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**Unions, Within-Workplace Job Cuts
and Job Security Guarantees**

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Abstract

Using data from the Workplace Employment Relations Survey 1998, this paper shows that unionisation increased the probability of within-workplace job cuts and the incidence of job security guarantees. As theory predicts, both are more prevalent among market-sector workplaces with higher union density and multi-unionism. Expectations that these effects would be more muted in the public sector were also confirmed.

JEL Classification: J23, J45, J51, J63

Keywords: Job cuts, trade unions, job guarantees

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Introduction

Cutting jobs in particular sections of a workplace has become part of usual management practice, even when overall demand at the workplace is rising. This practice has been interpreted as reflecting competitive and financial market pressures on management (Standing, 1997; Cappelli, 1999). These within-workplace job cuts are presumably of high concern to the employees in sections that are potentially affected, and to their unions. The role of unions in relation to within-workplace job cuts has not previously been analysed, but there is substantial evidence, for both Britain and the USA that the presence of unions tends to reduce overall workplace employment (see Bryson, 2004 for a review) relative to its estimated level in the absence of unions. Within-workplace job cuts may be stimulated by unions for the same reasons. At the same time, however, unions have often emphasised job security in their aims, and numerous agreements are on record to guarantee that compulsory redundancy will not be applied, or to underwrite job security in other ways (IRS, 1997; Kelly, 2004). Such agreements on first view appear to increase employers' severance costs and so make within-workplace job cuts less probable.

This article poses three questions. Do unions increase the probability of within-workplace job cuts (WWJCs), so adding to the evidence about unions and workplace employment? Do unions increase the probability of job security guarantees (JSGs) being made by employers? How are JSGs and WWJCs related? The analysis uses workplace-level survey data that are representative of British workplaces with 10 or more employees in 1998, a period when job security was a salient issue.

Unlike most of the literature on workplace employment, we consider both the market sector and the public sector, in parallel. A policy-related reason for including the British public sector is that during the 1980s and 1990s it was heavily involved in workforce reduction (Morgan, Allington and Heery, 1999), yet has traditions of accepting and encouraging unionisation, which is almost universal there, and of offering long-term security to its employees (*ibid.*). There is also a theoretical motivation for comparing the market and public sectors if one wishes to understand workplace employment decisions and the role of unions. Because the public sector differs from the private through lack of a financial maximand, through prevalence of unions, and through distinctive forms and levels of bargaining, in some respects the two sectors should experience different effects of unionisation. Current understandings of unions and employment in the market sector can be further tested through observations of the public sector.

Since WWJCs by definition relate to sections of employees rather than to the whole workforce, one needs to show how union effects that are hypothesised to apply at the workplace level can be transferred to this lower level. The article argues that the union effect, *via* labour costs, is more likely to apply at sub-workplace level not only when workplace unionisation is at a high or 'strong' level, but more specifically when multi-unionism rather than single unionism is present. Additionally, it is argued that multi-unionism has a 'union voice' (Freeman and Medoff, 1984) interpretation. This is particularly relevant for JSGs, where the article offers a simple framework for interpreting the employer's decision.

In addition to its focus on unions, the analysis considers two additional variables that help to develop an interpretation of differences between the market and public sectors. These are the proportion of women employees at the workplace, and a new measure of monopoly position. The interpretation of these variables will be explained further in the section on theory (see below).

The remaining sections of the paper are as follows. The next section briefly reviews the previous findings concerning unions, workplace employment, and job security. Section three presents a theoretical perspective and hypotheses. Section four describes the data used and the variables constructed. Section five explains the analysis issues and methods. The results follow in section six, and the seventh and final section provides a discussion of the findings, and conclusions.

2. Previous Research on Unions, Workplace Employment and Job Security

The literature on unions' employment effects has focused on changes in workplace employment levels. Studies tend to find that the average effect of union recognition is to lower employment growth by 2.5-4 per cent per annum relative to non-union workplaces, *ceteris paribus* (Blanchflower, Millward and Oswald, 1991; Machin and Wadhwani, 1991; Booth and McCullagh, 1999; Bryson, 2004; Addison and Belfield, 2004). Similar findings emerge from other countries (Leonard, 1992; Long, 1993; Wooden and Hawke, 2000). This has led some analysts to refer to the employment effect of unions as the 'one constant' in studies of unions' economic effects (Addison and Belfield, 2004).

However, the evidence is not easy to interpret. First, the effect is not apparent always and everywhere. There is conflicting evidence on the union effect on employment growth in the late 1970s: Machin and Wadhwani (1991) identify a positive effect whereas Blanchflower et al. (1991) find a negative effect. Second, in spite of evidence that this union effect occurs *within* industries (Bryson, 2004) some have questioned whether it is a causal effect of unionisation (Metcalf, 2005: 100). Third, whereas some studies estimate the average effect of union recognition on changes in employment levels, some studies find union effects differ according to the nature of unionisation and the conditions facing the firm. In particular, union effects differ with union bargaining strength and the scope of bargaining. In the United States (Freeman and Kleiner, 1999) and Australia (Wooden and Hawke, 2000), it appears that union effects in slowing the rate of employment growth are more pronounced where unions have greater bargaining power, as proxied by union density.¹ This finding does not hold for Britain in the 1990s (Addison and Belfield, 2004) but negative employment growth effects are more pronounced where bargaining coverage is high (Bryson, 2004).

¹ DiNardo and Lee (2004) find no effect of unionisation on employment in the United States. However, as the authors readily admit (pp. 1428-1430), their estimates differ in important respects from the other studies. First, they estimate the effect of new unionisation, that is, effects shortly after an NLRB election. Second, their regression discontinuity methodology recovers the effect at the margin between workplaces where votes were just won and those where they were just lost.

The standard assumption is that unions and employers bargain over wages whereas employers set employment levels unilaterally conditional on the wage. If maximising profits, they will choose an employment level that lies along the labour demand curve. Yet, in many instances, unions in Britain do bargain over employment levels as well as wages (Bryson, 2004: 481). In these circumstances, efficient wage bargaining suggests that employment outcomes will be a function of the relative bargaining power of unions and employers and the utility maximisation of both parties. Although there is no direct evidence for Britain on the weight unions attach to employment compared to wages, Bryson (2004: 494-495) finds that when bargaining over employment and wages occurs the union effect on employment growth is ameliorated.

Studies for Britain also indicate that unionised workplaces have lower dismissal rates than non-unionised workplaces (Cully et al., 1999: 128) and lower voluntary quit rates (Fernie and Metcalf, 1995), findings consistent with evidence that unionised workplaces have lower job turnover and longer average job tenure. Yet little is known about the effects of unionisation on within-workplace job cuts. Some recent studies suggest that unions are often involved in ‘managing’ job cuts. For instance, Bryson, Capellari and Lucifora (2004) show unionised workplaces are more likely to have job security guarantees (JSGs) than non-unionised workplaces, but that JSG workplaces are just as likely to suffer job loss as those without a JSG. The difference appears to be that JSG workplaces were less likely to resort to compulsory redundancies. The authors suggest that this is the reason why employee perceptions of job security were higher in workplaces with JSGs than those without. This finding is supportive of case-study research by Kelly (2004: 281) who concludes “that the main function of ‘job security’ agreements is to help companies jointly manage labor force reductions rather than avoid them”. White (2005) also finds union recognition was associated with a combination of higher levels of labour cost-cutting in the form of workforce contraction and outsourcing, and better fringe benefits and family-friendly practices than non-unionised workplaces. He interprets this as evidence of mutual gains, whereby unionised workers trade labour flexibility for higher benefits.

Most of these studies focus on the private sector. However, Addison and Belfield (2004) find negative employment growth effects of union recognition in the public sector similar to those for the private sector. In addition, they find evidence for the public sector that changes in workplace-level union recognition affect employment growth, with new recognitions reducing employment growth and union de-recognition increasing employment growth (Addison and Belfield, 2004). These union switches do not affect employment growth in the private sector.

3. Theoretical Discussion

The reason most commonly advanced for supposing that the presence of unions reduces workplace employment is if they raise wages. Admittedly a negative effect on employment does *not* follow according to some theories of wage-fixing and production (e.g., McDonald and Solow, 1981). None the less, as already indicated, most empirical inquiries have been consistent with the traditional, simple view of the relationship, and that view is maintained here.

This section consequently has two main tasks. The first is to consider whether, *given* a negative relationship between union presence and workplace employment, that can also be extended to WWJCs. The second is to consider whether, or how, union presence may be related to JSGs. In addressing these tasks, consideration is also given to differences between the public and market sectors.

WWJCs and unions

For the market sector, the employer's employment decision on a specific section of the workplace will (other things being equal) be shifted toward cuts by any mark-up on wages or benefits achieved by unions for that section. That however depends on whether the section itself has union representation.² So, one can infer that WWJCs become more probable (for any one or more sections) as union representation across sections becomes more extensive.

Two widely used measures of unionisation that predict union representation of sections of the workforce are workplace membership density, and multi-unionism. As union density approaches 100 per cent, it becomes highly probable that all sections are covered.³ The presence of more than one union also empirically predicts increased sectional representation. For example, in the dataset used for the present research, the correlation between number of occupational groups at a workplace in the market sector and number of groups having union representation was 0.31 when there was only one union, but 0.56 with two or more unions. For the public sector, the corresponding correlations were 0.54 and 0.80.⁴ In addition, it has been argued (e.g., Horn and Wolinsky, 1988) that when a union represents only a section of the workforce, it tends to ignore its bargaining externalities on other employees; and this is accentuated if unions bargain separately rather than jointly. It therefore attempts to push for a higher wage than a union with wide representation that has to take account of possible repercussions for employment across groups. To the extent this takes place, multi-unionism will increase the employer's probability of resorting to WWJCs.

These considerations do not apply in the same way to the public sector. Apart from the absence of a financial maximand, pay and benefits are rarely decided at workplace level in the public sector, so there is usually little scope for unions to exert workplace pressure through local wage bargaining.⁵ Accordingly, there is no reason to hypothesise that workplace unionisation affects WWJCs in the public sector, so the relationship between union density or multi-unionism should be weaker than in the market sector. Local public sector unions will however strive to get the best severance terms for their members (as in the market sector), and management will

² While some positive 'spillover' effects from union bargaining may be gained by a non-union section, this is likely to be smaller than the effect gained by a unionised section.

³ Even in this case, particular sections – notably management – may be excluded from bargaining.

⁴ Although one could use the proportion of occupational groups with union representation as the unionisation variable, standard occupational groups often do not correspond to the sections recognised within a workplace. Also, such a measure is less smooth by comparison with union density and yields no objective classification like multi-unionism.

⁵ The dataset used in the present research shows that in 1998, 42 per cent of market sector workplaces had their pay decisions made at workplace level while this applied to six per cent of public sector workplaces. The pay fixing referred to did not necessarily take place through collective bargaining; in fact, the proportions varied little between unionised and non-union workplaces.

also need to involve unions as agents in implementing WWJCs in an effective manner. This leads on to the issue of agreements to refrain from compulsory severance or more generally to offer job security guarantees (JSGs).

JSGs and unions

Bryson, Capellari and Lucifora (2004) suggest that employers offer job security guarantees because they wish to dispense with some posts *but retain others* (our emphasis). The implication is that JSGs help to prevent or reduce turnover in the posts that employers desire to retain. This suggestion can be developed into a model of JSGs, under reasonable behavioural assumptions. These are that (i) WWJCs (whether actual or potential) increase feelings of insecurity among employees of other job groups, (ii) Feelings of insecurity increase quits, and (iii) JSGs reduce feelings of insecurity.

Consider an employer with two job-groups labelled '1' and '2', and considering job cuts in 1 only. Through WWJCs the employer computes that the profit contribution of 1 will increase by Y , after taking account of severance costs, but also believes that there will be costs of increased quits in 2, labelled C_2 . Now assume that any JSG will apply to both groups (the usual arrangement). The JSG introduces an increase in the severance cost for 1, C_1 , because the agreement is more constraining than standard severance terms; but it will reduce C_2 by a factor $1/d$ ($d \geq 1$), where d represents the 'dependability' of the guarantee ; as d increases, the JSG becomes more effective in reassuring employees and eliminating the induced turnover costs. The employer goes ahead with cuts, but without JSG, if $Y - C_2 > 0$ and $C_2 < C_1 + C_2/d$, and it uses both cuts and JSG if $Y - C_1 - C_2/d > 0$ and $C_1 + C_2/d < C_2$. In short, JSGs will tend to be offered where the severance costs for group 1 are not greatly increased, and where the guarantee can be effectively communicated to group 2, so as to reduce unwanted turnover.

Unions, if present, come into the picture in two ways: through a bargaining role on behalf of group 1, which affects C_1 , and through their voice role, which affects group 2 and factor d .⁶ If a union is present for 1, C_1 is smaller under JSG: because of bargaining, more favourable severance terms for employees have *already* been taken account of in Y (see previous paragraph), so there is less that JSG can do to enhance these terms for group 1. In group 2, the presence of a union reassures employees about the dependability of the employer's JSG, whereas in the absence of a union, the employees are more inclined to disbelieve the promise. The union can also ensure that the JSG is correctly framed by management to meet employees' anxieties. Thus, other things equal, unwanted labour turnover will be reduced more by JSGs where group 2 is unionised than where it is non-union, since factor d is increased through union voice services (Freeman and Medoff, 1984).⁷

⁶ Bargaining on severance does not arise for group 2, because the employer does not wish to cut jobs there. Voice-induced belief does not matter in 1, because induced turnover has already been taken account of by management in the WWJC decision.

⁷ Another case where JSGs can play a part is when WWJCs are potential rather than actual, but insecurity is rising because of employees' foresight. Here management has to set the immediate reduction in turnover costs, from an effective JSG, against the possible future increases in severance costs. The same reasoning about the role of unions applies in this case.

Accordingly, the situation where both groups are unionised tends to be the most favourable for JSGs, since the additional severance costs are lower and the cost of unwanted quits is also likely to be reduced. A situation with one unionised group provides one of these advantages while the least favourable situation is where neither is unionised. Management decisions will however depend on the specific relativities between severance costs and labour turnover costs, as well as these general considerations. Also, some workplaces may self-select into non-unionism through a harmonious or trusting long-term relationship between management and employees, which can be maintained under some circumstances by JSGs. This helps to explain the fact that JSGs occur in some non-union workplaces.

This model can produce predictions about the role of unions for JSGs in a similar way as for WWJCs. JSGs are more likely to be offered by employers where unions cover several sections of employees, and this in turn becomes more likely as union density increases or if multi-unionism is present. Also, where multi-unionism is present, unions specialise in voice services relating to particular sections of employees, and we hypothesise that this will tend to be more effective, further increasing the probability of JSGs being offered.

Unlike with WWJCs, this simple model for JSGs appears suitable for the public sector as well as the market sector, once job cuts (actual or potential) are given, since union voice services will play the same role in both sectors. Further, public sector employers have good reason to be particularly averse to unwanted turnover: cost per quit and per replacement is high, as a result of greater training provision than in the market sector and more bureaucratised recruitment procedures.

The role of other theoretically relevant variables

The inclusion of the public sector in this research motivates the use of two variables, which have not previously been used in studies of unions and workplace employment. These, it is hoped, help to clarify differences in employment practices between the sectors.

It has been customary to assume that monopoly producers are more able than other firms to pass on increases in labour costs in higher prices. This suggests that monopoly producers are less likely to resort to WWJCs. In recent years, however, increased financial incentives have been provided for senior management in many companies, tied to financial performance measures; financial markets have also, it is claimed, become enthusiastic over signals of labour cost reduction. These developments will have reduced any supposed tendency for monopoly employers in the market sector to 'feather-bed' their employees. Most monopoly services, however, are in the public sector, where financial incentives and financial disciplines are less developed. From 1979, British governments have persistently attempted to open public services to competition, but this still covers only a minority of services. A monopoly position may therefore have different effects on employment practices across sectors.

Another respect in which the sectors are likely to differ is in the relative position of women employees. It is hypothesised that employers' use of WWJCs and JSGs will be affected by the proportions of women employed at the workplace, but that this will

depend also upon sector. Labour costs will be lower where the female employment proportion is high, largely because of gender wage discrimination and associated costs. This labour cost advantage will however be smaller in the public sector since it is more constrained by an ethos of compliance with equal opportunity.

4. Data and Variables

The dataset used in the following analysis is the Workplace Employee Relations Survey of 1998 (WERS98). The level of observation is the workplace. WERS98 was a sample survey of workplaces (that is, places of employment at a single address or site) with 10 or more employees, across all regions of Britain and all industries except agriculture, fishing, mining and quarrying, private households, and extra-territorial organizations. This was the fourth survey in a series beginning in 1980, which is regarded as the prime source of information about workplace employment and industrial relations practices in Britain. In 1998, 2191 interviews were completed with a management respondent at each workplace; the response rate was 83 per cent. These were the members of management with responsibility for employee relations policies at the workplace. Further details of WERS98 are provided in Cully et al. (1999).

A particular advantage of taking 1998 as the focal year is that it came toward the end of a period of considerable employee anxiety about job security (Heery and Salmon, 1999) and of declining unionism, and also at the end of an era of Conservative government that placed emphasis upon reducing the size of the public sector.

Variables

The summary statistics for all variables used in the analyses are shown in Table 1. The table is divided into four panels, following the order of discussion below.

(i) The dependent variables

WWJCs are represented by a binary variable scored 1 if there have been reductions in any section of the workplace during the past year. Respondents who said such reductions had occurred were also asked what form these reductions had taken: wastage, labour redeployment, voluntary redundancies or early retirements, or compulsory redundancies. Nearly all workplaces with WWJCs recorded at least one of the labour reduction methods, and in the majority of cases more than one.

JSGs are represented by a binary variable scored 1 if the workplace has made a guarantee of job security, or of no compulsory redundancy, to the *largest* occupational group at the workplace. Only 12 per cent of workplaces with any JSGs did *not* include the largest occupational group, and in 76 per cent of cases of JSGs for the largest occupational group, *all* occupational groups at the workplace were covered by the guarantee. The variable therefore represents a widespread policy within the workplace.

(ii) Union variables

Following on from the earlier discussion, the analysis uses two measures of unionisation. *Union membership density* at workplaces with union recognition has six categories, as follows: no union recognised; 1-29% membership; 30-49%; 50-69%; 70-89%; 90-100%.⁸ Union membership is ignored when there is no recognition. *Single and multi-unionism* is represented by a variable with four categories: no union recognised; single union; two or more unions, bargaining jointly; two or more unions, bargaining separately. The distinction between separate and joint bargaining may be important in relation to the point about bargaining externalities made in section 3 (see Horn and Wolinsky, 1988).

The two variables are used in separate model specifications, rather than jointly, because they are closely associated. This is especially the case in the market sector, because of the presence of a high level of non-unionism common to both variables.

As noted earlier, 'no union' is a weak category in the public sector. Accordingly, the main interest lies in comparisons between the unionised categories in each sector, so for union membership density, the 1-29% category is taken as the reference group, and for multi-unionism, single union is the reference group. In the market sector, comparisons between the non-union case and the varied unionised cases are also of interest.

(iii) Other explanatory variables

Representing the concept of *monopoly position*, a dummy variable is defined in a partially different way for the market and public sectors. In the market sector, it is scored 1 if management does not consider that 'change in market conditions or competitive situation' has been an 'important factor' in bringing about changes that it has experienced in the past five years;⁹ and if, additionally, the *company's* UK market share for its (main) product or service exceeds 50 per cent. In the public sector, only the first condition (experience of market pressures or competition) is taken into account, as the market share question was not asked at public sector workplaces. It is assumed that if a public sector workplace does not experience competition, it has a monopoly share of the service it provides. On this criterion, market sector workplaces representing eight per cent of employment had a monopoly position in 1998 whereas the corresponding proportion in the public sector was 69 per cent. It is of interest that nearly one third of public sector employees were in workplaces that regarded themselves as being affected by market conditions or competition.

The *percentage of women employees* at the workplace is a continuous variable. As well as having an explanatory role, this variable serves as a control since it is negatively associated with unionisation variables in the market sector.

⁸ Ideally we would have liked to classify 100% membership separately, because of the historical importance in Britain of 'closed shop' arrangements, but there were only 48 such cases.

⁹ A workplace was also assumed to be unaffected by competition if it reported no significant change in its circumstances for the past five years, but this applied to only four per cent of workplaces.

(iv) Control variables

The characteristics known from previous research to be important for union recognition, in Britain, are sector, size, industry, region and age of workplace. Variables representing all these characteristics are included. For all analyses, the market and public sectors are treated separately, permitting parameter estimates for all other variables to take different values by sector. Size is represented by the log of the number of employees at the workplace one year previously. The use of lagged size rather than current size means we avoid confounding our dependent variable, WWJC in the last 12 months, with our right-hand side variable capturing size as a structural feature of the workplace. Region is represented by 11 dummies, and age of workplace is grouped into four bands that reflect the main distinctions relevant to unionisation found in previous studies. There are 12 industry groups, overall, but these are reduced to 11 for the market sector models and to nine for the public sector models, because of insufficient numbers in some cells.

A further variable included for both sectors indicates whether the workplace is a separate, administrative head office of an organisation. Such locations may be treated differently in corporate employment policy, compared to operational units, and may also have different forms of unionisation. For the market sector only, a final control variable combines information about corporate status (plc or non-plc) and ownership (UK or non-UK).

5. Analysis Method

The focus of the analysis is on the effects of unionisation on two outcomes, the occurrence of WWJCs and the occurrence of JSGs, which can be regarded as employers' policy choices. To identify the union effects, we assume that selection into unionisation is independent of these outcomes, conditional on the control variables (Manski, 1995: 37-43). This assumption rests on prior knowledge that union recognition in Britain is strongly influenced by structural characteristics that have been included in the regressors (see previous section). There may also be unobserved factors affecting employers' decisions concerning union recognition in particular cases, but these factors can be presumed to apply chiefly in the early years of a workplace, since once a workplace's union status has been established, it is rarely reviewed (Willman, Bryson and Gomez, 2006). Given the low rate of change in union recognition which began to prevail at the end of the 1990s (Gall, 2004), one can reasonably treat unobservables as ignorable. Furthermore, issues of self-selection into unionisation are scarcely relevant in the public sector where a presumption of unionisation has long prevailed (Millward et al., 2000).

The WWJC and JSG decisions can be thought of as discrete choices generated by values of underlying continuous distributions (see section 2). Analysis by means of the probit model is customary for this type of problem. With two dependent variables of interest, however, the initial issue is whether to perform a joint analysis or separate analyses. If WWJCs and JSGs represent a joint decision process, separate estimation of WWJC and JSG will not be consistent because of the likely presence of common unobserved variables. According to one view, a JSG-type agreement would be instituted by management as an adjunct to WWJCs to reduce the costs of induced

labour turnover, and this would point towards joint analysis. It was also noted in section 3, however, that JSGs could be set up without WWJC_s being present, because employees can react adversely to potential as well as to actual job cuts. Employers can also set up JSGs to allay fears of compulsory redundancy at times of reorganisation or technical change, even if no redundancies are planned (see Bryson, Capellari and Lucifora, 2004 and Kelly, 2004). Because of such variations in practice JSGs would often be observed in the absence of WWJC_s. Accordingly joint determination of WWJC_s and JSGs is an empirical issue. This section first presents tests relating to this issue. The analysis which is developed in the light of the results of the test, is then presented in more detail.

Initially, a set of bivariate probit models was estimated under the assumption of the errors having a joint normal distribution (see Greene, 2003, and Appendix for the model specification). The bivariate probit model estimates one additional parameter representing the correlation between errors, relative to estimating two separate probits. The functional form assumptions identify the model when the same regressors are used for each dependent variable; no exclusion restriction is required. Wald test statistics for the null hypothesis that the correlation is equal to zero are shown, for a set of four models, in Table 2. These results offered no evidence that WWJC_s and JSGs are jointly affected by unobserved variables. The correlations are all close to zero and the Wald test is always non-significant at the 15 per cent level.

The analysis accordingly proceeds by means of separate probit models for the two dependent variables. Four variant models are computed for each: two sectors by two unionisation variables (union density, and multi-unionism). After excluding cases with missing data, there are 1920 cases for analysis: 1357 in the market sector and 563 in the public sector. The data are analysed in weighted form, such that they are representative of aggregate employment in workplaces with 10 or more employees. The general value of a weighted analysis with sample data is in minimising sampling bias. A technical advantage of employment weighting in the present case is that it results in a considerably smaller variance in the weighting variable, by comparison with weighting to establishment numbers. This is because WERS98, in common with most surveys of employers, has a stratified sampling plan with selection probabilities that are already quasi-proportional to size of workplace (larger workplaces are oversampled while smaller workplaces are undersampled).¹⁰ Some econometric analyses of WERS data, including Blanchflower, Millward and Oswald (1991) and Booth and McCulloch (1999) have been unweighted: this in effect accepts the quasi-employment weighting which is inbuilt to the sampling design. The weighting applied here takes this a step further, in correcting the sample for departures from proportional-to-size sampling, whether in the design itself or arising from reclassification and non-response (see Cully et al., 1999 for these technical details). We also regard employment weighting as more relevant for policy interpretation and for assessing repercussions on employees, since more weight is given to relationships in the data that affect larger numbers of people. Standard errors for all estimates are derived with a robust variance estimator to take account of heteroskedasticity and of weighting.

¹⁰ The sampling fractions ranged from 1 in 545 in workplaces with 10-24 employees to 1 in 21 for workplaces with 500 or more employees: Cully et al. (1999: 304). However, other factors affecting sampling increase the variation of sample weights considerably beyond the range implied by these figures.

6. Results

This section presents the modelled results for WWJCs before turning to JSGs. To set the scene for the analyses, it may be helpful first to consider the descriptives for the two dependent variables and to note an aspect of their relationship that will be important for subsequent interpretation.

Over the 1997-8 period, Table 1 shows that workplaces accounting for 34 per cent of employment within the market sector experienced WWJCs. In the public sector, the corresponding figure was 45 per cent. These figures illustrate a period when public sector financial stringency, established under the 'Thatcher regime', was still in force. Over the same period, Table 1 shows that workplaces accounting for seven per cent of employment within the market sector experienced JSGs. In the public sector, the corresponding figure was 24 per cent. So the public sector in this period had a somewhat higher incidence of WWJCs than the market sector, and it had a very much higher incidence of JSGs.

WWJCs occur widely without JSGs and *vice versa*. None the less, there would be no value in JSGs unless they were seen to affect employer behaviour. In fact, evidence from WERS98 indicates that employers with JSGs are highly constrained by them. As shown in Table 3, employers in the market sector with JSGs rarely applied compulsory redundancies as a method of making WWJCs. In the public sector, they *never* did so. When no JSGs were in place, compulsory redundancies were used frequently.

(a) The effects of unionisation variables on WWJCs

The effects of the unionisation variables are summarised in the upper two panels of Table 4. The results for the market sector will be considered first. Compared to the lowest union density of 1-29 per cent membership, higher union densities were linked to an increased relative odds of WWJC, but the effect was not monotonic. The effect became positive, at just below the five per cent significance level at a density of 50-69 per cent, declined and became non-significant for densities of 70-89 per cent membership, and then increased to a much larger and more significant effect for the highest category of density (90-100 per cent). The corresponding marginal effects (changes in probabilities, evaluated at the means of the other variables) are shown in the second and third columns of Table 6. For the 50-69 per cent membership category, the probability of WWJCs taking place was increased by 14.3 percentage points relative to 1-29 per cent membership or by 10.1 percentage points relative to 30-49 per cent membership. For the 90-100 per cent membership category the marginal effects were 33.9 percentage points relative to 1-29 per cent membership and 24.0 percentage points relative to 70-89 per cent membership. These membership density groups with significant effects on WWJCs contained seven per cent and three per cent of market sector employment, respectively. In the market sector, then, the main contrast is between the strongest level of unionism and any other situation, whether moderately unionised or non-unionised: but the strongest group represents only a very small proportion of workplace employment. So, if one relied solely on the density variable, one would conclude that the *practical* importance of local unionisation on WWJCs was minor. Similarly, Addison and Belfield (2004) found no effect of union density on workplace-level employment growth.

A stronger conclusion, however, emerges from the market sector models using the multi-unionism variable. Multi-unionism, whether with joint or separate bargaining, had positive and significant effects on WWJCs relative to the single-union situation; the coefficient for separate bargaining was greater than for joint bargaining, but not significantly so. The marginal effects relative to single unionism (Table 6) were an increase in the probability of WWJCs by 13.1 percentage points for joint bargaining and 19.3 percentage points for separate bargaining. As the multi-union situations covered 16 per cent of employment in the market sector, these estimated effects have substantial practical significance.

The results for the public sector showed, as hypothesised, much weaker or non-existent effects of unionisation on WWJCs. Effects of increasing union density, though always positively signed, were not significant in the public sector even at the 15 per cent significance level. It is true that unionised public sector workplaces as a whole had higher odds of WWJCs than non-union workplaces, but this has to be interpreted with caution because, as noted earlier, the non-union workplaces are few and, being highly concentrated in education, cannot sensibly be contrasted with the great majority of unionised workplaces. A somewhat similar pattern of positive but non-significant results was found when using the multi-union versus single union contrasts.

Overall, there is reasonably consistent evidence of union density having a positive effect on WWJCs in the market sector. This is consistent with the previous evidence concerning unions and overall employment change at workplace level, and can be interpreted in a similar way. However, from a practical viewpoint the more important factor appears to be multi-unionism. A possible interpretation is that under multi-unionism the unions tend to press more strongly on wages and have less regard to employment repercussions. The lack of significant unionisation effects on WWJCs in the public sector is consistent with the argument that the prevalence there of higher-level wage fixing removes the scope of local unions to create wage pressures.

(b) The results of other theoretically interesting variables on WWJCs

The lowest panel of Table 4 displays the estimates for the variables that play a supporting explanatory role in these analyses. In the market sector, the female employment variable was negatively signed, and the estimates were significant in the two specifications at the 10 per cent significance level. For the public sector, estimates hovered around zero and were not significant. This appears consistent with the argument that lower female wages reduce wage pressures, and hence the occurrence of WWJCs, in the market sector, but less so in the public sector possibly because of equal opportunity policies.

Turning to the monopoly position variable, estimates for both sectors are negatively signed. However in neither model, are they significant at the 15 per cent level for the market sector and in both models they are significant at the 5 per cent level for the public sector. An interpretation is that in the market sector, financial incentives and disciplines have eliminated much of any difference between a monopoly market position and a competitive market position, from the viewpoint of avoiding WWJCs. In the public sector, there remains a difference between the monopoly service providers (the majority) and those that are more exposed to market influences (the

minority). Increased market exposure is associated, as would be expected, with a higher probability of WWJCs.

Overall, the ancillary variables suggest differences in the character of WWJCs across the two sectors. The market sector is responsive at local level to wage pressures or wage costs, but not to a monopoly position. The public sector workplaces are unresponsive at local level to wage pressures and costs, probably because these are determined by agreements and policies established elsewhere, but become more likely to make job cuts when exposed to market competition.

(c) The effects of unionisation variables on JSGs

The effects of the unionisation variables on the probability of JSGs are shown, across the various model specifications, in the upper panel of Table 5, while the marginal effects are summarised in the fourth and fifth columns of Table 6.

The probability of having a JSG *in the market sector* rose progressively and steeply with increasing union density, relative to the lowest level of density. Non-union workplaces also had an increased probability of JSGs than the lowest unionised level, but this difference was not large. A practical difference relating to JSGs became apparent once unions represented at least one half of employees. Compared with the lowest-density unionised workplaces, those with 70-89 per cent union membership had a 10 percentage point increase in the probability of JSGs and those with 90-100 per cent density had nearly a 20 percentage point increase.

For the market sector, the alternative model specification showed multi-union situations positively affecting JSGs, relative to either single union or non-union situations. However, the effect was significant only for workplaces with joint bargaining arrangements, for which the marginal probability of JSGs being provided increased by 7.6 percentage points, compared with single union workplaces.

In the *public sector*, in sharp contrast with the market sector, there were no significant effects of union density on JSGs. However, as in the market sector, here multi-unionism accompanied by joint bargaining arrangements increased the probability of JSGs, with a marginal effect of 18.9 percentage points relative to the single union situation. Although this is considerably larger than the corresponding marginal effect in the market sector, it should be recalled that JSGs are far more common in the public sector. The multiplicative effects on relative odds are similar across sectors.

The results concerning multi-unionism, when compared across sectors, provide some evidence in support of the earlier argument that JSGs would be promoted by widespread unionism in both sectors. There is however an obvious difficulty in the different between-sector results concerning union density. One way out of this difficulty is if one interprets multi-unionism, in this context, as primarily reflecting unions' voice services (i.e., unions have more effective voice services when they specialise by type of employee), while union density has its customary interpretation in terms of (local) bargaining power. The suggestion is that in the market sector, unions can influence severance terms locally both through bargaining power and through voice. Public sector unions cannot influence severance terms locally through

bargaining power (this may result from a lack of local bargaining structures), but can exert an influence through local voice.

(d) The results of other theoretically interesting variables on JSGs

The lowest panel of Table 5 displays the estimates for the variables that play a supporting explanatory role in the analyses of JSGs. In the market sector, the proportion of women in the workforce exerted a positive and significant effect on JSGs. This is reasonable if women employees reduce the added severance costs of JSGs (because these depend in part on wages, and in part on the normal rate of voluntary quits), making JSGs more affordable. Indeed, the results here could be taken as further evidence of market sector employers' sensitivity to severance costs. A monopoly position did not affect the use of JSGs in the market sector.

The public sector's use of JSGs, like that of the market sector, was unaffected by a monopoly position. However, when a higher proportion of women employees was present, the probability of JSGs being provided was *reduced* in the public sector. This is an unexpected finding for which we can offer no interpretation.

7. Discussion and Conclusions

This paper fills a gap in the existing literature by focusing on one possible reason for the well-documented association between lower employment growth rates and unionisation, namely the increased propensity for employers to cut jobs where unions operate at workplace-level. We conjectured that union effects on within-workplace job cuts (WWJCs) would be more evident where unions had the bargaining power to maintain above-market level wages and benefits, and where they covered some sections of the workforce but not others, the rationale for the latter being a lack of union concern for the employment effects that their wage claims might have for uncovered workers in the workplace. However, we also argued that unions remain concerned with the employment consequences of their bargaining, motivating them to bargain for job security guarantees (JSGs) for their members. We further argued that employers have an interest in offering these guarantees where they wish to make WWJCs, since JSGs can reduce quits from among core workers who they wish to maintain but whose feelings of job insecurity might otherwise rise when they see fellow workers' jobs cut. We outlined a model under which employers might engage in job cuts either with or without a JSG, showing that the probability of using a JSG rises with the number of employee groups covered by a union. Union bargaining plays a role in reducing the additional costs of JSG coverage to those groups who are targeted for cuts, while union voice can enhance employees' perceptions of JSG credibility, thus reducing quit rates among the group of workers employers wish to maintain. We also argued that these effects were likely to be more muted in the public sector.

As hypothesised, both union density at the workplace and multi-unionism had positive significant effects on WWJCs in the market sector and neither had significant effects on WWJCs in the public sector. However, the market-sector effects of density were weak, while the effects of multi-unionism were clearer and affected a larger section of

the workforce. The effects in the public sector, though non-significant, were always positive.

The hypothesis with respect to JSGs was that the unionisation variables would have positive and significant effects for both sectors. This proved to be the case in the market sector, but in the public sector only multi-unionism had the predicted effect. This pattern of findings is consistent with multi-unionism being interpreted in terms of 'voice' and union density in terms of 'bargaining power', a conjecture that could usefully be explored in future research.

Appendix: Bivariate Probit Models

The bivariate probit model is an extension of the usual single-equation probit model to the situation where there are two binary dependent variables with correlated disturbances, and complete data on all observations (to distinguish this from the bivariate probit selection model). For dependent variables Y_1 and Y_2 and observations i ($i=1, \dots, n$), one has four marginal probabilities, $\Pr(Y_{1i}=0 \ \& \ Y_{2i}=0)$, $\Pr(Y_{1i}=1 \ \& \ Y_{2i}=0)$, $\Pr(Y_{1i}=0 \ \& \ Y_{2i}=1)$ and $\Pr(Y_{1i}=1 \ \& \ Y_{2i}=1)$.

The bivariate probit model extends the probit model to this situation as follows:

$$y^*_1 = \beta'_1 x_1 + \varepsilon_1, \quad y_1 = 1 \text{ if } y^*_1 > 0, \quad y_1 = 0 \text{ otherwise}$$

$$y^*_2 = \beta'_2 x_2 + \varepsilon_2, \quad y_2 = 1 \text{ if } y^*_2 > 0, \quad y_2 = 0 \text{ otherwise}$$

where

$$E(\varepsilon_1) = E(\varepsilon_2) = 0$$

$$\text{Var}(\varepsilon_1) = \text{Var}(\varepsilon_2) = 1$$

$$\text{Cov}(\varepsilon_1, \varepsilon_2) = \rho$$

To write the log-likelihood, put $q_{i1} = 2y_{i1} - 1$, $q_{i2} = 2y_{i2} - 1$, and $w_{ij} = q_{ij} \beta'_j x_{ij}$. $\rho_i^* = q_{i1} q_{i2} \rho$ for $j=1,2$. Then

$$\log L = \sum \ln \Phi(w_{i1}, w_{i2}, \rho_i^*)$$

where summation is over the n observations and Φ is the bivariate normal cdf (see Greene, 2003: 849-51 for further details of estimation by maximum likelihood).

When $\rho=0$, the log-likelihood from the above model equals the sum of the log likelihoods from two separately estimated probit models for y^*_1 and y^*_2 . This leads to the application of standard hypothesis tests (LR or LM, or Wald test in the case of robust estimation) for the correlation term.

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Table 1 Descriptive statistics

	market sector N=1357		public sector N=563	
	Mean	s.e.	Mean	s.e.
dependent variables				
within-workplace job reduction	.3408	.0160	.4481	.0270
job security guarantee	.0698	.0080	.2411	.0222
explanatory variables (unions)				
no union	.6497	.0161	.0837	.0138
density 1-29%	.1008	.0104	.1204	.0165
density 30-49%	.0646	.0080	.2091	.0254
density 50-69%	.0660	.0079	.2366	.0222
density 70-89%	.0894	.0098	.1942	.0206
density 90-100%	.0295	.0050	.1559	.0175
single union	.1945	.0128	.2760	.0237
2+ unions, joint bargaining	.0895	.0100	.4115	.0270
2+ unions, separate bargaining	.0664	.0086	.2289	.0215
explanatory variables (supplementary)				
women employees % of total	44.0629	.9811	62.3984	1.4296
monopoly position	.0782	.0100	.6887	.0250
control variables				
log employees 1 year ago	4.5290	.0574	5.1826	.1095
head office	.1065	.0108	.0709	.0133
plc uk-owned	.4311	.0171		
non-plc uk-owned	.4058	.0165		
plc foreign-owned	.0889	.0106		
non-plc foreign-owned	.0743	.0091		
east anglia	.0467	.0069	.0346	.0090
east midlands	.0780	.0087	.0750	.0138
london	.1128	.0102	.1414	.0177
north	.0596	.0080	.0689	.0164
north west	.1065	.0103	.1184	.0185
scotland	.0792	.0091	.1267	.0187
rest of south east	.2049	.0140	.1611	.0181
south west	.0865	.0098	.0623	.0116
wales	.0422	.0065	.0552	.0138
west midlands	.0956	.0109	.0821	.0139
yorkshire & humberside	.0881	.0107	.0743	.0144
workplace age <5 years	.1720	.0130	.1322	.0198
workplace age 5-9 years	.2044	.0145	.0753	.0125
workplace age 10-24 years	.2928	.0152	.2450	.0232
workplace age 25+ years	.3308	.0161	.6887	.0250
manufacturing	.2894	.0166		
utilities	.0081	.0012		
mfg. & utilities			.0061	.0029
construction	.0425	.0065	.0263	.0059
distribution	.2143	.0140		
hotels & catering	.0628	.0074		
transport & communication	.0632	.0081		
distn., h.& c., & trans.& comm.			.0714	.0148
financial services	.0554	.0071		
other business services	.1568	.0126	.0377	.0114
public administration ^a			.2399	.0212
education	.0193	.0037	.2813	.0227
health	.0619	.0076	.2942	.0273
other services	.0264	.0039	.0429	.0078

Note: One market sector workplace coded as 'public administration' has been reclassified to 'business services' in the present analysis.

Table 2: Tests of the bivariate probit model relative to separate probit models for WWJCs and JSGs

	Market sector sample N=1357			Public sector sample N=563		
	athrho	Wald for rho=0	p for Wald	athrho	Wald for rho=0	p for Wald
Models with TU density	0.08	1.07	0.30	-0.07	0.55	0.46
Models with multi-unionism	0.09	1.38	0.24	-0.08	0.71	0.40

Notes: All models are estimated under employment weighting, with a robust variance estimator. For variables included in models, see Tables 4 and 5. The Wald test computes a chi-square statistic on one degree of freedom.

Table 3: Compulsory redundancy in workplaces with WWJCs, by presence of JSG

	job security guarantee present?		
compulsory redundancy used?	no	yes	total
Market sector			
no	66.1%	91.1%	67.9%
	n=257	n=63	n=320
yes	33.9%	8.9%	32.1%
	n=191	n=4	n=195
all	100%	100%	100%
	n=448	n=67	n=515
Public sector			
no	82.0%	100.0%	86.9%
	n=126	n=58	n=184
yes	18.0%	0.0%	13.1%
	n=61	n=0	n=61
all	100%	100%	100%
	n=187	n=58	n=245

Notes: Table restricted to those cases from the main analysis where WWJCs took place. Ns are observations, percentages are employment weighted.

Table 4: Effects on WWJCs of unionisation and other explanatory variables

	(1)	(2)	(3)	(4)
density (ref. 1-19%)	MARKET	PUBLIC	MARKET	PUBLIC
no union	0.222 (1.51)	-0.426 (1.34)		
30-49%	0.127 (0.59)	0.235 (0.93)		
50-69%	0.404 (1.98)+	0.338 (1.35)		
70-89%	0.287 (1.44)	0.109 (0.43)		
90-100%	0.900 (3.53)**	0.352 (1.33)		
multi-union (ref. single union)				
no union			0.157 (1.39)	-0.540 (1.96)+
2+ unions, with joint bargaining			0.361 (2.01)*	0.221 (1.12)
2+ unions, separate bargaining			0.521 (2.63)*	0.296 (1.33)
other explanatory variables				
female %	-0.0039 (1.85)+	0.0009 (0.23)	-0.0042 (1.99)*	0.0003 (0.08)
monopoly position	-0.217 (1.34)	-0.340 (2.11)*	-0.211 (1.27)	-0.352 (2.28)*
Constant	-1.620 (3.53)**	-0.643 (0.90)	-1.539 (5.05)**	-0.475 (0.70)

Notes: Coefficients are univariate probit models with robust variance estimator; t-statistics (absolute values) shown in parentheses. Estimates for control variables not shown. Controls are: log of lagged size, head office, region (11 dummies), age of workplace (four bands), industry (11 dummies for market sector, 9 dummies for private sector), form of ownership (four dummies, market sector only). N=1357 for market sector; N=563 for public sector. Significance: + 10%, * 5%, ** 1%.

Table 5: Effects on JSGs of unionisation and other explanatory variables

	(1)	(2)	(3)	(4)
density (ref. 1-19%)	MARKET	PUBLIC	MARKET	PUBLIC
no union	0.534 (2.23)*	-0.509 (1.51)		
30-49%	0.562 (1.77)+	-0.117 (0.41)		
50-69%	0.851 (2.90)**	-0.093 (0.35)		
70-89%	1.226 (3.89)**	-0.172 (0.63)		
90-100%	1.644 (4.89)**	0.160 (0.55)		
multi-union (ref. single union)				
no union		0.026 (0.17)	-0.256 (0.87)	
2+ unions, with joint bargaining		0.655 (2.73)*	0.654 (3.28)**	
2+ unions, separate bargaining		0.367 (1.49)	0.285 (1.21)	
other explanatory variables				
female %	0.0068 (2.42)*	-0.0075 (2.08)*	0.0057 (2.11)*	-0.0076 (2.16)*
monopoly position	0.077 (0.29)	0.070 (0.41)	0.036 (0.14)	0.087 (0.52)
Constant	-2.747 (5.83)**	0.957 (1.27)	-2.052 (4.77)**	0.854 (1.21)

Notes: Coefficients are from univariate probit models with robust variance estimator; t-statistics (absolute values) shown in parentheses. Estimates for control variables not shown. Controls are: log of lagged size, head office, region (11 dummies), age of workplace (four bands), industry (11 dummies for market sector, 9 dummies for public sector), form of ownership (four dummies, market sector only). N=1357 for market sector; N=563 for public sector. Significance: + 10%, * 5%, ** 1%.

Table 6: Marginal effects of the union variables

	WWJCs		JSGs	
	MARKET	PUBLIC	MARKET	PUBLIC
density (ref. 1-19%)				
no union	0.075 (1.58)	-0.145 (1.39)	0.020 (2.78)	-0.129 (1.54)
30-49%	0.042 (0.59)	0.091 (0.93)	0.022 (1.38)	-0.035 (0.41)
50-69%	0.143 (1.96)	0.133 (1.37)	0.046 (2.15)	-0.028 (0.35)
70-89%	0.099 (1.44)	0.042 (0.43)	0.100 (2.78)	-0.050 (0.61)
90-100%	0.339 (3.59)	0.138 (1.35)	0.198 (3.01)	0.053 (0.56)
multi-union (ref. single union)				
no union	0.054 (1.42)	-0.184 (2.16)	0.0017 (0.17)	-0.047 (0.93)
2+ unions, with joint bargaining	0.131 (1.94)	0.087 (1.13)	0.076 (2.02)	0.189 (3.59)
2+ unions, separate bargaining	0.193 (2.53)	0.117 (1.34)	0.033 (1.22)	0.070 (1.21)

Notes: Effects for union density and for multi-union variable are estimated in different models (see text, and Tables 4 and 5). Each dummy's marginal effect on $\text{Pr}(y=1)$ is evaluated at the means of the other variables. The z-statistics (absolute values) are shown in parentheses.

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