i>	<i>1647</i>	<i>285</i>	<i>1362</i>	<i>537</i>
<i>Unweighted base</i>	<i>2185</i>	<i>1511</i>	<i>295</i>	<i>1216</i>	<i>674</i>

Base: all establishments with 10 or more employees.

Our base model of pension provision in the private sector is presented in the first column of Table 8. It shows that, after controlling for a number of other factors, Professional and Technical workers were clearly the most likely to benefit.<sup>54</sup> The odds of employees in such occupations being provided with an employer pension scheme were almost 10 times greater than for Unskilled employees.<sup>55</sup> Other job characteristics were not significantly associated with the provision of employer pension schemes, but a number of workplace characteristics were found to be important. Provision was more likely in larger workplaces and in workplaces belonging to large enterprises, and it was also more common in workplaces that had been established for more than twenty years. Each of these associations may be indicative of economies of scale. The nature of the workforce at the establishment also impacted upon the likelihood of provision, with employer pension schemes being less likely in workplaces with higher proportions of young workers and more likely where greater numbers of older workers were employed

<sup>54</sup> The two occupational groups are combined in order to avoid any over-fitting of the model that would otherwise have resulted from the relatively high degree of provision to Technical employees. A similar strategy is adopted with certain groups of variables representing the High Involvement Management index, Size of enterprise and Industrial activity.

<sup>55</sup> The results presented in Table 8 are to be interpreted as the marginal effects on the odds of fringe benefit provision, relative to the reference category. Positive values imply that the odds of provision are higher than for the reference category; negative values imply that they are lower. More specifically, a value of 1.5 would represent odds of 2.5:1 (provision two-and a-half times as likely as for the reference group); a value of -0.5 would represent odds of 0.5:1 (provision half as likely as for the reference group).

(although the latter association was not statistically robust). Notably, the odds of pension provision were more than halved for establishments where 5 per cent or more of the workforce had a disability. Finally, product and labour market factors also had a role to play. Product market monopoly/oligopoly and above average financial performance both increased the odds of pension provision to the largest occupational group, as did the fact of being located in a tight labour market; but operating in a declining product market decreased them.

**Table 8 Marginal effects on odds of fringe benefit provision to largest occupational group (excluding managers) in the private sector in Britain, 1998**

	Employer pension scheme	Sick pay in excess of statutory requirements
<b>Occupation: (Ref. Unskilled)</b>		
Professional / Technical, Assoc. Professional	9.761**	..
Clerical, Secretarial	0.798	..
Professional / Technical, Assoc. Professional / Clerical	..	9.234**
Craft, Skilled Service	0.802	0.845
Personal or Protective Service	-0.026	-0.105
Sales	0.369	5.326**
Operative or Assembly	0.350	0.696
<b>Job characteristics</b>		
Percentage employees female	0.006	-0.006
Percentage employees part-time (less than 30 hours per week)	-0.003	-0.006
Percentage female/part-time missing	2.582*	1.196
Job security or no-redundancy guarantee	0.002	0.995
Performance-related pay	0.890	2.368**
<b>Workplace characteristics</b>		
High Involvement Management index: (Ref. Mixed approach / High Involvement Management)		
Traditional approach	-0.010	-0.515**
Unclassified	-0.252	-0.295

Cont.

Table 8 cont.

Size of workplace: (Ref.: 10-24 employees)		
25-49 employees	0.159	-0.034
50-99 employees	0.928	0.831
100-199 employees	1.619*	1.233*
200 or more employees	3.561**	3.238**
Size of enterprise: (Ref.: Less than 500 employees)		
500 or more employees	6.494**	2.262**
Not reported	3.995**	1.164
Age of workplace: (Ref.: 5 years or less)		
6-10 years	0.563	-0.016
11-20 years	0.979	0.049
21 or more years	2.234*	-0.178
Foreign owned	0.183	-0.464
Percentage employees under 21 years of age: (Ref.: None)		
1-14 per cent	-0.622**	-0.337
15 per cent or more	-0.781**	-0.614*
Not reported	-0.607	-0.784
Percentage employees over 50 years of age: (Ref.: Less than 5 per cent)		
5-19 per cent	0.144	0.467
20 per cent or more	0.263	1.367*
Not reported	-0.404	1.068
Percentage employees with a disability: (Ref.: Less than 5 per cent)		
5 per cent or more	-0.651	-0.394
Not reported	-0.449	0.313
Percentage employees from a non-white ethnic group: (Ref.: Less than 5 per cent)		
5 per cent or more	-0.186	0.147
Not reported	0.478	0.628
Industrial activity: (Ref.: Manufacturing; Electricity, Gas and Water Supply; Construction)		
Wholesale, Retail and Repairs	1.659*	0.407
Hotels and Restaurants	-0.627	0.320
Transport, Storage and Communication	..	0.086
Financial Intermediation	..	1.239
Transport, Storage and Communication; Financial Intermediation	0.950	..
Real Estate, Renting and Business Activities	-0.722**	0.454
Education, Health and Community Services	-0.491	0.017

Cont.

Table 8 cont.

Intensity of competition: (Ref.: Many competitors)		
None/Organization dominates the market	1.737	1.140
Few competitors	-0.167	-0.246
Not reported	0.091	-0.564
Product market state: (Ref.: Mature)		
Growing	0.143	-0.429
Declining	-0.800**	-0.560
Turbulent	-0.161	-0.451
Establishment's financial performance: (Ref.: About average for industry)		
A lot better than average	0.238	-0.132
Better than average	1.381**	0.349
Below average / A lot below average	1.245	-0.543
Not reported	1.004	-0.188
Tight labour market	0.791*	0.996**
London	-0.173	-0.069
<i>Observations</i>	<i>1411</i>	<i>1411</i>
<i>Measure of fit:</i>		
<i>Instances of provision correctly predicted</i>	<i>82%</i>	<i>84%</i>
<i>Instances of non-provision correctly predicted</i>	<i>74%</i>	<i>72%</i>

This base model of employer pension provision correctly predicted 82 per cent of cases of provision and 74 per cent of cases of non-provision.<sup>56</sup>

#### *The impact of employee voice on the provision of employer pension schemes*

In keeping with our analysis of pay levels, we investigated the effects of employee voice on the provision of employer pension schemes by making successive refinements to our final base model. However, our various measures of employee voice should be seen in a rather different light from how we used them in the analysis of pay. With pension provision in particular we know that schemes are generally company-wide (Marginson et al., 1988:104) and hence if they are part of a union bargaining agenda it would be more appropriate to use company-level measures of union strength to assess the impact of unions on their provision. However, insofar as our workplace-level variables of union representation reflect the same variables at a higher level, they may tell us something about the impact of unions, although in a less precise way.

<sup>56</sup> As with our models of earnings, more common indicators of fit cannot be implemented since the “likelihood” that is computed in estimation does not reflect the features of the complex survey design and so does not accurately represent the distribution of the sample (StataCorp, 1999b: 328).

The first characterisation of ‘voice’ that is employed is whether or not the largest occupational group is covered by collective bargaining between the employer and a trade union (Table 8).<sup>57</sup> Model A in Table 8 shows that the odds of the group being provided with an employer pension scheme are more than doubled if it is covered by collective bargaining arrangements. However, consistent with our analysis of pay, Model B shows that there is no robust ‘premium’ associated with multi-employer bargaining.<sup>58</sup> Instead, it is single-employer and workplace-level bargaining that significantly increase the odds of pension scheme provision when compared with pay-setting by workplace-level management. Single-employer bargaining appears to have the greater impact but, in fact, the two effects are not significantly different.

Following our earlier analyses, we sought to examine spill-over effects from covered to uncovered workers and found that the odds of pension provision for uncovered groups were greater when at least some employees outside the largest occupational group were covered by collective bargaining (Model C). However, we were unable to take this analysis any further, by looking at the spill-overs from different forms of unionism for example, since there were too few workplaces in this group to permit more detailed classification.

We were able to examine whether different forms of unionism led to different outcomes for covered workers, however. Interestingly, Model D shows a positive association with pension provision for covered groups in workplaces with overall coverage of less than 70 per cent, as well as for those where coverage was between 70 and 99 per cent, which was the critical range identified in our analysis of pay levels. The table shows a larger marginal effect for the group with lower coverage but, in practice, the two values are not significantly different from one another. In a further departure from the results on pay levels, we find that the odds of pension provision are higher for groups covered by single recognised unions, whereas multiple unions, which were associated with higher pay in the private sector, have no robust positive association with employer pension provision (Model E). The presence of a local representative of a recognised union does serve to increase the odds of provision for the largest occupational group (Model F), but the presence of strong management support for union membership does not (Model G).

In summary, unions do appear to have a positive impact on the likelihood of an employer providing a pension scheme for the members of the largest occupational group. However, the nature of the associations found in our analysis suggest that way in which the provision of employer pension schemes is determined is distinct from the determination of pay, with different forms of unionism gaining advantageous returns. In particular, the positive association with the recognition of a single union suggests that the impact of different forms of unionism on total employee compensation may be more equal than is suggested by an analysis of wages or salaries alone.

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<sup>57</sup> In keeping with the presentation of the earlier results on pay levels, Table 8 omits the ‘control variables’ and focuses on the independent variables of interest in this section.

<sup>58</sup> Here, we assume that fringe benefits are determined at the same level and through the same methods as pay.



Our analysis of forms of employee representation other than collective bargaining did not identify robust associations with the likelihood of employer pension provision. Model H compares uncovered groups in workplaces with and without a joint consultative committee that discussed “pay issues”. Model I compares uncovered workers in workplaces with and without a non-union representative. In neither case were the positive effects of these forms of representation large enough for us to reliably say that they increased the odds of provision for uncovered occupations.

#### *Extra-statutory sick pay*

Two thirds (60 per cent) of all private sector establishments with 10 or more employees provided sick pay in excess of statutory requirements to members of the largest occupational group within their workforce in 1998 (Table 7). As with the provision of pensions, there was no significant difference in the provision of extra-statutory sick pay between private sector establishments engaged in manufacturing or services and, again, non-manual occupations were more likely to enjoy provision than non-manual groups. The distinction between private and public sectors was not quite so great, however, with fewer public sector establishments providing extra-statutory sick pay than provided pension schemes (75 per cent, compared with 93 per cent).

Our base model of the provision of extra-statutory sick pay in the private sector shows that, after controlling for a number of other factors, non-manual occupations were more likely to benefit than manual occupations (Table 8, second column).<sup>59</sup> Occupations in receipt of performance-related pay were also more likely to be provided for. Workplaces having few formal arrangements for involving their employees - categorised as having a Traditional approach on our High Involvement Management index - were less likely to provide extra-statutory sick pay, as were those workplaces with a high proportion of younger workers. But provision was more likely in larger establishments, in establishments that were part of large enterprises, in workplaces with high proportions of older workers and also in those located in tight labour markets .

This base model of the provision of extra-statutory sick pay performed similarly to our base model of occupational pensions, correctly predicting 84 per cent of cases of provision and 72 per cent of cases of non-provision.

#### *The impact of employee voice on the provision of extra-statutory sick pay*

We investigated the effects of employee voice on the provision of extra-statutory sick pay by making the same successive refinements to our final base model of sick pay provision as we had made to that of pensions. Our workplace-level measures of employee voice can be expected to be more reliable in this analysis than they were in respect of pensions

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<sup>59</sup> Professional, Technical and Clerical occupations were combined in order to avoid any over-fitting of the model. A similar strategy is adopted with certain groups of variables representing the High Involvement Management index, Size of enterprise and Industrial activity.

since there appears to be a greater degree of workplace autonomy in the operation of sick pay schemes than there is in respect of pension schemes (Marginson et al., 1988: 186-91). However, it still appears to be the case that most schemes are devised and run on a company-wide basis and, in these cases, company-level measures of unionism would have been ideal.

Our analysis shows firstly that, consistent with our analysis of pension provision, the odds of the largest occupational group being provided with sick pay in excess of statutory requirements are significantly enhanced under collective bargaining; in fact, the odds are more than tripled (Model A, Table 9). Multi-employer, single-employer and workplace-level bargaining all enhance the odds of provision relative to unilateral, workplace-level pay setting, but groups whose pay is set by managers at a higher level in the organization are also more likely to benefit (Model B). In contrast to our analysis of pay levels and pension provision, we find no spill-over effect of unionism to uncovered workers in the same establishments (Model C). However, the forms of unionism that yield returns for covered workers are generally the same as in our analysis of wages/salaries: coverage of between 70 and 99 per cent of the workforce (Model D); multiple unionism (Model E); the presence of local union representatives (Model F); and strong management encouragement for union membership (Model G) are all associated with greater odds of provision of extra-statutory sick pay. Yet in this analysis, the general effect of unionism seems stronger than on pay levels. And so groups covered by single recognised unions, groups without access to local representatives and those in workplaces where strong management support for membership has not been secured are also more likely to be provided for than groups not covered by collective bargaining.

**Table 9 Alternative models of ‘voice’ effects on fringe benefit provision in the private sector in Britain, 1998**

**Part 1: Employee voice through union bargaining**

Model	Variable	Marginal effect on odds		Per cent of workplaces
		Pension scheme	Ext. stat. sick pay	
A	<b>Whether pay set by collective bargaining</b>			
	(Ref.: LOG not covered by collective bargaining)			
	LOG covered by collective bargaining	1.275*	2.422**	15
B	<b>Nature and level of pay determination</b>			
	(Ref.: LOG’s pay set by workplace-level management)			
	Set by management at higher level in organization	0.822	2.118*	27
	Set by management, level not known	2.078	1.508	6
	Negotiation with individuals	-0.030	1.124	7
	Workplace-level collective bargaining	2.148*	3.326*	3
	Single-employer collective bargaining	5.265**	6.443**	7
	Multi-employer collective bargaining	0.996	4.367**	5
C	<b>Interaction of LOG and workplace-level coverage of collective bargaining (simple)</b>			
	(Ref.: Non-union workplaces)			
	LOG not covered by collective bargaining, but others at workplace covered	2.305*	-0.252	3
	LOG covered by collective bargaining	1.375*	2.387**	15
D	<b>Interaction of LOG and workplace-level coverage of collective bargaining (disaggregated)</b>			
	(Ref.: LOG not covered by collective bargaining)			
	LOG covered; workplace coverage 1-69 per cent	2.377	2.442	3
	LOG covered; workplace coverage 70-99 per cent	1.345	5.133**	6
	LOG covered; workplace coverage 100 per cent	0.843	1.200	7
E	<b>Interaction of LOG coverage and complexity of collective bargaining arrangements</b>			
	(Ref.: LOG not covered by collective bargaining)			
	LOG covered; single union recognized	2.862**	3.328**	8
	LOG covered; multiple unions recognized	0.886	7.938**	4

Cont.

<b>F</b>	<b>Interaction of LOG coverage and presence of local representative of recognized trade union</b>			
	(Ref.: LOG not covered by collective bargaining)			
	LOG covered; covered employees do not have local rep.	0.560	1.864*	8
	LOG covered; covered employees have local rep.	3.966**	3.934**	7
<b>G</b>	<b>Interaction of LOG coverage and management encouragement of union membership</b>			
	(Ref.: LOG not covered by collective bargaining)			
	LOG covered by collective bargaining but management does not strongly encourage union membership for any groups of workers	1.400**	1.850**	14
	LOG covered by collective bargaining and management strongly encourages union membership for at least some groups of workers	0.803	26.986**	2

## Part 2: Employee voice outside union bargaining

<b>Model</b>	<b>Variable</b>	<b>Marginal effect on odds</b>		<b>Per cent of workplaces</b>
		<b>Pension scheme</b>	<b>Ext. stat. Sick pay</b>	
<b>H</b>	<b>Interaction of LOG coverage and joint consultation over “pay issues”</b>			
	(Ref.: LOG not covered by collective bargaining; No joint consultation over “pay issues” at workplace)			
	LOG not covered; JCC discusses “pay issues”	1.320	0.781	7
	LOG covered by collective bargaining	1.433**	2.580**	15
<b>I</b>	<b>Interaction of LOG coverage and presence of non-union employee representatives</b>			
	(Ref.: LOG not covered by collective bargaining; No non-union rep. at workplace)			
	LOG not covered; non-union rep. present, but no role in determining “pay or conditions”	0.157	0.093	4
	LOG not covered; non-union rep. present with involvement in determining “pay or conditions”	0.878	0.265	4
	LOG covered by collective bargaining	1.355*	2.488**	15

Key to statistical significance of marginal effects: \* significant at 5% level; \*\* significant at 1% level

As far as joint consultation and non-union representation are concerned, the results were in line with those on pension provision since, in neither case were the positive effects of these forms of representation large enough for us to reliably say that they increased the odds of provision for uncovered occupations.

Our analysis of fringe benefit provision suggests that the positive association with unionism, revealed by Casey to exist at the beginning of the 1990s (Casey, 1994), were still present at the end of the decade. In our models, the forms of unionism associated with the provision of extra-statutory sick pay were extremely similar to those shown to be associated with higher wages or salaries, whilst those associated with the provision of employer pension schemes were, in some respects, distinct. One general conclusion that can be reached, therefore, is that the impact of unions on the total amount of compensation afforded to employees is greater than the effect they are shown to have on pay alone.

## **8 Conclusions**

Our analysis of pay levels and fringe benefit provision has revealed much about the characteristics of employers and trade unions that provide better outcomes for employees. The analysis is more illuminating for private sector employees than for the public sector, as might be expected. When allowance is made for a wide range of individual employee characteristics, indicative of their 'human capital', we find that different types of employer and different types of employee 'voice' have an important bearing on hourly pay levels for comparable employees. Some of the relationships are consistent with other empirical research, some are at odds with previous findings and some are quite novel. In part, the novelty of some of our results stems from the size and richness of our data source, particularly its combination of employer and employee data.

We find that job characteristics have an important bearing on pay levels. Employers pay higher wages or salaries for permanent jobs than they do for similar temporary jobs. They do not fully compensate employees who work overtime on a voluntary basis, since these have a lower hourly rate of pay than employees who do not work overtime hours. Employees who work compulsory overtime do not, on average, get paid at a higher hourly rate than employees working only standard hours. These differences in hourly pay may reflect deliberate choices by employers or they may be the unintended consequences of employers' decisions about the division of labour and of the selection and self-selection of employees into the different types of jobs. However, in a capitalist economy it is primarily employers and managers who design the division of labour within enterprises and individual workplaces and so are largely responsible for the design of jobs. It is largely they who decide whether jobs should be permanent or temporary, full or part-time, include pay for overtime working and so on. Hence we regard associations between these job characteristics and levels of pay as largely the consequences of employers' behaviour.

Another set of job characteristics associated with higher hourly pay is the degree to which the employee receives other rewards or inducements to loyalty or effort. Employees provided with fringe benefits such as pensions, enhanced sick pay, job security guarantees and performance related pay generally also have higher hourly earnings from their job. This adds support to many studies which have shown how employers supplement pay with other rewards in an attempt to increase worker productivity.

One particular job characteristic stands out as having an especially large effect upon pay levels – the extent to which the job is organised to be within a group of jobs that are generally done by men or generally done by women. Of course, it has been unlawful for some time for employers to advertise jobs as only available to men or to women; and similarly it is unlawful to discriminate against either women or men in selecting them for a job and in setting their level of pay. Nevertheless, job groups within workplaces are highly segregated by gender: nearly a quarter of jobs are such that either only men or only women are doing them within particular workplaces. Making due allowance for their ‘human capital’ and for other job characteristics, we find that employees are paid very much more if they are doing a job only done by men at their workplace than if they are doing a job only done by women. The difference is around 17 per cent of hourly pay in the private sector and is only slightly smaller when we make additional allowance for the impact of different pay determination arrangements and for the impact of trade unions. There is an additional effect at workplace level: pay is generally lower where the workforce is predominantly female. Needless to say, part of the gender segregation apparent for groups of jobs and for workplaces is due to employees’ preferences about whom they wish to work with. But that leaves considerable room for manoeuvre for employers in how they locate their establishments, design the jobs within them and set the terms of conditions attached to them. We cannot say from our analysis how much those decisions are influenced by the fact that jobs occupied by women are generally paid substantially less than those occupied by men. But it seems likely that it is a factor that many employers do not ignore.

Extending our focus beyond the individual job and its immediate surroundings to the workplace as a whole and the wider enterprise, we find a further range of influences upon pay. As many have shown before, larger workplaces pay higher wages and salaries, although our results suggest that this is not so across the whole range of sizes encompassed by our results, when other factors are taken into account. Only the largest workplaces in the private sector (those with 200 or more employees) pay a demonstrable premium over the pay of the smallest workplaces. But in contrast to a number of influential studies, we find no differences according to the size of the enterprise in which the employee works. Foreign-owned firms pay more, even controlling for the industry that they are in and the competitiveness and growth trend of the product market. Private sector employers in tight labour markets pay higher wages and salaries, adding to the wealth of evidence on this relationship put forward by Blanchflower and Oswald (1994).

Our most novel findings are those that examine how employers’ behaviour in setting pay is modified by the influence of employee ‘voice’. Trade unions have long been shown to

raise pay levels above those in comparable non-union situations, but the general decline in the extent of union representation and in the influence of unions raised the possibility that this was no longer the case. In the private sector we showed that there is no general premium for employees covered by union bargaining arrangements, as indeed was suggested by analysis of workplace-level data for 1990 (Stewart, 1995). But specific types of employer-union arrangements do show a substantial premium compared with cases where the employee's pay is not covered by union negotiations. It makes no clear difference whether the employer negotiates with the union at workplace level, enterprise level or in a multi-employer setting. But it does matter how extensive the collective bargaining is in terms of the proportion of the workforce that it applies to. Only where bargaining covers between 70 and 99 per cent of employees is there a demonstrable pay premium over similar employees in similar non-union workplaces. We estimate the premium in those circumstances to be around 8 per cent of hourly pay and it applies to 14 per cent of all employees in the private sector. However, another smaller group of employees also benefits from the union activity in these workplaces. They are mostly managers and professional workers and they may even benefit to a greater degree than the majority of the workforce in their establishment who are directly covered by the union bargaining arrangements.

Another way of identifying the group of employees who most clearly benefit from union bargaining is by the complexity of their representation arrangements. Multiple unions at workplace level achieve a demonstrable wage premium of around 11 per cent, whereas single union arrangements show no advantage for employees over having no union representation for pay bargaining. Again the 'uncovered' employees in the same workplaces share in the gains achieved by the unions.

The ineffectiveness of single-union representation in achieving a pay premium is matched by the ineffectiveness of voice arrangements that do not involve collective bargaining. Where managers consult with employees, either through a consultative committee or with individual non-union representatives, pay levels are unaffected.

We find that unions continue to have a role in inducing employers in the private sector to offer enhanced fringe benefits, but only in particular circumstances. Controlling for other factors, pension schemes are more common where unions negotiate at workplace or enterprise level, but not where there is multi-employer bargaining over pay. Unlike pay, pension provision is more common where single unions are recognised. But as with pay, none of the forms of employee voice outside bargaining make any difference as to whether employers provide pensions. Sick pay provision closely follows the pattern of higher pay, with the same types of workplace and union representation having an increased likelihood of providing the benefit.

In broad terms, we find that the pay of comparable employees is modified substantially by the type of employer who employs them. In a minority of workplaces the employer's behaviour is modified by collective bargaining over pay with trade unions. This effect spills over to other employees in the same workplace and may also increase the likelihood of the employer providing fringe benefits.





## Appendix A

### Definitions of variables used in analysis of earnings

Variable	Definition
Occupation	Employee's self-classification into one of nine occupational groups, combined with employee's report of the degree of influence they have about how they do their work. 'A lot' classified as high autonomy; 'Some', 'A little' and 'None' classified as low autonomy.
<b><i>Human capital variables</i></b>	
Highest educational qualification	Employee's report of highest educational qualification held. 'Postgraduate degree or equivalent' combined with 'Degree or equivalent'.
Vocational qualification	Employee's report of whether they hold a recognised vocational qualification, such as a trade apprenticeship, NVQ or City and Guilds Certificate.
Employer-provided training in last 12 months	Employee's report of the number of days training received in the past year that was either paid for or organised by their employer (in one of six bands).
Age	Employee's report in one of seven bands.
Length of service	Employee's report of number of years that they have worked at the sampled workplace (in one of five bands).
<b><i>Personal and family characteristics</i></b>	
Gender and dependent children	Employee's self-classification of gender, combined with employee's report of whether they have dependent children under 12 years of age.
Ethnic Minority	Employee's report as belonging to one of seven specified ethnic groups or "another ethnic group" but not "white".
Disability	Employee's report of having a long-standing health problem or disability that limits what they can do at work, at home or in their leisure time.
<b><i>Further job characteristics</i></b>	
Contracted hours	Employee's report of total usual weekly hours, less overtime or extra hours.
Temporary or fixed-term job	Employee reports their job to be temporary or fixed-term.
Overtime working	Whether overtime is compulsory or voluntary, derived from employee's report of one main reason for working overtime or extra hours. 'It's required as part of my job' coded as compulsory; 'I enjoy my work', 'I need the money', 'I don't want to let down the people I work with', 'So that I can get all my work done' and 'Some other reason' coded as voluntary.
Gender Job Segregation	Employee reports that the type of work they personally do is done at their workplace "only by men", "mainly by men", "equally by men and women", "mainly by women", or "only by women".
Occupational pension	For non-managerial employees: manager reports that employees in the largest non-managerial occupational group are entitled to join an employer pension scheme. For managerial employees: manager reports that managers at the workplace are entitled to join an employer pension scheme.
Extra-statutory sick pay	For non-managerial employees: manager reports that employees in the largest non-managerial occupational group are entitled to sick pay in excess of statutory requirements. For managerial employees: manager reports that managers at the workplace are entitled to sick pay in excess of statutory requirements.

Job security or no-redundancy guarantee	Manager reports that there is a policy of guaranteed job security or no compulsory redundancies for members of the employee's occupational group.
Performance-related pay	Manager reports that at least some members of the employee's occupational group receive performance-related pay.
<b>Workplace characteristics</b>	
High Involvement Management index	High Involvement Management workplaces are those with at least two of three chosen 'task practices' (teamworking, functional flexibility and quality circles), two of four 'individual supports' (briefing groups, information disclosure, performance appraisal and human relations training) and two of three 'organizational supports' (internal recruitment, job security and financial participation). Traditional workplaces are those with less than two practices in each of the three categories. Mixed Approach workplaces constitute the remainder. See Forth and Millward (2000a).
Work arranged in shifts	Manager reports that the work of at least some non-managerial employees is arranged in shifts.
Size of workplace	Manager's report of numbers employed at the workplace, banded into: 10-24, 25-49, 50-99, 100-199, 200-499, 500 or more.
Size of enterprise	Manager's report of numbers employed by the whole organisation in the UK to which the workplace belongs, banded into: 10-499, 500-1999, 2000-9999, 10000-49999, 50000 or more.
Age of workplace	Manager's report of number of years establishment had been at its current address (plus its previous address if it had moved) amalgamated in 4 bands.
Foreign owned	Manager reports workplace is at least 50 per cent foreign-owned or controlled.
Percentage employees female at establishment	Manager's report of number of female employees at the establishment, expressed as a percentage of the total number of employees.
Percentage employees part-time at establishment	Manager's report of number of employees at the establishment working part-time (less than 30 hours per week), expressed as a percentage of the total number of employees.
Percentage employees manual at establishment	Manager's report of number of employees at the establishment in the following occupational groups: Craft and Skilled Service; Personal or Protective Service; Operative or Assembly; and Unskilled. Expressed as a percentage of the total number of employees.
Percentage employees sustaining work-related injuries in last 12 months	Manager's report of number of employees sustaining any of seven specified injuries, or any other injury resulting in immediate hospitalisation for more than 24 hours, during the last 12 months. Expressed as a percentage of the total number of employees employed at the time of interview.
Percentage employees absent due to work-related illness in last 12 months	Manager's report of number of employees absent during the last 12 months owing to any of four specified physical problems that were caused or made worse by their work. Expressed as a percentage of the total number of employees employed at the time of interview.
Industrial activity	Manager's response to open question on main activity of workplace, coded to 4-digit level of Standard Industrial Classification, then amalgamated into broad categories.
Intensity Of Competition	Manager reports that organisation to which the workplace belongs has no competitors/dominates the market for the workplace's main product, has few competitors or has many competitors.
Product Market State	Manager reports market for main product or service is growing, mature, declining or turbulent.
Establishment's financial performance	Manager reports that, compared with other establishments in the same industry, the sampled establishment's current financial performance is a lot better than average, better than average, about average for the industry, below average or a lot below average.

Tight labour market	Ratio of officially recorded unemployment rate to officially recorded vacancy rate is less than or equal to 3.0, for the travel-to-work-area in which the workplace is situated.
London	Workplace situated within Greater London.
<b><i>Union voice arrangements</i></b>	
Whether pay set by collective bargaining	Manager reports that collective bargaining (at industry, organisation or workplace level) most closely characterised the way pay was set for members of the employee's occupational group.
Nature and level of pay determination	Manager's report of the method that most closely characterised the way that pay is set for members of the employee's occupational group, chosen from one of seven categories. Category labelled 'Some other way (e.g. pay review body)' in the questionnaire is here labelled 'Set by management, level not known' in private sector, 'External to organization' in public sector.
Coverage of collective bargaining within employee's workplace	Computed from manager's reports of whether collective bargaining (at industry, organisation or workplace level) most closely characterised the way pay was set for each of up to nine occupational groups and of the numbers of employees in those groups. Expressed as percentage of the total number of employees at the establishment.
Interaction of individual and workplace-level coverage of collective bargaining (simple)	Whether employee's pay is set by collective bargaining and, if not, whether the pay of other employees in the same establishment is set by collective bargaining. Derived from combination of employee-level variable 'Whether pay set by collective bargaining' and workplace-level variable 'Coverage of collective bargaining within employee's workplace', both described above.
Interaction of individual and workplace-level coverage of collective bargaining (disaggregated)	Whether employee's pay is set by collective bargaining or not, combined with coverage of collective bargaining within workplace. Derived from combination of employee-level variable 'Whether pay set by collective bargaining' and workplace-level variable 'Coverage of collective bargaining within employee's workplace', both described above.
Complexity of collective bargaining arrangements	Derived from manager's reports of whether there were one or more recognised unions with members at the workplace and, if more than one, whether the unions negotiate jointly or separately, either singly or in groups. Separate dummy variables indicate the presence of: a single recognised union; multiple unions negotiating jointly; multiple unions, some or all negotiating separately.
Interaction of individual coverage and complexity of collective bargaining arrangements	Whether employee's pay is set by collective bargaining or not, combined with manager's reports of type of bargaining arrangements in place at the workplace. Derived from combination of employee-level variable 'Whether pay set by collective bargaining' and workplace-level variable 'Complexity of collective bargaining arrangements'.

Interaction of individual coverage and presence of local representative of recognised trade union	Whether employee's pay is set by collective bargaining or not (described above), combined with manager's report of whether one or more recognised unions have any representatives or stewards at the workplace, excluding any representatives concerned exclusively with health and safety.
Management encouragement of union membership	In workplaces where at least some employees are covered by collective bargaining, manager's report of whether employees have to be a union member to get or keep some jobs at the workplace and, if not, whether management strongly recommends that some employees should be union members.
<b><i>Non-union voice arrangements</i></b>	
Interaction of individual coverage and joint consultation over "pay issues"	Whether employee's pay is set by collective bargaining or not (described above), combined with manager's report of whether the workplace has a committee of managers and employees that is primarily concerned with consultation, rather than negotiation, and that discusses 'Pay issues (e.g. wage or salary reviews, bonuses, regrading, job evaluation)'. .
Interaction of individual coverage and presence of non-union employee representatives	Whether employee's pay is set by collective bargaining or not (described above), combined with manager's report of whether the workplace has any employees, apart from representatives of recognised unions or health and safety representatives, who act as representatives of other employees in dealing with management.

## Appendix B

### Interval Regression

The method of interval regression developed by Stewart (1983) estimates a model in which the value of the dependent variable for the  $i$ th individual,  $y_i$ , is observed to lie somewhere in the interval

$$y_i^{LB} \leq y_i \leq y_i^{UB} \quad (i=1, \dots, N)$$

on the real line, where  $y_i^{LB}$  is the lower bound of the interval and  $y_i^{UB}$  the upper bound.  $y_i^{LB}$  may equal  $-\infty$  or  $y_i^{UB}$  equal  $+\infty$  if the observation is identified as falling in an open-ended interval.

In respect of the earnings data analysed in this paper, where  $y_i$  is the natural logarithm of hourly earnings,

$$y_i^{LB} = \log\left(\frac{g_i^{LB}}{h_i}\right) \quad \text{and} \quad y_i^{UB} = \log\left(\frac{g_i^{UB}}{h_i}\right)$$

where  $g_i^{LB}$  is the lower bound and  $g_i^{UB}$  the upper bound of the interval of gross weekly wages, from question D11 in the WERS98 Survey of Employees, and  $h_i$  is the usual number of hours worked each week, from question A3. In this case,  $y_i^{UB}$  will equal  $+\infty$  if the observation is identified as falling in the uppermost band on question D11 but, clearly, if the observation falls in the lowest band  $y_i^{LB} > 0$ , rather than  $y_i^{LB} \geq -\infty$  as in the general case stated above.

The latent structure of the equation to be estimated is assumed to be given by:

$$y_i = x_i \mathbf{b} + \mathbf{e}_i \quad (i = 1, \dots, N)$$

where  $y_i$  is the unobserved dependent variable (in our case, the natural logarithm of hourly earnings),  $x_i$  is a vector of regressors and  $\mathbf{b}$  a vector of parameters. The errors  $\mathbf{e}_i$  are assumed to be independent, identically and normally distributed random variables with a mean of zero and variance  $\mathbf{s}^2$ ,  $\mathbf{e} \sim N(\mathbf{0}, \mathbf{s}^2)$ , and are assumed to be independent of  $x_i$ . Let the interval  $[y_i^{LB}, y_i^{UB}]$  within which  $y_i$  is observed be denoted by  $j_i$ .

Following Stewart (1983, 1987), and amending for the inclusion of sampling weights (StataCorp, 1999c: 205), the likelihood of the observed sample is given by:

$$L = \sum_{j=1}^J \sum_{i \in j} w_i \log \left[ \Phi \left( \frac{y_i^{UB} - x_i \mathbf{b}}{\mathbf{s}} \right) - \Phi \left( \frac{y_i^{LB} - x_i \mathbf{b}}{\mathbf{s}} \right) \right]$$

Where  $j = 1, \dots, J$  are the observed intervals,  $\Phi(\cdot)$  is the standard cumulative normal distribution, and  $w_i$  is the sampling weight for the  $i$ th observation.

Maximisation of  $L$  provides consistent estimates of  $\mathbf{b}$  and  $\mathbf{s}$ . An alternative Least Squares estimation might involve assigning the midpoint to observations in any given interval, with open-ended intervals being assigned values on some other hoc basis. However, such methods do not generally result in consistent estimates (Stewart, 1983).

## Appendix C

### Definitions of variables used in analysis of fringe benefits

Variable	Definition
Occupation	Non-managerial group containing the largest number of employees, computed from manager's reports of the number of employees in each of eight non-managerial occupational groups. Termed the largest occupational group, or LOG.
<i>Job characteristics</i>	
Percentage employees female	Manager's report of number of female employees in the largest non-managerial occupational group at the establishment, expressed as a percentage of the total number of employees within that group.
Percentage employees part-time (less than 30 hours per week)	Manager's report of number of employees in the largest non-managerial occupational group at the establishment that were working part-time (less than 30 hours per week), expressed as a percentage of the total number of employees within that group.
Job security or no-redundancy guarantee	Manager reports that there is a policy of guaranteed job security or no compulsory redundancies for members of the largest non-managerial occupational group.
Performance-related pay	Manager reports that at least some members of the largest non-managerial occupational group receive performance-related pay.
<i>Workplace characteristics</i>	
High Involvement Management index	High Involvement Management workplaces are those with at least two of three chosen 'task practices' (teamworking, functional flexibility and quality circles), two of four 'individual supports' (briefing groups, information disclosure, performance appraisal and human relations training) and two of three 'organizational supports' (internal recruitment, job security and financial participation). Traditional workplaces are those with less than two practices in each of the three categories. Mixed Approach workplaces constitute the remainder. See Forth and Millward (2000a).
Size of workplace	Manager's report of numbers employed at the workplace, banded into: 10-24, 25-49, 50-99, 100-199, 200-499, 500 or more.
Size of enterprise	Manager's report of numbers employed by the whole organisation in the UK to which the workplace belongs, banded into: 10-499, 500-1999, 2000-9999, 10000-49999, 50000 or more.
Age of workplace	Manager's report of number of years establishment had been at its current address (plus its previous address if it had moved) amalgamated in 4 bands.
Foreign owned	Manager reports workplace is at least 50 per cent foreign-owned or controlled.
Percentage employees under 21 years of age	Manager's report of number of employees at the establishment aged 20 or under, expressed as a percentage of the total number of employees.
Percentage employees over 50 years of age	Manager's report of number of employees at the establishment aged 51 or over, expressed as a percentage of the total number of employees.
Percentage employees with a disability	Manager's report of number of employees at the establishment with a disability, expressed as a percentage of the total number of employees.

Percentage employees from a non-white ethnic group: (Ref.: Less than 5 per cent)	Manager's report of number of employees at the establishment from a non-white ethnic group, expressed as a percentage of the total number of employees.
Industrial activity	Manager's response to open question on main activity of workplace, coded to 4-digit level of Standard Industrial Classification, then amalgamated into broad categories.
Intensity of competition	Manager reports that organisation to which the workplace belongs has no competitors/dominates the market for the workplace's main product, has few competitors or has many competitors.
Product market state	Manager reports market for main product or service is growing, mature, declining or turbulent.
Establishment's financial performance	Manager reports that, compared with other establishments in the same industry, the sampled establishment's current financial performance is a lot better than average, better than average, about average for the industry, below average or a lot below average.
Tight labour market	Ratio of officially recorded unemployment rate to officially recorded vacancy rate is less than or equal to 3.0, for the travel-to-work-area in which the workplace is situated.
London	Workplace situated within Greater London.
<b><i>Union voice arrangements</i></b>	
Whether pay set by collective bargaining	Manager reports that collective bargaining (at industry, organisation or workplace level) most closely characterised the way pay was set for the largest non-managerial occupational group.
Nature and level of pay determination	Manager's report of the method that most closely characterised the way that pay is set for members of the largest non-managerial occupational group, chosen from one of seven categories. Category labelled 'Some other way (e.g. pay review body)' in the questionnaire is here labelled 'Set by management, level not known' in private sector, 'External to organization' in public sector.
Interaction of LOG and workplace-level coverage of collective bargaining (simple)	Whether pay of the largest non-managerial occupational group is set by collective bargaining and, if not, whether the pay of other employees in the same establishment is set by collective bargaining. Derived from combination of occupation-level variable 'Whether pay set by collective bargaining', described above, and workplace-level variable 'Coverage of collective bargaining within employee's workplace' described in Appendix A.
Interaction of LOG and workplace-level coverage of collective bargaining (disaggregated)	Whether pay of the largest non-managerial occupational group is set by collective bargaining or not, combined with coverage of collective bargaining within workplace. Derived from combination of occupation-level variable 'Whether pay set by collective bargaining', described above, and workplace-level variable 'Coverage of collective bargaining within employee's workplace' described in Appendix A.
Interaction of LOG coverage and complexity of collective bargaining arrangements	Whether pay of largest non-managerial occupational group is set by collective bargaining or not, combined with manager's reports of type of bargaining arrangements in place at the workplace. Derived from combination of occupation-level variable 'Whether pay set by collective bargaining', described above, and workplace-level variable 'Complexity of collective bargaining arrangements' described in Appendix A.
Interaction of LOG coverage and presence of local representative of recognised trade union	Whether pay of largest non-managerial occupational group is set by collective bargaining or not (described above), combined with manager's report of whether one or more recognised unions have any representatives or stewards at the workplace, excluding any representatives concerned exclusively with health and safety.



Interaction of LOG coverage and management encouragement of union membership	Whether pay of largest non-managerial occupational group is set by collective bargaining or not (described above), combined with manager's report of whether, in workplaces where at least some employees are covered by collective bargaining, employees have to be a union member to get or keep some jobs at the workplace and, if not, whether management strongly recommends that some employees should be union members.
<b><i>Non-union voice arrangements</i></b>	
Interaction of LOG coverage and joint consultation over "pay issues"	Whether pay of the largest non-managerial occupational group is set by collective bargaining or not (described above), combined with manager's report of whether the workplace has a committee of managers and employees that is primarily concerned with consultation, rather than negotiation, and that discusses 'Pay issues (e.g. wage or salary reviews, bonuses, regrading, job evaluation)'
Interaction of LOG coverage and presence of non-union employee representatives	Whether pay of the largest non-managerial occupational group is set by collective bargaining or not (described above), combined with manager's report of whether the workplace has any employees, apart from representatives of recognised unions or health and safety representatives, who act as representatives of other employees in dealing with management.

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