CENTRE for ECONOMIC PERFORMANCE

CEP Discussion Paper No 745

August 2006

Unions, Job Reductions and Job Security Guarantees: The Experience of British Employees

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Abstract
A national survey makes it possible to examine employees' awareness of net overall reductions in the size of the workforce along with their awareness of employer policies that promise 'no compulsory redundancies'. Differences are investigated between union and non-union workplaces, and between unionised workplaces with high membership density and those with low-to-medium density. A union presence increases both job reductions and job security guarantees to employees, and high membership density has some additional effects in the market sector, but not the public sector.

Keywords: job cuts, trade unions, job guarantees
JEL Classifications: J23, J45, J51, J63

This paper was produced as part of the Centre's Labour Markets Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

Acknowledgements
The survey *Working in Britain in the Year 2000* was funded by the ESRC, as part of the Future of Work research programme, under grant number L212252037, with additional support from the Work Foundation. Alex Bryson would like to thank PSI's strategic development fund for financial support.

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Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

ISBN 0 7530 2051 3

1 Introduction

Job security and insecurity have loomed large, in the past two decades, both in public debates about the risks[1] of contemporary life, and in research on management policies and employee relations. Widespread anxiety about job security in part emerged from the massive recessions of the early 1980s and early 1990s, which witnessed UK unemployment rising to more than 3 million. In the 1990s, additionally, it appeared that employers developed labour policies that called in question even the security of economic prosperity. Old ideas about temporary lay-offs seemed overlaid by the tactics of downsizing: cutting employment even in times of business growth as part of a search for continuous labour cost reduction and 'lean enterprise' (Womack and Jones 1994; Heery and Salmon, 1999).

It was against this background that job security agreements or guarantees rose to some prominence within British employee relations towards the end of the 1990s. Survey evidence (Bryson and McKay 1997) revealed that there was an unmet desire among union members for their unions to bargain on their behalf for job protection. The return of a Labour government to political power in 1997, followed by a more positive governmental and industry attitude towards unions, and some stabilisation of union membership (Gall 2004), provided a facilitative context in which agreements to strengthen job security could be discussed. In addition, there was a growing influence, in management circles, of the ideas of 'human resource management' (HRM) and of associated 'high performance work systems' (HPWS), both originating in the USA. Under at least some versions of HRM/HPWS (e.g., Kochan and Osterman 1994), job security was considered to be a valuable underpinning for a workforce that would be responsible, flexible, and able to learn continuously and take part in organisational innovation.

Some British employers were offering employees limited job protection in the late 1990s. Most often, this took the form of a guarantee against the use of compulsory redundancy. If job reductions were necessary, management would achieve them by other means, such as natural wastage or a call for volunteers to accept redundancy terms. By this means, employees would at least be protected from being pushed onto the job market at times unfavourable for their re-employment prospects. Such guarantees were also written-in to a number of new-style 'partnership agreements' between management and unions that attracted wide notice (IRS 1997; TUC 1999; Brown, 1999, 2000; Kelly 2004).

This article uses a national survey to examine employees' awareness of job reductions at the workplace and of job protection guarantees. This evidence is of a different type from that which is available in employer surveys with management respondents but, it will be argued, not less reliable if interpreted in its own terms. Employee awareness contains an in-built threshold of salience or importance, and captures changes in employee relations of an informal type, as well as the more formal developments.

The central questions to be considered here concern unions' relationship to both job loss and job protection. The evidence of the existing economic literature connects

[1] Throughout this paper, 'risk' is used in its common-language sense of 'chance of something bad happening' rather than in its technical sense of (high) variance in an outcome.

unions, in several countries, with reduced employment by comparison with non-union workplaces, and this has generally been interpreted by labour economists as a consequence of the increased labour costs that unionised employers have to reckon with (Addison and Belfield 2004; Bryson 2004). The existing evidence, however, does not reveal much about how the relative reductions in employment have come about. From an employee viewpoint, there would be a considerable difference between, say, a loss of employment through a brake on rapid growth and a loss of employment through the presence of visible job reductions. This difference is potentially important for employees' views of union membership. In this article, contrasts are estimated between job reductions at unionised and non-union workplaces, and between workplaces with different levels of union density.

Job security guarantees have been discussed in Britain largely in the context of agreements between employers and unions. But there is nothing to prevent employers at non-union workplaces offering such guarantees. The simple question whether employee perceptions of job protection are connected, in Britain, with union representation has not previously been answered. It is another question with obvious relevance for the ability of unions to maintain their appeal to members and potential members.

In addressing these issues, there are technical issues to be faced. The most familiar of these is how to estimate and interpret the effects of unions. A second is whether individual employees, the majority of whom are not located within management, can add anything of value to the information available from management respondents who are knowledgeable about employer policy. A third question, arising from the use of an employee sample, is how to allow for individuals sorting themselves into unionised and non-unionised workplaces, and into relatively secure or relatively insecure work situations.

The next section of this article selectively discusses relevant literature about unions and job reductions, and about unions' relation to job protection or 'no compulsory redundancy' guarantees. The third section discusses the questions of methodology that have just been indicated. Section four describes the dataset used and the variables derived. Section five describes the methods of analysis, and section six the findings. The seventh and final section summarizes the findings and draws conclusions.

2 Previous research on unions, job reductions and job protection

Employees cite job protection as one of the most important goals for trade unions. British Social Attitudes Surveys ask employees in unionised workplaces what they think is the most important thing unions should try to do at their workplace. Even at the height of the Lawson boom in 1989 'protecting existing jobs' was equal first with 'improve pay'. When employees are fearful of job loss it is far and away the most frequently cited goal. Thus, during the depths of recession in 1993 the percentage citing 'protecting existing jobs' was double the percentage opting for the next most common goal (Bryson and McKay, 1997). Even in 2001, when economic conditions were very good, the British Worker Representation and Participation Survey found

that 'protection against unfair dismissal' was by far the issue unionised workers thought was 'very important' for unions at their workplace (Bryson, 2005).

There is conflicting evidence as to whether unions deliver greater perceptions of job protection. In the early 1990s, Gallie et al. (1998: 140-141) found that, *ceteris paribus*, union members were far less likely than non-members to believe they could be easily dismissed. The authors speculate that this effect was due to union membership lengthening the necessary period for dismissal, concluding:

"Despite the decline in union power over the last decade, it is clear that the unions still exercise a considerable influence at workplace level in ensuing stronger regulation of managerial powers".

And yet the same authors go on to find that, ceteris paribus, union membership was associated with greater dissatisfaction with job security (Gallie et al., op. cit.: 145-146). This is in line with other research. Using *BSAS* data, Bryson and McKay (1997) find individual union membership and the presence of a recognised union were associated with higher perceived job insecurity over the 1980s and 1990s.

There are various reasons why unionised workers might feel greater job insecurity and express greater dissatisfaction with job security than their non-member counterparts, even if they rate the probability of dismissal to be lower. As part of the bargaining process unions may encourage 'voice-induced complaining' to strengthen their bargaining hand with the employer (Freeman and Medoff, 1984). Because unions increase the flow of information to employees those in unionised workplaces may be more aware of problems affecting job security than their non-union counterparts. A third possibility is that union members simply have higher expectations of their jobs than non-members. Fourthly, the expression of greater insecurity on the part of union workers could reflect the greater costs of job loss faced by union employees which arise from the wage and fringe benefits premia unions achieve for their members (Blanchflower and Bryson, 2003). This may explain why, in their analyses of the 1986 SCELI[2] and 1997 Skills Surveys Green, Felstead and Burchell (2000) found unionized workers envisaged greater difficulties than non-unionized workers in obtaining re-employment in an equally good job. Green (2003) has reconfirmed this finding with more recent data.

It is clear that job protection and employment security are matters of great importance to unionized workers, their perceptions of security differ somewhat from non-unionized workers, and they expect their union to play a role in protecting jobs. What, then, do unions actually do to jobs and what measures do they take to enhance job protection?

Evidence of unions' effects on employment comes from surveys of individuals, on the one hand, and employer surveys on the other. Beginning with surveys of individuals, although there is considerable evidence that unions reduce voluntary quit rates (Freeman and Medoff, 1984; Bryson and McKay, 1987) and increase job tenure there are few studies that estimate factors associated with involuntary quits. Those that do exist proxy union effects with a union membership dummy, thus potentially

[2] Social Change and Economic Life Inquiry, incorporating a sample survey of adults in six urban areas.

conflating what the union does with the characteristics of employees who become union members. Using SCELI 1986 Theodossiou (1996) finds that, conditional on being a job leaver, union members have a lower probability than non-members of leaving a job for unemployment. They are also less likely to leave a job for reasons of redundancy, suggesting unions play some role in protecting employees from unemployment and redundancy.

Turning to surveys of employers, there is a clear association between unionisation and lower employment growth rates. The effect is in the order of a reduction in employment growth of 2.5-4 per cent per annum in the private sector, *ceteris paribus* (Blanchflower, Millward and Oswald, 1991; Machin and Wadhwani, 1991; Booth and McCullogh, 1999; Bryson, 2004; Addison and Belfield, 2004). Addison and Belfield (2004) are unusual in estimating union employment effects in the public sector. They find the negative effects are similar to those for the private sector. Negative employment growth effects are more pronounced where bargaining coverage is high (Bryson, 2004), suggesting that unions may slow the rate of employment through wage bargaining. This may occur if unions and employers bargain over wages but employers set employment levels unilaterally conditional on the wage, as per the 'right to manage' bargaining model. To maximise profits they will choose an employment level that lies along the labour demand curve.[3]

Negative union employment effects do not necessarily imply a greater probability of job reductions in unionized workplaces. They could arise if unions make firms more reluctant to expand their labour forces because the union wage effect makes new recruits more costly for union than non-union firms and because unions impose additional costs on downward workforce adjustment through severance packages. Alternatively, they may inhibit employment growth by adversely affecting sales growth if higher union labour costs lower the returns to investment relative to non-union firms (Hirsch, 1992) or if lower profitability in union firms means there is less internal capital available for reinvestment than in non-union firms. Empirical studies for the United States (Hirsch, 1990, 1992) and Britain (Denny and Nickell, 1991) suggest that unionised firms do make lower investments in capital than non-union firms.

Employer surveys 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. It is no surprise, therefore, to find unionised workplaces have longer average job tenure (Mumford and Smith, 2004).

The evidence above suggests negative union employment effects may not result from within-workplace job cuts. Yet it is only recently that studies have begun to consider this issue directly. These studies indicate 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 than those without a JSG. The difference appears to be that JSG workplaces were less

[3] Bryson (2004: 494-495) finds that when bargaining over employment and wages occurs the union effect on employment growth is ameliorated, as suggested by efficient wage bargaining theory.

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. Bryson and White (2006) also find unionised workplaces are more likely to suffer within-workplace job cuts (i.e., cuts in particular sections of the workforce), are more likely to have JSG's and are less likely to make compulsory redundancies than similar non-unionised workplaces. These findings are 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.

3 Issues of method

Employee data

A variety of information on both job reductions and job protection is provided by mangers responsible for personnel in the Workplace Employee Relations Survey 1998 (WERS98). Why then seek information from employees, who will generally be less well informed? This is a valid objection if one's chief interest is the formation of employer policy. However, employer data is generally not sufficient to establish the personal experience of an employer's policies by employees. There are two reasons for this. The first is that employer policies or practices often apply patchily across the workplace, including some groups while excluding others. The second and more important reason is that individuals often classify and report employer policies in different ways from both management respondents and from analysts making inferences from quantified data.

The latter point can be illustrated with the question of job reductions. As noted in section 2, several econometric studies have estimated a union effect on workplace employment of around *minus* three per cent per annum. But it seems unlikely that employees are able to judge the counterfactual of how much employment there would have been at the workplace in the absence of unions. More likely, they will judge the condition of workplace employment by reference to net overall change during the recent past. But how much contraction is needed before an employee notices or judges that change is taking place? Unless one has a calibration of numerical change against employees' judgement of change, one cannot infer the latter from the former. The form of change is also relevant, since smooth adjustments to recruitment have different connotations to redundancies. A survey of employees can circumvent these interpretive issues, which arise with employers' data, by directly asking the individual to make a qualitative judgement about change of employment, and similarly by posing questions about perceived job protection practices.

Individual self-selection and sorting

Analysis at the level of the employee brings individual characteristics into the picture. This is familiar in research on union effects on wages, under the rubric of self-

selection and sorting. For example, individuals who prioritise wages may seek out workplaces with a union presence if they believe that unions are generally able to push wages up. Or again, individuals with low productivity (relative to their human capital) may seek out unionised workplaces if they believe that unions reduce wage differentials between more productive and less productive workers. This type of argument can be applied to the subject-matter of this article by replacing wage-related terms by others relating to job security.

Similar considerations apply when one is interested in employee reports or perceptions concerning several aspects of employer policy that are conceptually related. The individual's reports may become correlated through a personal characteristic that makes her or him interested in all related aspects of a policy area. Someone who is highly concerned about job security may closely watch changes in staffing levels and so be more able to report small reductions (or increases) than someone who lacks this interest. The security-conscious person may also to a greater extent be watchful for management signals about job protection.

For these reasons, employee-level analysis of employer policies (with or without a union dimension) is strengthened if some account can be taken of individual characteristics, either by inclusion of control variables or by analytic designs that permit some assessment of unobserved effects.

Union effects

The main hypotheses to be tested in this research concern the effects of the presence of a union at the workplace. First, it is hypothesised to raise the probability of job reductions that are noticeable to employees. Second, it is hypothesised to raise the probability of job protection being offered to employees. Both these hypotheses imply that the presence of the union is (in some sense) a causal effect. One needs to justify this type of hypothesis, especially because the data that will be used are of an observational and cross-sectional type.

A reasonable justification exists if the main influences on the unionisation of workplaces are well known from previous research, and can be represented in the control variables for the analysis. To identify the union effects, we may then assume that selection into unionisation is independent of the outcomes of interest, conditional on the control variables (Manski 1995: 37-43). It remains true however that if any omitted factors that influence union presence also affect the outcomes of interest, the results will be biased. Most research on unions assumes that all relevant variables have been controlled. The main reason for making this assumption (in Britain) is because of the long history of unionism and because the presence or absence of unions is known to depend on a few circumstances that have a very powerful influence – notably sector (market or public), and size of workplace. Although additional unobserved influences doubtless influence employers' choices around the time of giving union recognition (for instance, particular changes in personnel policies may stimulate employees' demand for union representation), most of these unobservable circumstances are long in the past and have often lost their relevance. According to WERS98, more than one half of unionised employment was in workplaces that had been established for at least 25 years, and a further one quarter was in workplaces that had been established for 10 to 24 years. Once a workplace has

decided on union status, it is rarely reviewed (Willman, Bryson and Gomez 2006). These considerations, coupled with the low rate of change in union recognition which began to prevail at the end of the 1990s (Gall 2004), suggest that 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).

4 Data and variables

The dataset for this research is the Working in Britain in the Year 2000 survey (WIB00) (see Acknowledgements). This was a sample survey of employed people in Britain, carried out in the latter part of 2000 and early 2001. Interviews were conducted in the home, by means of a structured interview and a short self-completion questionnaire, and on average were of one hour. In total, 2466 people were interviewed, with an estimated response rate of 65 per cent. Of these, 2132 were employees while the others were self-employed; the present article concerns only employees. Data were weighted to correct for Kish sampling and to align the sample to national proportions (as estimated by the Labour Force Survey 2000). The dataset and further documentation are available in the UK Data Archive.

There are two *dependent variables* for the analysis. The first, 'job reduction', is derived from the following question: "In the past 3 years has the number of people where you work in your current job got larger, smaller or stayed the same?". Interviewers were instructed to accept answers for a shorter period from those who had worked for less than three years in their current job. A "don't know" response was also provided. For present purposes, those answering "got smaller" were coded 1 on the variable, otherwise they were coded 0. Previous experience with this question, which was asked in the 1992 Employee in Britain survey, showed that experience of decreased employment at the workplace was a powerful negative influence on organizational commitment, while increased employment had no effect either way (Gallie et al. 1998: 243-5). In treating those in the "don't know" category as part of the 'no job reduction' group, we make the variable into a measure of *salient* (for the employee) job reduction at the workplace: not knowing about employment change is interpreted as meaning that nothing noticeable has happened.[4] It is worth noting that reports of job reductions in the past three years were strongly associated ($p<0.001$) with employees' expectations of redundancies taking place in the year to come. This suggests that employees tend to be aware of persistent risks to job security; it is of course plausible that some employers make repeated job cuts because of external pressures and/or management policies.

The second dependent variable, 'no compulsory redundancy', is derived from the following question: "Does your organisation have a stated policy of avoiding

[4] Alternatively, one might exclude the "don't know" responses from the analysis, which is equivalent to assuming that their underlying true values have the same distribution as the complete observations. If that were the case, then the coding used for the present analysis would be partially erroneous and would bias the estimates towards zero. Variant analyses were run with the "don't know" responses excluded, as a sensitivity test: the results were similar to those reported below, suggesting that the amount of error introduced by our approach was slight. The results of the sensitivity analysis are available on request from the authors.

compulsory redundancies and lay-offs?". Answers were coded 'yes', 'no' or 'don't know', and the variable was coded 1 for yes and 0 otherwise. This applies the same *salience* interpretation as for job loss, in that a 'don't know' reply is interpreted as no noticeable policy about job protection being present for the employee.[5]

The main type of *explanatory variable* in the analysis concerns unionisation. In parallel analyses, this takes two forms. The first is 'union presence' and is based on the following question: "Are there any trade unions or equivalent organisations where you work?". Questions were also asked in WIB00 about personal union membership, but these are less relevant to the issues of overall workplace job loss and organisational avoidance of compulsory redundancy. The union presence variable has the considerable advantage for an employee survey of simplicity: only four per cent of employees had a 'don't know' or missing response here.[6]

In addition to the union presence question, it is useful to have a variable that reflects the strength of the union in the workplace. In principle, strong unions can bargain more effectively with management, and can also provide more effective voice services for their members and for management. Individuals may also become more critically conscious of employer policies within a highly unionised setting. Within the public sector, particularly, most workplaces are unionised so comparisons with non-union workplaces are somewhat uninformative; it is of more interest to see whether there are differences in outcomes between weaker and stronger unionisation. Accordingly, the second union variable is 'union density' and is based on the following question: "In your workplace, roughly what proportion of people doing your kind of work are members of trade unions or equivalent organisations?". Responses offered on a show-card were: more than three quarters, half to three quarters, about half, a quarter to a half, less than a quarter, none. Respondents unable to choose a category were treated as missing on this question. We condense all the responses above 'none' and below 'more than three quarters' into a single 'low to medium density' category, leaving 'above three quarters' as the high density category. A limitation of the question is that it is confined to the respondent's own type of work, rather than covering the whole workplace. It taps into workplace bargaining to the extent that occupational union density, within the workplace, correlates with workplace union density.

Control variables relating to unions are included in all analyses. The largest influence on union recognition in Britain is whether the organisation is in the public or market sector. The analyses to be reported were carried out separately for the public and the market sectors, thus allowing all parameter estimates to differ freely between sectors. Additionally, the within-sector analyses control for size (number of employees, in five bands), industry group (16 dummies), and region (11 dummies).The only control variable not available in this survey, though known to be an important influence on union recognition, is the age of the workplace (see Disney et al. 1995, Machin 2000 and Millward et al. 2000). Even here, the influence of this variable is largely confined to the market sector, since the public sector has a high prevalence of unionisation

[5] See note 2.

[6] Union membership might be correlated with the propensity to voice complaints and with security-consciousness. However, union membership is not significantly associated with job cuts or job security guarantees and its incorporation made no difference to the results reported later.

even in new establishments.[7] As discussed in section 5, the analysis incorporates a method of eliminating the effect of unobserved employer characteristics, such as age of workplace, that may affect the two outcome variables and unionisation.

Some *individual-level controls* are also included. These are: age and the square of age, gender, social class, marital status (single, partner not employed, partner employed), and contractual status (part-time contract dummy, and non-permanent contract dummy). Social class is coded to the NSSEC-8 classification, except that self-employed categories are absent, so that there are six categories. Unobserved employee characteristics are eliminated along with unobserved employer characteristics (see below).

5 Method of analysis

The analytical issues presented by the subject-matter have been discussed in section 3. Here we describe the methods and assumptions that are applied in the analysis and note how these address the issues.

The focus of the analysis is on the effects of unionisation on two outcomes, the occurrence of workplace job reductions and the occurrence of a 'no redundancy' policy, as experienced by employees. The salience interpretation of these responses suggests that each outcome can be considered as a cutting-point on an underlying continuum. In this type of situation, it is common to apply the *probit model* (see Appendix). The probit model belongs to an analytical family that also includes the logit model, from which it differs chiefly in the assumed underlying distribution of disturbances (see Wooldridge 2002 for an integrated presentation of the probit and logit models). The normal distribution is assumed in the case of the probit model.

A particular advantage of the probit model for the present case is that it can be extended to two dependent variables with correlated disturbances: the *bivariate probit* model. As discussed in section 3, correlation between disturbances could arise either because individual employees have unobserved attributes that influence their reports of both outcomes, or because employers make joint decisions on job reductions and job security guarantees that are perceptible to employees, and these decisions are influenced by the employers' unobserved characteristics. If either of these circumstances applies, analysis by means of separate univariate probit models will give biased results. The bivariate probit model handles the joint estimation of associated binary outcomes in an appropriate manner, and the correlation between disturbances is directly estimated. In the present case, this correlation will capture unobserved influences that are shared by both dependent variables: both those that may arise from joint determination of policies by employers, and those that may arise from characteristics of employees. An additional point to note is that when the same regressor variables are used for each of the two outcomes, the distributional assumptions are sufficient to identify the estimates without imposing any further restrictions. For further details of the model, see Appendix, and for a full explanation, see Greene (2003).

[7] WERS98 indicates that among public sector employees in establishments less than five years old, 95 per cent had a recognised union.

To identify the union effects, we rely on the inclusion in all analyses of the wide range of control variables that was described in section 4, coupled with the elimination of unobserved influences captured in the correlation term of the bivariate probit model. The method does not remove unobserved influences that affect one dependent variable but not the other. However, because both dependent variables concern aspects of job security, it is reasonable to assume that any bias relating to one outcome and not the other (and also related to unionisation) will be small. Also, any unobserved influence on either outcome variable that is not also related to unionisation does not affect the analysis.

In all, four bivariate probit models are estimated: for each sector (market, public), the model is run first with 'union presence' as the explanatory variable, then with 'union density' as the explanatory variable. For the latter, the focus is on whether a high density of union membership makes a difference as against low-to-medium density. All analyses use the weighting described in section 4, and a robust variance estimator that takes account of heteroskedasticity as well as of weighting in calculating standard errors. (For further explanation of robust estimation, see Berk 1990.)

Following presentation of the key estimates, we also present tables of the marginal effects of the union variables. These represent the difference, in percentage points, in outcomes between union and non-union workplaces (or between high-density and low/medium-density workplaces), when all other characteristics are fixed at their means.

6 Results

Descriptive background

One in four of British employees at the start of the 2000s reported a reduction of jobs at their workplace over the previous three years, a period marked by steady growth of total employment in the economy. Nearly the same proportion (23 per cent) reported that their employer had a stated policy of avoiding compulsory redundancies and lay-offs. The association between the two responses (without introducing other controls) was significant, with the highest use of guarantees against compulsory redundancy in workplaces where employment had shrunk (Table 1).

The proportions of employees reporting job reductions did not differ by sector, but the proportion reporting job protection differed greatly, with 17 per cent in the market sector and 35 per cent in the public sector (table not shown).

One half of employees reported the presence of a trade union, or equivalent organisation, at their workplace (Table 2). Confining this to workplaces with at least 10 employees, to make it comparable to WERS98, this becomes 58 per cent: the WERS employment-weighted figure for union recognition is only slightly lower (53 per cent), so it seems that union 'presence', reported by employees, is not far from 'recognition', reported by a management representative. There was also a reasonably good correspondence by sector. Among market sector employees in WIB00 (excluding those in the smallest workplaces), 40 per cent reported presence of a

union, against an employment-weighted figure of 39 per cent from WERS98; the corresponding figures for the public sector were 85 per cent (WIB00) and 91 per cent (WERS98). The lower overall figures shown in Table 2 arise because of the inclusion of employees from the smallest workplaces, where unions are less often present (9 per cent of market sector employees and 71 per cent of public sector employees).

The union density variable had 16 per cent missing who could not estimate membership. Excluding these cases, the proportion of employees at workplaces with no membership was only slightly lower than the proportion with no union presence, at 46 per cent (in other words, very few employees reported membership where they did not report a union presence). 'High density' (three-quarters or more membership) was reported by 24 per cent of employees overall, and by 13 per cent in the market sector but 48 per cent in the public sector (table not shown).

Results from bivariate probit models

Table 3 shows the estimated effects for union presence, for each sector, while Table 4 likewise shows the estimated effects of high union density. These union effects are shown in the upper half of the tables, while the lower half presents the estimates of the correlations between disturbances, and the test for the null hypothesis that each correlation is zero. This test is equivalent to testing the bivariate probit model against separate probit models for the two dependent variables, since these models differ only in the inclusion or exclusion of the correlation term.

Looking across the two tables, one can see that for the market sector, the estimated correlations are positive and the Wald statistics are significant for both outcome variables at the 10 per cent significance level. This supports the use of the bivariate probit model. For the public sector however the estimated correlations between residuals are close to zero and non-significant at the 15 per cent level (a customary significance threshold for this type of test). It therefore seems that employees in the market sector have some unobserved attributes (or their employers do) that influence both their experience of job reductions and their experience of job protection policies; but this does not hold for employees in the public sector.

Focusing on Table 3, one sees that where unions are present, employees' reporting of both job reductions and job security guarantees is higher. This applies in both the market sector and the public sector. The effects appear somewhat larger in the public sector, though it should be borne in mind that the practical significance may be less in the public sector since only a small minority there work in a non-union workplace. Overall, a union presence is important for both job reductions and job security guarantees.

Turning to Table 4, one finds marked differences between the sectors in the effects of high union density. In the market sector, high union density makes a difference compared with low-to-medium union density, significantly increasing employees' reports of job security guarantees and, at a lower significance level, also suggesting an increased experience of job reductions. In the public sector, the differences by union density are small and non-significant. It seems that market sector employers have a high responsiveness to union density, as seen by their employees, whereas this does

not apply in the public sector. This might be because high membership density is more prevalent (or 'normal') within the public sector.

Table 5 presents the marginal effects of the probability of job reductions and of job protection guarantees, for the unionisation variables, evaluated at the means of the remaining variables. This brings out more clearly the different patterns across the two sectors. In the public sector, 'average' employees in unionised workplaces are more likely, relative to non-union workplaces, to experience workforce reductions by 17 percentage points, but they are more likely to experience job security guarantees by 26 percentage points. In the market sector, a union presence brings the opposite pattern to 'average' employees, with a greater increase in workforce reductions (19 percentage points) than in job security guarantees (11 percentage points). However, where the employee's union has a high density in the market sector, the pattern shifts more towards the public sector situation. Compared with low-to-medium density, 'average' employees in the high density market sector workplaces have a bigger differential for job security guarantees (15 percentage points) than for workforce reductions (10 percentage points). However, these differences should be treated with caution as the probit model is non-linear and other patterns of marginal effects can be obtained for employees with characteristics that depart from the average. The main conclusion to be drawn is simply that the marginal effects of unionisation on these two outcomes are generally large.

The results shown in Table 5 correspond to the usual marginal effects from separate probit equations: for instance, the marginal effect of 'no compulsory redundancy' is averaged over cases where decreases in the workforce have occurred and where they have not occurred (and *vice versa)*. This is appropriate in the case of the public sector, as the two outcomes have uncorrelated disturbances, but less so in the case of the market sector. With the bivariate probit specification, it becomes possible to evaluate the joint marginal effects in the presence of correlated disturbances. This is of policy interest since, as the discussion in section 2 indicated, job security guarantees can be given by employers either after the event of job reductions or in anticipation of job reductions: the latter is clearly more desirable from an employee viewpoint. The joint marginal effects for the market sector, shown in Table 6, provide some insight into this issue.

Looking first at the marginal effects of union presence versus non-union situations, one sees that unions make a significant difference to the provision of job security guarantees both in combination with job reductions and in their absence. However, the union presence also increases the probability of job reductions in the absence of job security guarantees, and quantitatively this is the largest effect. Turning to the marginal effect of a high union density (relative to low-to-medium density), one sees a partly different picture. Unions with high membership density make a significant difference to job security guarantees both when job reductions have taken place and when job reductions are absent, but they do not significantly raise the probability of job reductions taking place in the absence of job security guarantees. In the market sector, therefore, it seems that high union density is specially advantageous for employees' overall job security.

7 Discussion and Conclusions

This article has examined employees' awareness of job reductions at their workplace and their awareness of employers' stated policies of job protection: avoiding compulsory redundancies and lay-offs. The main aim has been to assess how employees at unionised workplaces differed from employees at non-union workplaces in their experience of these two types of outcome.

Previous research has indicated that a union presence on average reduces workplace employment relative to counterfactually estimated employment. However, such an effect might often not be visible to employees. This study shows for the first time that employees in union workplaces are more likely to notice *absolute* reductions in employment taking place than are employees in nonunion workplaces. Additionally, however, employees in union workplaces are more likely to observe job protection policies by the employer. In short, where unions are present, employees have to tolerate greater risk of job reductions but are also more likely to have some appreciable protection against the most adverse consequences for themselves.

These differences in outcomes between union and non-union situations are common to employees in both the market sector and the public sector, but have less practical importance in the public sector since most employees there are in unionised workplaces. For this reason, differences were also examined between employees whose work-groups had high union density and those in work-groups with low-to-medium density. High density made a difference in the market sector, intensifying the union effects on both outcomes. But this did not happen for public sector employees. In general, it seems that public sector employees are less affected by variations in unionisation, perhaps because for them unions with a major presence are the norm.

The findings concerning unions and reductions in employment can be interpreted as in the existing economic literature on unions and employment: employers are more likely to cut employment because their labour costs are higher in a unionised regime. On the other hand, the findings concerning unions and job security guarantees show unions continuing to carry out their welfare services for employees. Job security guarantees are more likely to be forthcoming for employees in workplaces with a union presence, whether or not job reductions have been made in the recent past. In other words, unions appear to be to some extent successful in obtaining at least this measure of job protection. In the market sector, however, there is a further practical difference between workplaces with a union presence, taken as a whole, and the group with high union density. Overall, a union presence in the market sector increases the probability of job reductions without any accompanying job security guarantees; but where there is a union presence *with high union density*, this particularly adverse effect on employees is largely removed while the favourable effects on job security guarantees are maintained.

These findings could have important implications for union membership in the long run, but this will depend on several factors. Do employees perceive the link between union membership and job reduction? Assuming that they *do* see the link between unions and job protection (presumably unions will emphasise this link), how do they personally weigh job reduction against job protection? And how does employees'

behaviour (for instance, their decisions to stay or leave the employer, to join or leave a union) change in the light of job reductions and job protection? These are questions for future research that are stimulated by the results reported here.

Appendix: Probit and Bivariate Probit Models

The probit model is commonly applied where an observed dichotomous response is interpreted as a function of a latent continuous response, e.g.

$y_i=1$ if $y^*_i>0$
$y_i=0$ otherwise

The linear regression model for the latent variable is, in customary notation,

$$y^*_i = \beta'_i x_i + \varepsilon_i$$

and if the disturbances are assumed to have a standard normal cdf, then

$$Pr(y_i=1|x_i) = Pr(\beta'_i x_i + \varepsilon_i > 0) = Pr(\varepsilon_i < \beta'_i x_i) = \Phi(\beta'_i x_i)$$

where Φ is the standard normal cdf. The standardisation of the normal distribution (i.e., $Var(\varepsilon_i)=1$) is necessary for identification.

The bivariate probit model extends the 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, … , 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:

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

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

where

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

$$Var(\varepsilon_1)=Var(\varepsilon_2)=1$$

$$Cov(\varepsilon_1, \varepsilon_2)=\rho$$

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

$$\log L = \Sigma \ln \Phi_{(2)}(w_{i1}, w_{i2}, \rho_i^*)$$

where summation is over the n observations and $\Phi_{(2)}$ 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 inference on the correlation term.

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Table 1 Job reductions and job protection ('no compulsory redundancy')

Job reduction	Job protection *row percentages*		
	No	Yes	Total
No	79.0% (n=1246)	21.0% (n=322)	100% (n=1568)
Yes	70.3% (n=373)	29.7% (n=154)	100% (n=527)
All	76.9% (n=1619)	23.1% (n=476)	100% (n=2095)

Table 2 Union presence by sector

	Market sector	Public sector	All
	column percentages		
No union present	66.6% (n=903)	19.35% (n=153)	50.0% (n=1056)
Union present	33.4% (n=446)	80.65% (n=593)	50.0% (n=1039)
Total	100% (n=1349	100% (n=746)	100% (n=2095)

Table 3 Bivariate probit estimates for the effect of union presence

	Market sector		Public sector	
	No compulsory redundancy	Workforce has decreased	No compulsory redundancy	Workforce has decreased
tu present[a]	0.456	0.591	0.876	0.700
	(4.23)**	(5.89)**	(4.78)**	(3.56)**
Observations	1349		746	
athrho	0.1188		-0.0096	
Wald(1)	3.682		0.016	
p for Wald	0.055		0.898	

Note. Estimates of effects are probit coefficients; t-statistics (absolute values) are shown in parentheses. **=significant at the 1 per cent level.
a: Reference group: no union present

Table 4 Bivariate probit estimates for the effect of high union density

	Market sector		Public sector	
	No compulsory redundancy	Workforce has decreased	No compulsory redundancy	Workforce has decreased
no union[b]	-0.123	-0.377	-0.723	-1.021
	(0.99)	(3.30)**	(3.51)**	(4.78)**
union density high[b]	0.529	0.262	0.138	0.168
	(3.46)**	(1.83)+	(1.02)	(1.18)
Observations	1145		620	
athrho	0.1257		-0.0351	
Wald(1)	3.673		0.187	
p for Wald	0.0553		0.6653	

Note. Estimates of effects are probit coefficients; t-statistics (absolute values) are shown in parentheses. +=significant at the 10 per cent level. **=significant at the 1 per cent level.
b: Reference group: union density low/medium.

Table 5 Estimated marginal effects (percentage points) of unionisation variables, by sector

	Union presence (v. no union)		High union density (v. low/medium)	
	No comp. redund.	Decrease workforce	No comp. redund.	Decrease workforce
Market sector	10.9	18.8	15.4	9.8
Public sector	25.7	16.9	(5.3)[a]	(5.8)[a]

Marginal effects are evaluated at the means of the remaining variables.
()[a] Effect is not statistically significant.

Table 6 Estimated marginal effects (percentage points) of unionisation variables on joint outcomes, for market sector

Joint outcome evaluated	Union presence (v. no union)	High union density (v. low/medium)
	Effect	Effect
No compulsory redundancy=1 and Decrease workforce=1	6.9	8.4
No compulsory redundancy=1 and Decrease workforce=0	4.3	7.0
No compulsory redundancy=0 and Decrease workforce=1	12.2	(1.4)

Marginal effects are evaluated at the means of the remaining variables.
()[a] Effect is not statistically significant.

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