Not so dissatisfied after all? The impact of union coverage on job satisfaction

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Abstract

The links between unionization and job satisfaction remain controversial. In keeping with the existing literature we find statistically significant negative correlations between unionization and overall job satisfaction. However, failure to account for fixed unobservable differences between covered and uncovered employees leads to a systematic underestimate of the effects of coverage on both overall job satisfaction and satisfaction facets for both union members and non-members. Once one accounts for these differences between covered and uncovered employees, union coverage is positively and significantly associated with satisfaction with pay and hours of work. Examination of the pay satisfaction effect indicates this is apparent for employees who attain coverage in the same job and for those who become covered when switching employer, but the effect is not apparent for job switchers who remain with the same employer. Furthermore, the 'new' coverage effect on pay satisfaction dissipates over time.

JEL Classification: C35, J28, J51

1. Introduction

There is a well-established negative correlation between union membership and job satisfaction. The association is apparent in most data sets, across country and time. This has puzzled analysts who anticipate union efforts to improve members' wages and working environment should, if anything, lead to an improvement in employee job satisfaction. However, there are several reasons why we might anticipate the negative correlation. First, since union membership is costly it is likely that those who join are among those most dissatisfied with their jobs or, more generally, have dissatisfied personalities. Second, the poor conditions that generate dissatisfaction may trigger unionization. If these sources of heterogeneity are unaccounted for in analyses this will downwardly bias the relationship between unionization and job satisfaction. Third, it is conceivable that the union effect is a true causal effect arising from unions' voice function. This function, as described by Freeman and Medoff (1984) and others, leads unions to foment dissatisfaction with a view to strengthening the bargaining hand of the union in negotiations with the employer.

Many efforts have been made to isolate the causal effect of unionization on job satisfaction. One set of papers uses cross-sectional data and instrumental variables to account for the potential endogeneity of union status. Some of these papers find the negative association between union status and job satisfaction disappears when this is done. A second set of papers identifies the impact of union status by tracking individuals over time, recovering the job satisfaction effect through switches in union status. These papers have the advantage that they account for fixed unobservable differences across unionized and non-unionized workers. Although results are mixed, these authors generally conclude that there is a negative association between union status and job satisfaction, one that appears robust to the inclusion of person fixed effects to account for otherwise unobserved heterogeneity across workers. However, two recent papers (Powdthavee, 2011; Artz, 2010), reviewed together with others in Section Two, have pointed to a positive association between becoming unionized and job satisfaction, at least over the short-run.

It is therefore timely to reconsider this long-standing question. Through a panel analysis (1991-2008) of both overall job satisfaction (OJS) and four facet satisfaction measures we demonstrate that the effects of union coverage on job satisfaction are more positive than hitherto believed. Eliminating fixed unobservable differences we remove a downward bias in the union coverage coefficients that arises when fixed effects are ignored. Moreover, union coverage actually has a *positive* and statistically significant effect on both pay satisfaction and hours satisfaction, two facets of satisfaction relating directly to unions' negotiating role. We find our results hold for covered union non-members as well as members, a finding that is consistent with non-members' ability to free-ride on non-excludable union goods. Focusing

exclusively on pay satisfaction, we show that the positive impact of union coverage appears short-lived, a finding in line with Powdthavee (2011) and Artz (2010), but also in keeping with adjustments to employees' expectations, a process which is frequently noted in the wellbeing literature. Our chief contribution is that we distinguish between union coverage effects on job satisfaction between those who switch union status within their current job, those who switch whilst with the same employer but across jobs, and those who move employer. This proves informative because the positive effect of coverage for pay satisfaction is apparent for employees who attain coverage in the same job and for those who become covered when switching employer, but the effect is not apparent for job switchers who remain with the same employer. We discuss why this might be the case.

Section Two reviews the existing literature and how this paper seeks to contribute to it. Section Three describes our conceptualization and estimation strategy for the analysis. Section Four presents the data and our empirical approach. Section Five presents the results. In Section Six we reflect on these findings and their implications for our understanding of the effects of union coverage.

2. Individual Differences and Their Implications for Union Status and Job Satisfaction

Reviews of the psychological literature show that much of the variation in subjective wellbeing results from individual differences in personality that are very persistent (Diener and Lucas, 1999: 226). Various applied studies have revealed biases in the estimates relating to effects of income, family and unemployment on subjective wellbeing (Ferrer-i-Carbonell and Frijters, 2004; Gerlach and Stephan, 1996; Taylor et al., 2011).

Similar considerations apply in relation to the link between job satisfaction and union status. To our knowledge there is no empirical evidence regarding personality traits and individuals' propensity to be unionized. However, it seems reasonable to argue, as others have done (eg. Bender and Sloane, 1998) that workers are more likely to organize the more dissatisfied they are with their jobs and this may be part of a systemic tendency to dissatisfaction. Those least satisfied with their job will perceive the greatest returns to unionization, leading them to organize or join an existing union while others may be less prepared to incur the costs. The implication is that fixed unobservable differences across unionized and non-unionized employees are liable to downwardly bias the effects of unionization on job satisfaction measures.

The empirical literature remains split as to whether there is a negative effect of unionization on OJS and various facets of job satisfaction. One strand of the literature which is based on cross-sectional data suggests the negative correlation between unionization and job satisfaction is accounted for by

unobservable features of the workplace or the employees who become members. For example, in one of the first studies for Britain, Bender and Sloane (1998) find the negative association between unionization and various job satisfaction measures (OJS, pay, promotion and job security) often disappears when accounting for the industrial relations climate, leading them to argue that union dissatisfaction may be genuine, arising from the poorer working environment which induces union organizing. In a similar vein studies for the United States (Gordon and Denisi, 1995) and Canada (Renaud, 2002) find union effects are non-significant having conditioned on working conditions. Two cross-sectional studies using linked employer-employee data by Bryson and co-authors focus on worker unobserved heterogeneity. Bryson et al. (2004) find negative associations between union membership and OJS and pay satisfaction become statistically non-significant when they instrument for union status, leading them to argue that the effect is driven by selection into union status. In a follow up study using the same data they account for selection into both union membership and union coverage (Bryson et al., 2010). In doing so they find a negative relationship between unionization and job satisfaction facets (respect from supervisors, influence over work and sense of achievement) which is confined to uncovered union members. They suggest membership may increase the 'taste' for coverage, leading to member dissatisfaction in an uncovered environment.

A further set of studies is more directly linked to the current study because they use the same longitudinal panel data - the British Household Panel Survey (BHPS) - to account for fixed unobservable differences across unionized and non-unionized workers. These studies offer seemingly conflicting accounts of the underlying link between unionization and job satisfaction. In the first such study Heywood et al. (2002) analyzed pooled data for the private and public sectors from the first four waves of the BHPS covering the period 1991-1994. They found links between union membership and job dissatisfaction persisted controlling for person fixed effects. Indeed, contrary to expectations outlined above, the negative union membership coefficient became much larger in the fixed effects models estimating overall job satisfaction and satisfaction with 'relations with the boss' compared with their OLS equivalents (op. cit.: 606). On the other hand, the negative union membership coefficient became smaller with the introduction of person fixed effects into the models estimating satisfaction with 'the work itself' and pay. In the case of pay the union membership coefficient became statistically non-significant (op. cit.: 606). Their paper illustrates the importance of distinguishing between different facets of job satisfaction.

Using the BHPS data for 1995-2008 Green and Heywood (2014) find that, having accounted for both fixed individual and job effects, covered members are significantly less satisfied with 'the work itself' and job security. There are no differences by union status with respect to satisfaction with pay or hours. Furthermore, the introduction of worker fixed effects systematically reduces the size of the negative

coefficients for satisfaction with all aspects of the job (op. cit.: Table 5). The implication of this study, together with Heywood et al.'s (2002) earlier paper is that, once one accounts for individual fixed unobserved heterogeneity, there is no statistically significant association between union status and satisfaction with pay, and some evidence that the association disappears with respect to other job facets like hours. Dissatisfaction with job security seems to persist. One possible explanation for such findings is that unionized employees have concerns about the impact of successful union bargaining over terms and conditions, such as pay, on their job security. These concerns may be well-founded given the evidence linking union bargaining power with a higher incidence of within-workplace job cuts in Britain (White and Bryson, 2013).

Recently analysts have been concerned with identifying the potential time-varying effect of switching union status on job satisfaction. Powdthavee (2011) tackles the issue of time-variance in the relationship between union status and job satisfaction for private sector employees over the period 1995-2005 using waves 5-15 of the BHPS. He finds job satisfaction does indeed decline in the year prior to becoming unionized relative to the job satisfaction of those who continue to remain non-union (what he terms an 'anticipation' effect). He also shows that the initial positive impact of being newly unionized dies out quickly, a finding he argues is consistent with the voice-induced complaining needed to support union bargaining, an effect that counters the initial positive effect of becoming unionized. He refers to this process as 'adaptation'. There is one exception to this finding: the positive effect of becoming unionized on pay satisfaction persists, providing further evidence that, at least in this regard, union bargaining may have a causal impact on a key bargaining objective.

In a similar study for the United States using the National Longitudinal Survey of Youth (NLSY) Artz (2010) finds an initial positive impact of unionization on 'global' job satisfaction[1] for those with no previous union experience. However, as in Powdthavee's study, this positive effect decreases with workers' accumulated experience in the union.

In the spirit of Powdthavee (2011) and Artz (2010) who explore links between satisfaction and the dynamics of unionization, we examine changes in job satisfaction with the time employees spend in a union covered environment. However, Powdthavee (2011) confines his analysis to those who do not switch workplace arguing that he wishes to avoid confounding job changers and the newly organised.[2] Instead, we retain all employees and explicitly distinguish between coverage changes associated with

[1] This is the only job satisfaction measure available in NLSY for all years.
[2] Furthermore, his model specification means he focuses on the subset of respondents with at least 4 years of data before unionization and 3 years afterwards.

changing employer, changing jobs with the same employer, and coverage changes within the same job. As well as avoiding the sample selection issues inherent in Powdthavee's (2011) estimation we are able to tackle an issue not hitherto considered in the literature, namely whether satisfaction changes associated with changes in coverage are confined to particular types of employment situation.

3. Conceptualization and estimation

In the light of the psychological literature referred to above, we assume that part of the negative association previously found between unionization and job satisfaction is attributable to unobserved personality variables.[3] If these unobserved variables are constant over time, we can eliminate them by fixed effect methods. Conditional on fixed individual differences, and assuming individuals to be rational in evaluating their employment situation, a positive effect of unionization will dominate where union bargaining has improved workers' terms and conditions relative to what they might have achieved in a non-union environment. A negative effect will dominate where bargaining relies on voice-induced complaining to strengthen the bargaining hand of the union. Negative effects will also arise where unions prove ineffectual in bargaining. Equally unions may have no discernible impact on employees' job satisfaction where union gains are so slight that they simply compensate employees for poorer conditions than those they might face in a non-union setting.

Our estimation strategy is two-pronged. We chiefly rely on fixed-effects (FE) panel regression to estimate the union effect while removing unobservable fixed characteristics such as personality. We also however obtain pooled OLS regression estimates that assume any unobserved fixed differences between individuals are ignorable. Comparison of the two sets of estimates permits an assessment of the importance of unobservable fixed characteristics (see Ferrer-i-Carbonell and Frijters, 2004).

The identification of union effects on job satisfaction in the fixed effects models relies on employees who switch union status. We distinguish between those who switch union status in their current job, those who switch jobs whilst at the same employer, and those who move employer. These different settings can assist in interpreting union effects because they are informative about workers' union preferences and the information they have about unions and thus their expectations over time. Let us take worker preferences first. Employees who enter union coverage while working in the same job do so for one of two reasons: either a union gains recognition from the employer or an already recognised union widens its coverage to the employee's kind of job. Either way the switch is exogenous with respect to the employee since it is not

[3] Ideally we would include personality variables in our specifications. We are unable to do so because the BHPS dataset offers such variables only in one year, and we find that their reliability is somewhat low (Cronbach alpha always below 0.7 and in some cases below 0.6).

her choice. On the other hand, when new coverage accompanies a switch in employer this may reflect choice on the part of the individual worker (who may be influenced, at least in part, by the coverage status of the new job) and the prospective employer (who may choose applicants deemed to be a good match for the covered setting).[4] The intermediate case is where the employee changes coverage status having changed job while remaining with the same employer. Promotions to managerial status can entail a loss of coverage because managers are less likely to have pay set via collective bargaining, even in workplaces with coverage among non-managerial employees. However, we know very little about the circumstances surrounding within-employer job changes so cannot infer how much choice individuals exert in practice. In many cases employees may be required to change job at the employer's behest.

Turning to the issue of worker information about unions and thus their expectations regarding changes in terms and conditions pursuant to a change in coverage, it is well-established that unionization is an experiential good and, as such, workers only come to realise its costs and benefits over time (Bryson and Gomez, 2003). Where a worker is newly covered by a union that has been operating at the workplace, for example, through an extension of the existing recognition agreement, the worker will form expectations based on some knowledge as to how it has performed for other workers at the same employer. But if coverage arises through the arrival of a new union, or if a worker is switching to a new workplace, the employee is likely to base her expectations on what she knows about the average effect of unions. Of course, in all cases, workers will update their expectations as they gather further information about the operation of the union once covered.

Estimation

Our estimation methods for both FE and OLS regression are standard but it may nevertheless be of some help to provide formal definitions as a basis for defining subsequent variant analyses. The underlying model is

$$Y_{it}=X_{it}\beta + c_i + u_{it} \qquad (1)$$

where i indexes sample members and t the panel waves (years) at which they are observed, Y is a vector of values taken by a satisfaction measure, X is a vector of explanatory and control variables including an intercept, β is the vector of parameters to be estimated, c_i are the individually specific constant effects and u_{it} are the disturbances. The constant terms c_i can be arbitrarily correlated with the Xs.

[4]This firm entry route to coverage is what underpins Abowd and Farber's (1983) union selection model.

To estimate the model by panel regression we transform the observations by subtracting the individual-specific means, resulting in the elimination of the c_i. The resulting fixed effect (FE) or 'within regression' estimates have the form ÿit = ẍit β + üit using the notation of Wooldridge (2002) where the accents above model terms indicate de-meaned variables. In the pooled OLS regression models the fixed constant effects are assumed to be uncorrelated with the X variables and are left in the disturbance term.

Assuming this framework the models to be estimated are more fully specified as follows:

$$y_{it} = X_{it}\beta + [R_{it}\gamma] + T_t\delta + l_{it}\kappa + c_i + u_{it} \qquad (2)$$

In equation (2) vector X denotes the control variables and consists of sub-vectors P (personal and family characteristics), W (workplace characteristics), and J (job characteristics) – the J variables are omitted in some analyses; vector [R] contains the explanatory variables concerning union representation and related variables, the brackets indicating that these vary across analyses - they will be more fully specified at the relevant points; T contains the time (wave or year) dummies, and l is a dummy indicating the last wave prior to the individual exiting the panel; c are the individual-specific unobserved constant characteristics, and u are the disturbances; finally, Greek letters indicate parameters to be estimated.

The job satisfaction items (see Section 4) have 7-point response scales. Following others (Borjas 1979; van Praag, 1991; Frey and Stutzer (2002); Ferrer-i-Carbonell and Frijters, 2004; Clark 2005; Green and Tsitsianis 2005; Green 2006: 168-9; Clark et al., 2008; Powdthavee, 2011; and Taylor et al., 2011) we make a cardinality assumption that is needed to run the FE and OLS regressions.[5] Standard errors are computed by means of a robust variance estimator that takes account of panel clustering and also of heteroskedasticity.

We analyze the unbalanced panel (basing the approach on Taylor et al. 2011). The unbalanced nature of the panel involves potential selectivity effects. As suggested by Verbeek and Nijman (1992) and Wooldridge (2002) it is possible to get some indication of its likely influence on estimates by including among the regressors a dummy representing out-movement: including this dummy in our specification (see equation (2)), we found that its effect was not significant in any of the models of satisfaction. A further problem arising from the unbalanced nature of the panel is that it is not possible to weight the

[5] Cardinality has been adopted by applied psychologists in a great many studies (see Ferrer-i-Carbonell and Frijters 2004). Economists have often been unwilling to make such a strong assumption and have assumed only ordinality. Green and Heywood (2014) transform the satisfaction scales by the probit adapted OLS (POLS) method advocated by van Praag and Ferrer-i-Carbonell (2008: 29-34); see also Luechinger (2009) for a different application and interpretation of that method. Van Praag and Ferrer-i-Carbonell (2008) note that POLS also requires strong assumptions. Frey and Stutzer (2002) remark 'Ordinal and cardinal treatments of satisfaction scores generate quantitatively very similar results in happiness functions', see also conclusions in Ferrer-i-Carbonell and Frijters (2004). In any event results presented in Section 5 are robust to POLS and are available on request.

data; panel estimates can only be computed with constant weights. However, as detailed later, as an alternative to weighting, the analysis included a range of control variables that were used by the originators in stratifying the sample and in constructing the weights for the balanced panel (Taylor et al. 2011).

4. Data set, dependent variables, and controls

4.1 Data set

We analyze 17 waves of the BHPS through to 2008.[6] The initial sample for BHPS was drawn in 1990 and consisted of 9,912 full interviews with individuals from 5,538 households drawn as a stratified sample from all British households.[7] Members are interviewed annually. Representativeness has been maintained by following individuals who set up or join new households and by admitting as new panel members those who form a family relationship to existing members. At various stages booster samples were added to the original sample design, e.g. to contribute to the European Community Household Panel (ECHP), or to provide sufficient numbers for separate analysis of country sub-samples for Wales, Scotland and Northern Ireland. As these booster samples change the nature of the original sample, and as this cannot be corrected by weighting in the type of analysis we perform, we have excluded them entirely from all aspects of the analysis.[8]

We analyze the unbalanced panel incorporating those who either leave or join during the observation period. However, we exclude observations on leavers if they subsequently re-join the panel; leaving is treated as an 'absorbing state' (as recommended by Wooldridge 2002).[9] We also exclude the 3,940 observations who were only present for one period as they cannot contribute to the FE estimates. Further we limit the analysis to observations when individuals are aged 20-60, in order to reduce problems of selection and self-selection into employee status: ages 16-19 being peak student years, and ages 61-65 being peak years for (early) retirement and disability/incapacity claims. Around 52% of the original

[6] Although we would have liked to extend the analysis to additional years the switch from the BHPS to Understanding Society introduced a number of data discontinuities that make this problematic.
[7] Userguide, 5151userguide_vola.pdf, Tables 16 & 17 (page A4-28).
[8] This entails the removal of 75,959 person-year observations, equivalent to 31.8% of the person-year observations. In principle oversampling can be corrected by inverse probability re-weighting. However, the weights must be constant within the panel, something that is not possible since the supplementary samples are only present in certain waves. If, on the other hand, one simply includes supplementary samples without weighting, two main kinds of bias are introduced: first, the years when the supplements are present have an increased influence on model estimates; second, the results are no longer representative of British employees, or, in the case of the ECHP supplements, they are no longer representative of the British employee income distribution.
[9] 14780 observations (9.1% of the original sample) are removed because they follow a gap resulting from non-interview at one or more waves. We ignore observations after these sample members return because to include them would lead to irregular spacing of the interviews with various adverse consequences – e.g. no consistent definition of leads and lags.

sample observations are employees. Of these 70,870 observations 5,655 are dropped because the respondents are outside the 20-60 age range. After exclusions for missing data[10] we are left with somewhat more than 58,000 person-year observations on a little more than 8,000 individuals.

4.2 Variables

4.2.1 Dependent variables

The literature review indicates the importance of considering a range of job satisfaction measures and considering how each relates to the role of unions. We consider the five job satisfaction measures that are available across all waves of the BHPS (see next paragraph). We attach special importance to satisfaction with pay, but we also need to consider other aspects since pay bargains may have further repercussions. In the traditional right-to-manage model the bargaining object is wages whereas employment is set unilaterally by the employer conditional on those wages. Although there is evidence that unions negotiate over employment as well as wages in many instances (van Wanrooy et al., 2013) the right-to-manage model is usually viewed as a reasonable approximation to the British case. The implication is that the union wage premium should raise satisfaction with pay if the employee's reference point is her outside market wage. However, the wage premium may come at the cost of increased concerns regarding job security since wage pressures may encourage employers to substitute capital for labour and, *in extremis*, threaten workplace survival.

Five outcome variables are separately analyzed. *Overall job satisfaction* (OJS) is often interpreted by economists as a single-item measure of the subjective utility of a job. It is the most widely used measure in occupational psychology and has well established associations with behavioural outcomes including performance ratings, absence, lateness and quit rates (Judge et al. 2001; Harrison et al. 2006). However there may be many influences on overall job satisfaction that have not been enumerated (see Warr et al. 1979) and many would lie outside the domain of unions. Four further measures obtain ratings of *satisfaction with facets of jobs*: job security, the work itself, hours, and pay. Each of these relates to an area in which British trade unions have been engaged and also that are currently discussed as aspects of employment conditions under pressures from globalized competition and technological change (Green 2006; Gallie 2007). Table 1 provides further descriptive details.

[10] 7,536 observations (4.6% of the original sample) are removed due to missing data arising from proxy or telephone interviewing. Union coverage status is missing in waves 2-4 for individuals who have not changed jobs (see next section); apart from this, small numbers of observations have missing data on union status or job satisfaction.

[INSERT TABLE 1]

4.2.2 Explanatory variables

We take union coverage, rather than union membership, as our point of departure, on the assumption that any causal impact on employees' job satisfaction will arise through results of the bargaining process. Collectively bargained terms and conditions of employment are normally extended to non-members in a covered environment, and so we might not anticipate differential effects of union coverage on the job satisfaction of members and non-members; indeed non-members may derive added satisfaction from receiving the benefits of coverage without paying union dues. We consider whether there are differences in the coverage effects on members' and non-members' job satisfactions.[11]

Accordingly, there are two chief explanatory variables that are used alternately in parallel analyses: union recognition and union membership. Employee respondents are first asked 'Is there a trade union or a similar body such as a staff association, recognized by your management for negotiating pay or conditions for the people doing your sort of job in your workplace?' This question not only focuses on workplace trade union recognition, but also on recognition that covers the respondent's job or occupation at that workplace. From this question we get the union recognition dummy (designated R-r). At waves 2-4, the question was only asked of employees who had changed their job (including through promotion in the same workplace), so that union recognition is missing for employees who had not changed job. We assessed robustness of our results to the exclusion of these years.

If the respondent stated that a union was recognized, she was then asked 'Are you a member of that trade union or association?' We construct a union membership variable (designated R-m) with three categories: trade union member with recognized union/association; non-member where there is a recognized trade union/association (sometimes referred to as 'free-rider'); no trade union recognised . Table 2 shows the frequency distributions of the union recognition and membership variables.

We therefore have two basic specifications for estimation:

$$y_{it} = X_{it}\beta + R\text{-}r_{it}\gamma_1 + T_t\delta + l_{it}\kappa + u_{it} \qquad (2a)$$

[11] The situation in Britain is quite different from that in the United States where, even in right-to-work states, non-members are often required to pay union dues if covered by collective bargaining, even if they choose to remain union non-members. Partly because of this there are relatively few union non-members in covered workplaces in the United States (Bryson and Freeman, 2013).

$$y_{it} = X_{it}\beta + R\text{-}m_{it}\gamma_2 + T_t\delta + l_{it}\kappa + u_{it} \qquad (2b)$$

[INSERT TABLE 2]

4.2.3 Control variables

The control variables as shown in Appendix Table 1 are either individual/household characteristics (P) commonly used in models of labour market participation and earnings, or else are workplace characteristics (W) or job conditions (J) that are likely to affect employee attitudes. The inclusion of these J variables entails some risk of endogeneity bias as they may partly reflect individual choices, but if omitted the union effects may be distorted.[12] We therefore re-ran all analyses excluding the controls for job conditions. However, results were very similar so we only report those results where they differed significantly from main results. We also incorporate variables that were used in the original construction of the strata and weights for the survey sample – these are household variables and therefore form part of set P. Finally, in the pay satisfaction models that conclude our analyses we add an interactive variable for movement to a different employment in the current spell and a control for the cumulative number of years observed in employee status; this additional specification will be defined more fully later.

4.2.4 Sub-sample analyses

We ran all analyses for the whole economy and for the market sector since the nature of unionization and the institutional settings in the market and non-market sectors in Britain are fundamentally different. In practice, differences were small so we focus on the whole economy analysis here only reporting on sectoral differences when significant. Sector of employment (market versus non-market) was included as a control variable in the whole economy analyses. We also ran models for female employees only. These yielded results that were similar to those for the reported analyses that are pooled across gender.

4.2.5 Union change and employment moves

Perhaps the biggest limitation of previous studies has been an inability to account for the potential endogeneity of switches in union coverage status. Employees can move from the uncovered to the covered sector in one of three ways (movement in the opposite direction is also definable in terms of the same three employment stability or change conditions).

[12] Working conditions might be endogenous to the extent that they are choice variables. However, this is less likely to be the case if employers fix them by virtue of asymmetric power.

(1) Their existing job is newly organised by a union with bargaining rights.

(2) They switch jobs in the same workplace and the new job is covered while the previous one was not.

(3) The employee may switch to a workplace where she has union coverage, from a previous employment in a non-covered situation.

Since the three circumstances associated with switching coverage have potentially different implications for job satisfaction it is informative to explore interactions between union switching and employment switching. We therefore constructed an additional variable to represent employment stability or change (designated E) using the three categories noted above: same employer and same job in current wave as in previous wave; same employer but different job from previous wave; different employer (i.e., a new employment) from previous wave. In the BHPS data, we are able to classify 97.5 per cent of cases where we have union status information into these three employment stability/change categories.

For the joint analysis of unionization and employment stability/change we have two specifications to estimate. In the first, the $[R\text{-}r_{it}\gamma]$ term in (2a) is replaced by a combined treatment of union coverage in current period, union coverage in previous period, and employment stability/change status in the current period. We include the main effects and the two-way interactions while omitting the higher-order interaction:[13] putting E(2) for change of job within same employer, and E(3) for change to a different employer, this part of the model can be written as follows:

$$R\text{-}r_{it}\gamma_1 + R\text{-}r_{i(t-1)}\gamma_2 + E_{(2)it}\,\gamma 3 + E_{(3)it}\,\gamma 4 + (R\text{-}r_{it.}\,R\text{-}r_{i(t-1))}\,\gamma 5 + (R\text{-}r_{it.}\,E_{(2)it)}\gamma 6 + + (R\text{-}r_{it.}\,E_{(3)it)}\gamma 7 \ \ldots$$

$$\ldots + (R\text{-}r_{i(t-1).}\,E_{(2)it)}\,\gamma 8 + (R\text{-}r_{i(t-1).}\,E_{(3)it)}\,\gamma 9.$$

In the second specification, relationships are considered between union membership status in the current period, union coverage in the previous period, and employment stability/change status in the current period. As before we include the main effects and the two-way interactions but omit the higher-order terms. Putting R-m(1) for covered member and R-m(2) for covered nonmember, this part of model (2b) can be re-written as follows:

$$R\text{-}m(1)_{it}\gamma 1 + R\text{-}m(2)_{it}\gamma 2 + R\text{-}r_{i(t-1)}\gamma 3 + E_{(2)it}\,\gamma 4 + E_{(3)it}\,\gamma 5 + (R\text{-}m(1)_{it.}\,R_{\text{-}ri(t-1))}\,\gamma 6 + \ldots$$

[13] We also estimated models with the complete 3-way interaction including the high-order terms but a likelihood ratio test indicated that this did not improve model fit (chi-square 2.23 on 2 d.f., p=0.34).

$$... (R\text{-}m(2)_{it.} R_{\text{-}ri(t-1))} \gamma 7 + (R\text{-}m(1)_{it.} E_{(2)it)} \gamma 8 + (R\text{-}m(2)_{it.} E_{(2)it)} \gamma 9 + (R\text{-}m(1)_{it.} E_{(3)it)} \gamma 10 ...$$

$$... + (R\text{-}m(2)_{it.} E_{(3)it)} \gamma 11 + (E_{(2)it} . R\text{-}r_{i(t-1))} \gamma 12 + (E_{(3)it} . R\text{-}r_{i(t-1))} \gamma 13.$$

We focus the joint analysis of union coverage and employment change on satisfaction with pay. Pay bargaining is central to the role of unions.[14] Our chief assumption in framing this analysis is that pay satisfaction is formed by a rational evaluation that takes account of both current pay and future predicted pay from a given employment/job. Employees entering a unionized situation can on average expect a union premium or mark-up (Freeman and Medoff, 1984) and the prediction is therefore that pay satisfaction will be increased. This will not necessarily continue subsequently unless union bargaining is able to make further gains relative to the initial mark-up. Employees' pay satisfaction may also be affected by limitations on information and changes in information availability over time, as noted earlier.

We acknowledge that job moves - and decisions to stay put - are determined, at least in part, by individual choices. However, the main determinants of personal choice (qualifications and skills, family situation, and unobserved persistent attributes such as personality and ability) are already controlled or eliminated in our specification while the time-varying factors that influence mobility, notably labour market conditions or particular vacancies, are exogenously determined. For reasons noted earlier, switches into union coverage are most likely exogenous among employees remaining in the same job with the same employer and are most likely endogenous among those switching employer, with those switching job at the same employer being an intermediate case. In all three instances we anticipate a switch into union coverage will raise satisfaction with pay and, possibly, other terms and conditions that are subject to union bargaining. These gains may nevertheless come at the expense of satisfaction with job security, unless unions bargain over wages and employment, whereupon bargaining may lead to efficient outcomes. Whether any positive effects persist depends, in part, on union effectiveness and employee expectations regarding those effects.

5. Results

5.1 Overall effects of union coverage

The effects of union coverage on job satisfaction in the whole economy are presented in Table 3. Coefficients from OLS estimates are presented in the left-hand columns and those from person FE models

[14] Parallel analyses of satisfaction with hours and job security are not included here for reasons of space; additionally, analysis of the latter outcome (job security) proved less robust to specification change (see also note 17).

are presented in the right-hand columns. All estimates can be interpreted in terms of the proportions of the unit response on a response scale of 1-7 with 7 being high (more satisfied).

[INSERT TABLE 3]

The OLS estimates show a negative statistically significant association between union coverage and three of the five job satisfaction measures, namely OJS, job security and satisfaction with the work itself. There is no statistically significant association between union coverage and satisfaction with pay or hours. While Table 3 shows only the estimates for the representation variables, FE estimates for the full specification, with pay satisfaction as the dependent variable, are shown in Appendix Table 1. The linearity of the model permits the effect size of union representation to be assessed by direct comparison with effects of other variables. For instance, the union effect is almost the same as the effect of an employee receiving incentive payments, and is one third as great as the effect on pay satisfaction of possession of a degree qualification.

Conditioning on person fixed effects, so that we are comparing the effects of union coverage *within* individuals over time, the effects of union coverage become more positive. This is apparent from a direct comparison of the OLS and FE coefficients.[15] Under the FE model union coverage is associated with significantly higher satisfaction with pay and hours, which are often the subject of direct bargaining between unions and employers (van Wanrooy et al., 2013). However, coverage continues to be associated with significantly lower job security.[16] [17]

The consistently more positive estimates under the FE models indicate that there is substantial negative bias from unobserved fixed effects in the OLS regression model. For a possible interpretation of these effects, see the literature reviewed in Section 2.

[15] The significance of the differences between the OLS and fixed effects estimates cannot be established but the sign of the (FE-OLS) difference is positive without exception.

[16] We obtain very similar results if we confine the analysis to the market sector. The only notable difference is that the negative association between coverage and satisfaction with job security is larger in the market sector and robust to the exclusion of job characteristics. However, the estimates relating to the effect of current coverage on job security were not robust when we introduced the more complex specification detailed in section 5.3 below; current union coverage then had a non-significant marginal effect, while it was lagged coverage that had a significantly negative effect. These results, and others reported in the text only, are available from the authors on request.

[17] We reran the analyses on waves 5 to 17 of BHPS, thus avoiding potential problems regarding measurement error in union status in early waves. But the results are similar. For instance, in the fixed effects model with job controls the union coverage effect on pay satisfaction is 0.088, t=2.97, for hours satisfaction it is 0.068, t=2.57. Dropping the job characteristics from the specification the pay satisfaction coefficient is .093 (t=3.14) while the coefficient in the hours satisfaction equation is .072 (t=2.71). The coverage effects on overall satisfaction estimates are positive and non-significant while those for job security and work satisfaction are negative and non-significant.

5.2 Differences between covered members and non-members

To establish whether coverage effects differ across covered members and non-members we run models with the same controls but this time distinguish employees according to whether they are members of the union recognised for pay bargaining. The reference category is all uncovered employees.

[INSERT TABLE 4]

Focusing on the FE estimates in Table 4, one sees that members have significantly positive satisfaction on pay (one per cent level) and hours (10 per cent level), but are significantly negative on security (one per cent level), work and OJS (5 per cent level). The covered nonmembers always have more positive estimates than the members. Like members they are positive on pay and hours (one per cent level), but they are also positive on OJS (five per cent level) and have non-significant estimates for security and work itself. Compared to members, the more positive estimates for the nonmembers are significant for security, work, and OJS but non-significant for pay and hours satisfaction.

Turning to the OLS v FE comparisons in Table 4, the FE estimates are always more positive, both for members and nonmembers, just as for the estimates relating to overall union coverage. This underlines the pervasive negative bias on satisfaction ratings that arise in models that do not account for unobserved fixed effects.

5.3 Effects on pay satisfaction of union change together with employment change

In Section Three we outlined a rationale for an elaborated model specification incorporating lagged information to examine entry into union coverage along with employment stability or change. We apply the same controls as before (but omitting the job characteristics variables). Note that when introducing lagged terms into the analysis individuals who were not employees at the previous wave (as well as the current wave) will be omitted. The analysis sample is therefore slanted towards people in continuous employee status. We estimate a model that contains the three separate two-way interactions: union coverage now x lagged union coverage; union coverage now x employment change; lagged union coverage x employment change (see Section Four for the formal definition).

In Table 5, we present results in terms of mean marginal predictions (henceforth ‘marginal means’) for each combination of the interacted variables. These are the average of the outcome variable as predicted by the model estimates when all observations are fixed at that combination while all the other variables in the model are left with their observed values. Pairwise comparisons between marginal means are equivalent to conditional partial effects, and these are shown in the right-side columns of Table 5.

Panel (a) of the table shows that those who switch from being uncovered last year to covered in the current year experience an increase in pay satisfaction (compared with those not covered at both years) of 0.190, a difference significant at the 1 per cent level. Those who are covered in both years experience a small increase in satisfaction relative to those who lose coverage (4.983 against 4.917), but this contrast is non-significant at the 10 per cent level. Tests can also be constructed for other pairwise contrasts than those shown in the table. For instance, the pay satisfaction of those who lose coverage remains higher than for those not covered at both years, the difference in this case being significant at the 10 per cent level. The persistently uncovered have the lowest satisfaction level (coefficient 4.841).

Panel (b) of Table 5 shows the effects of changes in coverage for different sorts of union switchers. Pay satisfaction rises with union coverage (relative to not being covered) both when individuals remain in the same employment and job, and when they move to a different employment, consistent with the hypothesis of an immediate union mark-up. However there is a smaller and non-significant increase in satisfaction due to coverage when individuals move to a different job within the same employer.

[Table 5 about here]

To interpret the practical significance of these results, note that movements into union coverage while remaining in the same job comprised 53 per cent of all new coverage, while movements to a new (covered) employment comprised 39 per cent and internal job moves providing new coverage comprised 8 per cent. A transition matrix for union coverage in the previous and current year, conditional on employment stability or change, is provided at Appendix Table 2.

In panel (c) of Table 5 we have the mean margins and pairwise comparisons of union coverage in the previous year for job stayers and movers by current year. The results show that lagged coverage has no significantly positive effects on pay satisfaction when interacted with employment stability/change. Indeed, when combined with movement to a new employment, the effect of lagged (1-year) union coverage is significantly negative at the 10 per cent level. This is evidence that the effects of union coverage in the period analysed were not persistent.

We have hypothesized a positive effect of union coverage on pay satisfaction on the grounds that unions are expected to achieve a wage mark-up, and that covered employees' satisfaction with pay reflects a rational evaluation based on this. The same panel regression models used to estimate union effects on pay satisfaction were rerun with the natural logarithm of the usual hourly wage as the dependent variable. The average mark-up over the 1991-2007 period, for covered versus non-covered (in a specification analogous to that of Table 3 – FE estimates), is 7.5% with $p<0.001$. In a model with interaction terms

corresponding to those in Table 5, the partial effect of current coverage is estimated to be 5.2 % while that of coverage in the previous year is found to be 2.1%; both estimates have $p<0.01$. These are whole-economy estimates and the corresponding estimates for the market sector subsample are somewhat smaller, 4.3% and 1.3% respectively – the former significant at the one per cent level, the latter non-significant.[18]

5.4 Effects on pay satisfaction of union membership together with employment change

Given the recent literature distinguishing between coverage effects on members and non-members we ran estimates of current coverage status on members' and non-members' pay satisfaction distinguishing between the routes by which they gained coverage. (See Section Four for formal definition of this model.) The results, presented in Table 6, indicate that the effects of switching into coverage are similar for both union members and non-members. In both cases becoming covered is positively and significantly associated with pay satisfaction, whether one entered coverage whilst in the same job, or by switching employers. However, neither members nor non-members benefited significantly from coverage if coverage was acquired by entering a different job in the same employment.

[Table 6 about here]

6. Conclusions

In keeping with the existing literature we find strong statistically significant negative correlations between unionization and job satisfaction when individual fixed effects are assumed to be uncorrelated with regressors. However, in contrast to much of the previous literature, having accounted for fixed unobservable differences between covered and uncovered employees, union coverage is positively and significantly associated with satisfaction with pay and hours of work. These effects are apparent for covered members and non-members. Furthermore, shifting from OLS to fixed effects estimates results in the union coverage coefficients becoming more positive for job satisfaction across a range of job satisfaction measures, something that happens for both union members and non-members. It seems reasonable to conclude, therefore, that union coverage has a positive impact on some aspects of job satisfaction.

These results are consistent with union bargaining effects which result in higher pay, and hours schedules that better suit covered employees' preferences, relative to what they might have received in the uncovered sector. In keeping with the literature on the non-excludable nature of collectively bargained

[18] Full details are available from the authors on request.

terms and conditions, the positive benefits of coverage are not confined to union members. On the contrary, satisfaction is higher among non-members than it is among members, even having accounted for fixed unobservable differences across individuals. This may reflect the fact that the net returns to coverage are highest for non-members who are able to avoid the financial costs of membership and reduce the potentially adverse effects of voice-induced complaining that members engage in to strengthen the union's bargaining hand in negotiation.

Our results are, perhaps, most similar to those of Powdthavee (2011). He also uses the BHPS and, like us, he shows that union coverage effects on job satisfaction differ markedly across facets of the job in a way that is consistent with union bargaining effects. In general, he observes an increase in job satisfaction once covered by a union which diminishes with time, as we do. However, his use of lagged job satisfaction measures means his analysis is confined to employees appearing in many years in the BHPS, so his sample is more selective than ours. Furthermore, he excludes those switching workplace such that his analysis only captures changes in coverage within a particular workplace. Our analysis, on the other hand, includes coverage changes due both to changes within and across workplaces. Furthermore, for pay satisfaction we extend the literature by interacting changes in coverage status with changes in employment status. Specifically we distinguish between coverage changes associated with changes in employer, changes in job with the same employer, and coverage changes that occur whilst remaining in the same job. We find the effect is not significant for those who switch jobs in the same employment. This may be because union-covered jobs are less likely to be at managerial/upper-grade level, and/or because differentials within the union-covered segment of a workforce are relatively small (because of comparison bargaining). These suggestions are speculative and point to the need for further research in this area. The biggest coverage effects on employees' pay satisfaction arise when coverage is extended to an employee remaining with the same employer in the same job - which is when we most expect the switch to be exogenous - and when union coverage is gained via a switch in employer.

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Table 1: Descriptives for job satisfaction dependent variables – by union coverage status

satisfaction with:	pay		security		work		hours		overall	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
covered member	4.84	1.54	5.23	1.59	5.34	1.36	5.08	1.48	5.25	1.33
covered non-member	4.89	1.50	5.27	1.54	5.44	1.33	5.33	1.35	5.38	1.26
total covered	4.85	1.53	5.25	1.57	5.38	1.35	5.17	1.44	5.30	1.30
not covered	4.85	1.59	5.44	1.49	5.50	1.32	5.16	1.47	5.39	1.31
all employees	4.82	1.58	5.31	1.56	5.46	1.34	5.18	1.46	5.18	1.46

Notes: Unweighted sample statistics for employee respondents aged 20-60. All satisfaction questions are answered on a response scale scored 1 to 7: 'completely satisfied', 'very satisfied', 'satisfied', 'neither satisfied not dissatisfied', 'dissatisfied', 'very dissatisfied', 'completely dissatisfied'. The scoring has been reversed so that 1 represents 'completely dissatisfied' while 7 represents 'completely satisfied'. Means for 'all employeees' may be inconsistent with the covered/noncovered means because of missing data on the union variables.

Table 2: Union recognition and membership frequencies

Union or staff association recognized at workplace?	N observations	column %
yes	27838	40.4
no	26945	39.1
missing data	14094	20.5
Total	68877	100
If union recognized, is respondent a member?		
yes	17459	25.3
no	10351	15.0
membership data missing	28	0.1
no union recognized	26945	39.1
union recognition missing	14094	20.5
Total	68877	100

Notes: Unweighted sample statistics for employee respondents aged 20-60. About two thirds of missing data for union recognition arises in waves 2-4 where respondents were only asked this question if they had changed jobs (including by promotion) since the previous wave.

Table 3: Union Coverage Effects on Job Satisfaction

Outcome:	**OLS**			**FE**			$\mathbf{b_{fe}-b_{ols}}$
	b (s.e.)	t	Nit	b (s.e.)	t	Ni	
Overall JS	-.11 (.02)	4.82	49996	.01 (.02)	0.46	8077	0.122
Pay	-.02 (.03)	0.77	49958	.12 (.03)	4.16	8071	0.136
Job security	-.25 (.03)	9.64	49779	-.07 (.03)	2.66	8050	0.180
Work itself	-.15 (.02)	6.08	49979	-.02 (.02)	0.85	8074	0.062
Hours	.00 (.03)	0.16	49992	.09 (.03)	3.60	8074	0.087

For details of control variables, which are included in all the above analyses, see Appendix Table 1.

Table 4: Union Membership Effects on Job Satisfaction

Outcome:		**OLS**			**FE**			**b_{fe}-b_{ols}**
		b (s.e.)	t	Nit	b (s.e.)	t	Ni	
Overall JS	mem	-.17 (.03)	6.36	49970	-.07 (.03)	2.15	8074	0.105
	nm	-.03 (.03)	1.04		.06 (.03)	2.40		0.088
Pay	mem	-.04 (.03)	1.49	49932	.09 (.04)	2.7	8068	0.138
	nm	.02 (.03)	0.50		.13 (.03)	4.41		0.116
Job security	mem	-.29 (.03)	9.31	49753	-.14 (.04)	3.89	8047	0.155
	nm	-.19 (.03)	6.91		-.03 (.03)	1.06		0.164
Work itself	mem	-.21 (.03)	7.29	49953	-.08 (.03)	2.51	8071	0.127
	nm	-.07 (.03)	2,41		.02 (.03)	0.67		0.082
Hours	mem	-.07 (.03)	2.21	49966	.06 (.03)	1.83	8071	0.124
	nm	.10 (.03)	3.71		.11 (.03)	4.23		0.011

Notes:mem=member in covered workplace employment; nm=nonmember in covered workplace employment; reference category is not covered. For controls see Appendix Table 1.

Table 5: Mean marginal predictions of pay satisfaction – interaction effects of current or previous union coverage and employment change

	estimates (s.e.)		pairwise comparisons	
(a)	not covered now	covered now	contrast	z
not covered last year	4.841 (0.023)	5.031 (0.031)	0.190	4.64
covered last year	4.917 (0.035)	4.983 (0.020)	0.066	1.54
(b)				
staying in same employment and job	4.824 (0.023)	4.942 (0.020)	0.117	3.49
same employment, different job	5.027 (0.047)	5.084 (0.042)	0.057	0.78
different employment	5.064 (0.036)	5.278 (0.038)	0.214	3.88
(c)	not covered last year	covered last year		
staying in same employment and job	4.874 (0.022)	4.897 (0.021)	0.023	0.69
same employment, different job	5.022 (0.047)	5.088 (0.042)	0.066	0.90
different employment	5.224 (0.034)	5.132 (0.036)	-0.093	-1.87

The above mean marginal predictions and standard errors are derived from the interaction terms (current union coverage status x lagged union coverage status) + (current union coverage status x employment change status) + (lagged union coverage status x employment change status). The model specification includes controls for P and W characteristics, a dummy indicating last observation in the individual panel, and a constant term – see also Appendix Table 1.

Table 6: Covered members and covered nonmembers: partial effects on pay satisfaction under different employment change conditions

covered union member and:	estimate (s.e.)	z
- same employment same job	0.143 (0.046)	3.13
-same employment different job	0.087 (0.085)	1.02
- different employment	0.203 (0.070)	2.91
covered union nonmember and:		
- same employment same job	0.100 (0.037)	2.97
-same employment different job	0.052 (0.080)	0.65
- different employment	0.232 (0.062)	3.72

The above conditional partial effects and standard errors are derived from the interaction term (current union membership and coverage status x employment change status). The model specification also contains interaction terms for (current union membership and coverage status x lagged union coverage status) and (lagged union coverage status x employment change status), as well as controls for P and W characteristics, a dummy indicating last observation in the individual panel, and a constant term – see also Appendix Table 1.

Appendix Table 1: Panel fixed effects regression of pay satisfaction – complete estimates

	estimates	**test**	**descriptives**		
Variable	b, s.e	t	mean	between s.d.	within s.d.
trade union coverage	0.1151, 0.0276	4.16	0.509	0.443	0.265
Time dummies (T)					
year 2	0.2843, 0.0596	4.77	0.022	0.144	0.125
year 3	0.3467, 0.0578	6.00	0.021	0.117	0.129
year 4	0.2450, 0.0582	4.21	0.021	0.099	0.132
year 5	0.1907, 0.0399	4.78	0.071	0.128	0.244
year 6	0.2306, 0.0410	5.62	0.071	0.106	0.247
year 7	0.2672, 0.0429	6.23	0.073	0.108	0.251
year 8	0.5349, 0.0438	12.21	0.073	0.112	0.251
year 9	0.4818, 0.0464	10.40	0.070	0.100	0.249
year 10	0.48403, 0.0490	9.89	0.071	0.102	0.248
year 11	0.5706, 0.0524	10.88	0.069	0.101	0.245
year 12	0.5256, 0.0561	9.36	0.066	0.098	0.240
year 13	0.54319, 0.0582	9.34	0.063	0.093	0.235
year 14	0.5448, 0.0625	8.72	0.060	0.094	0.230
year 15	0.5825, 0.0656	8.88	0.059	0.099	0.225
year 16	0.56932, 0.0676	8.43	0.058	0.116	0.223
year 17	0.5688, 0.0713	7.98	0.055	0.160	0.212
Personal/household (P)					
age 30-39	0.0660, 0.0347	1.90	0.300	0.347	0.338
age 40-49	-0.0109, 0.0512	-0.21	0.271	0.326	0.330
age 50-59	-0.0002, 0.0696	-0.00	0.187	0.353	0.221
female & youngest 0-2	0.1195, 0.0474	2.52	0.030	0.119	0.143
female & youngest 3-4	0.1747, 0.0498	3.51	0.30	0.107	0.146
female & youngest 5-11	0.0686, 0.0463	1.48	0.094	0.220	0.208
female & youngest 12-16	0.0434, 0.0444	0.98	0.050	0.140	0.181
female & youngest 17-18	0.0015, 0.0596	0.02	0.012	0.070	0.099
male & youngest 0-2	0.02307, 0.0455	0.51	0.045	0.145	0.169
male & youngest 3-4	0.0580, 0.0492	1.18	0.032	0.104	0.154
male & youngest 5-11	0.0180, 0.0455	0.40	0.080	0.200	0.197
male & youngest 12-15	0.0051, 0.0480	0.11	0.038	0.128	0.158
male & youngest 16-18	0.0233, 0.0658	0.35	0.010	0.059	0.088
professional qualification	0.0098, 0.0413	0.24	0.322	0.419	0.195
highest qual. degree	0.3394, 0.1493	2.27	0.180	0.372	0.079
highest qual. a-level/equiv.	0.2251, 0.1255	1.79	0.278	0.434	0.079
highest qual. o-level/equiv	0.1784, 0.1151	1.55	0.289	0.442	0.091
female, partner not employed	0.1721, 0.0730	2.36	0.032	0.157	0.115
female, partner employed	0.1581, 0.0468	3.38	0.361	0.445	0.185
male, partner not employed	-0.0328, 0.0594	-0.55	0.075	0.227	0.165

male, partner employed	0.0326, 0.0504	0.65	0.230	0.412	0.202

Appendix Table 1 continued

	estimates	test	descriptives		
P – related to sample design	b, s.e.	z	mean	between s.d.	within s.d.
use of car/van	0.0461, 0.0471	0.98	0.916	0.283	0.152
last year labour income	0.000008, 0.000003	2.57	16183	10067.3	8772.0
last year nonlabour income	-0.000016 0.000022	-0.72	1130	2345.6	2378.9
outright owner	0.01746, 0 .0520	0.34	0.127	0.298	0.192
owner with mortgage	-0.0065, 0.0422	-0.15	0.694	0.430	0.258
rent public housing	-0.0424, 0.0636	-0.67	0.094	0.303	0.136
workplace (W)					
market sector	-0.1121, 0.0442	-2.53	0.675	0.422	0.200
size 25-49	-0.0286, 0.0290	-0.99	0.135	0.256	0.257
size 50-99	-0.0143, 0.0331	-0.43	0.117	0.239	0.244
size 100-199	0.0122, 0.0349	0.35	0.106	0.228	0.236
size 200-499	0.0275, 0.0353	0.78	0.133	0.257	0.246
size 500-999	0.0236, 0.0413	0.57	0.069	0.183	0.192
size 1000 +	-0.0072, 0.0422	-0.17	0.108	0.251	0.194
utilities	0.1705, 0.1783	0.96	0.010	0.089	0.058
manufacturing	-0.1328, 0.1302	-1.02	0.202	0.361	0.200
construction	-0.0150, 0.1395	-0.11	0.036	0.185	0.176
distribution	-0.3056, 0.1299	-2.35	0.168	0.346	0.205
transport & communications	-0.1231, 0.1383	-0.89	0.063	0.214	0.129
finance & business services	-0.1561, 0.1314	-1.19	0.155	0.320	0.194
government	-0.2136, 0.1355	-1.58	0.087	0.230	0.138
education	-0.1936, 0.1422	-1.36	0.100	0.267	0.129
health	-0.3972, 0.1357	-2.93	0.099	0.253	0.155
other services	-0.2122, 0.1300	-1.63	0.078	0.226	0.174
job (J)					
hours	-0.0059, 0.0013	-4.64	34.37	10.0	6.22
incentive receipt	0.1142, 0.0187	6.10	0.321	0.356	0.335
fixed-term contract	0.1378, 0.0752	1.83	0.025	0.129	0.125
permanent contract	0.0457, 0.0565	0.81	0.952	0.194	0.168
leaving sample indicator	0 .0148, 0.0336	0.44	0.047	0.220	0.174
constant	4.3202, 0 .1824	23.69			

N_i = 8071 Proportion of variance due to fixed effects = 0.532

Appendix Table 2: Transitions between jobs/employments and between union covered and noncovered status

employment change		not covered at t-1 not covered at t	covered at t-1 & not covered at t	not covered at t-1 & covered at t	covered at t-1 & covered at t	Total
Same job (t & t-1)	N	12875	983	1076	15193	30127
	Row %	42.7	3.3	3.6	50.4	100.0
	Col. %	75.2	52.8	53.2	80.2	75.4
Different job within same employment (t v. t-1)	N	1350	156	167	2172	3845
	Row %	35.1	4.1	4.3	56.5	100.0
	Col. %	7.9	8.4	8.3	11.5	9.6
Different employment (t v. t-1)	N	2897	723	781	1590	5991
	Row %	48.4	12.1	13.0	26.5	100.0
	Col. %	16.9	38.8	38.6	8.4	15.0
Total	N	17122	1862	2024	18955	39963
	Row %	42.8	4.7	5.1	47.4	100.0
	Col. %	100.0	100.0	100.0	100.0	100.0

Note: Excludes 2.5 % of employee observations where information on employment change was missing or inconsistent.