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## Worker Satisfaction and Worker Representation: The Jury Is Still Out

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# Worker Satisfaction and Worker Representation: The Jury Is Still Out

## Abstract

This paper investigates the relationship between worker job satisfaction and workplace representation, to include works councils as well as local union agencies. The paper marks a clear shift away from the traditional focus on union membership per se because its sample of EU nations have industrial relations systems that diverge markedly from those of Anglophone countries. Our dataset comprises two waves of the European Working Conditions Survey (EWCS). Pooled cross-section data indicate that workers in establishments with workplace representation have less job satisfaction than their counterparts in plants without formal representation. We proceed to upgrade these findings of conditional correlation by constructing a pseudo-panel with cohort fixed effects to take account of unobserved worker heterogeneity. Causality issues are directly tackled using an endogenous treatment effects model to address the possible endogeneity of worker representation. A persistence of our central finding leads us to conclude that, despite the recent evidence of a turnaround in the association between job satisfaction and unionism, it would be premature to conclude that this result can be generalized to continental European nations.

JEL-Codes: I310, J280, J520, J530.

Keywords: job satisfaction, workplace representation, European Working Conditions Survey, sorting, exit-voice.

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## 1. Introduction

The contemporary suggestion of a revival of union fortunes has been accompanied by more solid evidence of a positive relationship between union membership and job satisfaction. The latter development is evident in the Anglo-American literature and goes against the grain of much of earlier research pointing to a negative association between unionization and job satisfaction in Anglophone nations, which result much exercised labor economists and industrial relations scholars alike. The empirical *volte face* can be overstated because correlation is one issue causation quite another. Moreover, the generalizability of the new facts is also an issue because there has been little in the way of confirmation from continental European studies. That said, the study by Blanchflower, Bryson, and Green (2022; hereafter BBG), which can be credited with upsetting the apple cart, does supplement its largely British and American evidence with the finding of a corresponding shift in union members' job satisfaction across European countries.<sup>1</sup>

Nevertheless, more evidence on the European experience is required for several reasons. First, the European evidence is thin. Thus, of the 235 estimates from 59 studies contained in the meta-regression analysis conducted by Laroche (2016) just 18 and 6, respectively, cover continental Europe. Second, the continental European evidence is more nuanced, reflecting an institutional setting that is very different from Britain and the United States. In particular, union membership is distinct from coverage by a collective bargaining agreement, and very low union density may coincide with near universal coverage by collective agreements (e.g., from under 10 percent and above 90 percent, respectively, in France). In these circumstances, given that working conditions are likely to be similar for members and non-members alike, why should union membership have a causal effect on job satisfaction? Rather than answer this question directly, the goal of the present exercise is to frame it in the broader context of workplace representation, namely, to determine whether differences in job satisfaction are shaped by the presence or absence of the *institutions of formal worker representation at the workplace*. The institutions in question comprise not only union bodies of course but also works council type agencies. As such, workplace representation may be a more relevant a construct for registering job satisfaction in continental Europe than union membership both by virtue of its greater proximity and incidence, and the presence of formal worker representation may be able to generate a sense of identity that cannot be captured by union membership status. However, to our knowledge there have been no studies of the impact of workplace representation as opposed to union membership on job satisfaction, even if the

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<sup>1</sup> As we shall see, using three waves of the European Social Survey, BBG provide aggregative evidence of a shift in union member job satisfaction for 38 nations which broadly parallels that detected in Britain and the United States.

questions of the impact of worker representation on firm performance and more recently of a potential shortfall in worker representation have been addressed.

This, then, is the uniqueness of our approach using an institutional affiliation that is closer to the worker respondent and more embracing of continental European practice than union membership. Our dataset, comprising two waves of the European Working Conditions Survey (EWCS), is also new to this line of inquiry. Not only is it a well-known source for investigating the well-being implications of working conditions (Caroli and Godard, 2016) but also contains fuller information quite apart from the presence of worker representation (including meaningful work) than the European Social Survey used by BBG (see section 2).<sup>2</sup>

Using simple earnings regression results, we first report that the two waves of the EWCS are likely up to the task of hosting an analysis of job satisfaction in providing evidence of a positive association between worker representation and individual wage gains at plant level. Next, our baseline job satisfaction model points to a negative association between workplace representation and job satisfaction. Attention then shifts to investigations of the potential role of unobserved individual heterogeneity and causality issues more directly. In rejecting the role of unobserved worker fixed effects, our pseudo-panel model offers initial support for the proposition that our earlier results go beyond mere conditional correlation. More fundamentally, in tackling the possible endogeneity of worker representation, the results of our IV approach and associated test procedures offer support for a causal interpretation of the negative association earlier reported in the baseline model.

## **2. A Review of the Literature**

### *2.1 The Direction of Association*

The origins of the literature on unions and job satisfaction can be traced to the work of Freeman (1978) seeking to address the paradox that union members, while benefiting from improved wages and working conditions were seemingly less satisfied with their jobs than their non-union counterparts. For Freeman the paradox reflected the role of collective voice. By helping solve employee problems at the workplace the expression of voice made union workers less likely to quit than equally dissatisfied non-union workers who did. The proportion of dissatisfied workers duly rose. Accordingly, the correlation between membership and satisfaction might be causal, with a tangible mechanism promoting lower exits being the union procedure in filing grievances.

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<sup>2</sup> For a very recent treatment using the EWCS to investigate the importance of the non-monetary aspects of work vis-à-vis wages and benefits, inter al., in contributing to the meaningfulness of work/job satisfaction and thence effort input, as proxied by absenteeism, training, and retirement decisions, see Nikelova and Cnossen (2020).

Fomenting dissatisfaction to augment union bargaining power might be construed as no less causal were it to rectify unsatisfactory conditions that the workforce might be unaware of in the absence of a union, although Borjas (1979) labeled this dissatisfaction as ‘not genuine’ in the sense that it leads to quits.

There are a number of alternative hypotheses that are consistent with view that unionized workers are less satisfied with their jobs than non-unionized workers, all of which are based on worker sorting or reverse causation. For example, the working conditions of union jobs may be less attractive than those of non-union jobs, or jobs may become less attractive after unionization as firms compensate for higher wages by adjusting along other margins (e.g., fringes), or unionization may be an experience good whose adverse characteristics are learned of only over time. As a practical matter, however, analytical attention has focused on the likelihood that workers who join unions possess different characteristics from those who opt to remain non-union. Thus, for example, workers who select into unions may anticipate better working conditions and consequently be more easily dissatisfied by the union reality. Alternatively, union jobs may attract those with personality traits of the naturally less satisfied or those who may have higher expectations about employer behavior and obligations.

In contrast, there are also arguments consistent with there being a positive direct association between unionization and job satisfaction (e.g., Pfeffer and Davis-Blake, 1990). An example might be circumstances in which union members have greater control over their working conditions, leading to organizational commitment. From a sorting perspective, sympathy toward unions or an ideological mind-set favorable to the organization of labor might positively affect both the probability of unionization and the level of job satisfaction.

The weight of empirical work reflects a focus on cross-section country studies with only a handful using instrumental variables to account for endogenous selection into union status. Evidence based on such studies, largely for the United States and Britain, was long held to have established a negative correlation between union membership and job satisfaction (Bryson and White, 2016). Nevertheless, the meta-study by Laroche (2016: 735) concluded that, taken as a whole (including panel studies), the evidence for this negative association was “comparatively weak.” Other reviews since Laroche have been able to track a more nuanced set of findings (e.g., Artz and Heywood, 2022). More importantly, one focus of recent research has served to shift attention toward expecting a present-day *positive* partial correlation between union membership and well-being while confirming findings from an earlier epoch of the negative partial correlation reported by Freeman. That said, the comparative dearth of European studies persists.

## *2.2 From dissatisfaction to satisfaction*

In an enthusiastic treatment, BBG (2022) return to familiar pastures in investigating the association between unions and job satisfaction. Other aspects of worker well-being – including life satisfaction and happiness – are also examined. The bulk of the data are taken from U.S. and British surveys. However, as was noted earlier, this material is supplemented by European data on 38 countries from the European Social Survey.

The main message of the authors' treatment is that if the association between union membership and job satisfaction was once negative that is no longer the case. For the United States a simple regression analysis of data from the General Social Surveys (GSS), 1972-2018, indicates that the correlation between job satisfaction and union membership was negative and statistically significant for the interval 1972 -1996 and remained negative (if not significant) for the period 1998-2008 leading up to the Great Recession. Thereafter, the union coefficient reversed sign and was significantly positive for the private sector at least. For Britain, historically the focus of most research into negative union effects, OLS estimates using data for the period 1995-2018 from the British Household Panel Survey (BHPS) and the UK Household Longitudinal Study (UsoC) point to lower satisfaction among union members (or those covered by a collective agreement) than their non-unionized counterparts. However, when using person fixed effects models, the union coefficient abruptly changed sign while retaining significance at conventional levels. On this occasion, there was no temporal variation: splitting the sample period into pre- and post-Great Recession intervals did not change the pattern of the union coefficient estimates reported above. European results, obtained by fitting OLS models across all nations included in the European Social Surveys (ESS) for 2006, 2010, and 2012 combined, seemed to confirm the U.S. result: in recent years union members in Europe register greater job satisfaction than non-members.

The balance of the contribution of BBG is given over to the association between union membership and aspects of well-being other than job satisfaction together with informed speculation on the reasons for observed changes in the association between union membership and job satisfaction drawing on the United States experience. Analysis of data for 2009-2017 from the Gallup US Daily Tracker Poll (GUSFTP) data on life satisfaction and union membership points to a positive and significant partial correlation between union membership and happiness/lifetime satisfaction that survives the introduction of basic and detailed controls and, in a separate specification, controls for negative effects such as anger, pain and stress. Similar results for lifetime satisfaction are reported for European nations using ESS data. In each case the results are not sensitive to pre- and post-Great Recession sample splits.



This brings us to the possible reasons behind the switch in the direction of association between union membership and job satisfaction, most evident in the case of the United States. Against the backdrop of a substantial union wage premium (e.g., Artz et al., 2021), BBG consider the issue of exposure to job loss. They estimate OLS equations using data from the GSS, 1977-2018, asking individuals about this risk and the ensuing income implications. Union membership entered positively in the risk of job loss equation, and negatively in the ease of finding a comparable job equation. However, after separating the sample into the intervals 1977-1998 and 2000-2018, the sign of the union member coefficient in the former equation became negative and insignificant over time while it remained negative and significant (albeit reduced in absolute magnitude) in the latter equation. There is some suggestion, therefore, that the positive coefficient earlier observed for the GSS job satisfaction equations in the post-Great Recession interval is indicative of a perceived reduced risk of exposure to job loss taken in conjunction with an unchanged premium.

### *2.3 Examples of Recent Single-Country Continental European Studies*

In what follows, we offer a review of two prototypical continental European studies.<sup>3</sup> In the first, Laroche (2017) offers a nuanced treatment of union membership and job satisfaction for France. Although observing that union membership is expected to have no causal effect on job satisfaction when collective agreements are extended to all workers, he cautions that the protection offered by a union might lead union members to voice their discontent more freely/loudly than nonunion members. In addition to this Freeman-association, he draws on the specific features of French system to argue that union representatives can negotiate better wages and working conditions *at workplace level* than at higher bargaining levels and thereby induce greater job satisfaction than enjoyed by workers in workplaces without local agreements. Laroche advances two hypotheses: first, union members are less satisfied with their jobs than non-members (via a voice effect); second, that union members in workplaces without local agreements will be less satisfied than their counterparts that have local agreements.

Two equations are presented, the first being the probability of being satisfied with work and the second the probability of being unionized. The former equation is estimated both independently of and simultaneously with the second using a bivariate probit model. As instruments for union membership, assumed not to affect job satisfaction, Laroche uses management's assessment of the labor relations climate (after Bryson et al., 2004). Results of

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<sup>3</sup> The reader is also referred to a comparative study by van der Meer (2019) of Britain and Ireland on the one hand and 11 continental European nations on the other.

estimating the satisfaction equation independently show that union members have significantly lower satisfaction. This relation persists with controls for worker attributes, job attributes, and workplace attributes. However, it does not carry over to the augmented model controlling for unobserved heterogeneity. That is, the marginal effect of union membership after endogenization of membership changes sign and is no longer statistically significant, while the correlation between unobservables is negative and significant.

Next, estimates are presented by level of collective bargaining, splitting the sample by firm-level agreements on the one hand and higher-level (national or sectoral) agreements on the other. Without controlling for the endogeneity of membership the previous results hold. The situation changes under endogeneity: overall job dissatisfaction increases in workplaces with local bargaining and declines for higher-level agreements. In the former case, the correlation between unobservables is positive but not significant, suggesting that there is a positive selection effect of inherently more satisfied workers into union membership. That is to say, it is not dissatisfaction that impels workers to join a union but rather union membership that seems to lower overall job satisfaction directly. Finally, in the case of those covered by higher-level rather than local-level agreements, individuals who are unionized have a propensity to be less satisfied than their counterparts – as indicated by the negative correlation between error terms in the satisfaction and membership equations – while there is no causal effect here. This result is consistent with the sorting hypothesis.

The latest European study of unions and worker well-being is for Germany. Using data from the Socio-Economic Panel, Goerke and Huang (2022) deploy a mix of cross section and fixed effect regressions of job satisfaction on union membership, supplemented by 2SLS and IVFE approaches to take account of reverse causality and omitted variables bias.

The authors' OLS estimates indicate a statistically significant negative relationship between trade union membership and job satisfaction. However, adding person-specific effects to the model renders all coefficient estimates for union membership statistically insignificant. This systematic difference between the OLS and FE estimates is consistent with a sorting of individuals with time invariant characteristics that are negatively associated with job satisfaction into union membership. However, noting that only individuals changing union status help identify relevant coefficient in the FE model (while all workers in the sample determine the OLS estimates), the authors re-run their baseline equations distinguishing between those who do and do not change their union membership status. They use an OLS model for non-switchers and OLS and FE specifications for switchers. For non-switchers they find a significantly negative correlation, whereas for switchers there is no significant correlation in either OLS or FE models. When the authors separately identify those switchers who enter membership (those going in an

opposite direction being the default) they find that the association between union membership and job satisfaction is negative and statistically significant in the OLS but not the FE estimates. It is concluded that these results support the notion that unsatisfied or pessimistic employees join unions, with no evidence pointing to a sorting effect for switchers in the opposite direction.

In addressing the endogeneity of unionism, then offer a *time-variant* instrumental variable (IV) approach in models with and without person fixed effects (i.e., 2SLS and IVFE models, respectively). Union density (of others) in the same industry, region, and year is used as an instrument for an individual's membership of a union. Their main results are twofold. Firstly, there is no significant effect of predicted union membership on an individual's job satisfaction. Secondly, in separate results are provided by gender, age and birth cohort, and working time, there is only limited evidence of effect heterogeneity. In particular, although OLS estimates are significant and negative for older individuals and statistically insignificant for younger individuals, FE and IV models yield insignificant results and do not turn positive for younger people.

## 2.4 Summary

A review of the recent evidence on union membership and job satisfaction does little to attenuate the diversity of finding reported in earlier studies of unionism and job satisfaction in Anglophone and continental European nations. A basic problem in effecting comparisons of job satisfaction and unionism would seem to stem from the continuing focus on union membership, which differs both between and within blocs and which has been subject to erosion in most nations. In these circumstances, we propose to focus on a more encompassing metric than union membership although one that is rooted at establishment level. We refer to the institutions of formal worker representation, encompassing local union bodies and works councils and analogous agencies.

## 3. Data

This study uses the last two waves of the European Working Conditions Survey (EWCS), namely the 2010 and 2015 editions (European Foundation for the Improvement of Living and Working Conditions, 2020), available at the U.K. Data Service website. Data from the (five) previous surveys are not included as they did not collect information on worker representation at plant level. On the other hand, although the EWCS has covered more than 30 European nations since 2005, we restrict our analysis to the 27 European Union Member States plus the United Kingdom. This limitation is required by our linking procedures with the ECS-European Company

Survey (European Foundation for the Improvement of Living and Working Conditions, 2010 and 2015) further described in section 4.

In each wave of the EWCS, individuals are asked about a variety of working conditions at the workplace level, as well as for their views on several indicators of well-being, such as worker job satisfaction with working conditions in the main paid job and satisfaction with pay, life in general, household income, and leisure activities. The set of worker-level variables also contains information on schooling level (seven categories), occupation (ten), type of contract (five), number of weekly hours, number of years of service (i.e., tenure), age and gender, as well as information on monthly earnings. The information on monthly earnings (on the main job) in particular will be used to conduct a preliminary exercise to test the quality of the data. For this purpose, we will specify an earnings regression model that includes an extended set of observables. These include workplace representation status (i.e., whether there is a trade union or works council, or a similar committee, representing employees), industry affiliation of the employer (eleven categories), and establishment size (five). The dataset also contains information at the household level, namely the presence of spouse/partner, number of children, and household size.

Appendix Table 1 gives the definition of all included variables, including the variable acronyms in the raw dataset and some data generation procedures. We remit the descriptive statistics to Online Appendix 1, using the estimation sample of our baseline job satisfaction model. The model is restricted to paid employees with at least 100 Euros of monthly earnings, yielding an estimation sample of 37,940 individuals (16,330 in 2010 and 21,610 in 2015), whose distribution across the selected countries is given in Online Appendix 2.

#### 4. Modeling Strategy

Job satisfaction, and the alternative indicators of worker well-being, are modeled as a function of observables, including monthly earnings and other factors with a potential impact on the outcome. Firstly, as a preliminary exercise, we run a standard earnings regression model. The model is run in separate cross sections as well as pooled data. The goal is to evaluate whether the estimated returns to schooling and included covariates are in the expected range.

We then examine the determinants of job satisfaction, using pooled cross-section data and relying on the enlarged set of control variables/observables to tackle possible endogeneity related to worker selection and self-sorting. In this case, we follow the job satisfaction literature, specifying an ordinary least squares model:

$$y_{ict} = \beta_0 + \delta WR_{ict} + X_{1ict}\beta_1 + X_{2ict}\beta_2 + X_{3ict}\beta_{31} + \lambda_c + \lambda_t + \varepsilon_{ict} , \quad (1)$$

where  $y_{ict}$  is the satisfaction level of individual  $i$  in country  $c$  and year (i.e., wave)  $t$ ; and  $X_1$ ,  $X_2$ , and  $X_3$  denote the vector of worker, establishment, and household-level characteristics, respectively, as described in section 3. The model also includes year ( $\lambda_t$ ) country ( $\lambda_c$ ), as well as industry, establishment-size, and occupation fixed effects. Worker satisfaction is measured as either job satisfaction at the main paid job, although reference will also be made to satisfaction with pay, life in general, household income, and leisure activities.

There is no longitudinal component in the EWCS. This means that we have two repeated cross sections with a single observation per individual. Controlling for person (worker) fixed effects is therefore not possible. We tackle this important limitation by using a pseudo-panel technique based on the 2010 and 2015 cross-sections. Specifically, we generated different cohorts to then run a model in first differences, assuming a time-invariant (unobserved) cohort trait that is taken as a surrogate for a person fixed effect. According to our procedure, in each cohort workers share the same birth year, gender, schooling level (aggregated into three categories, namely primary, secondary, and tertiary education), marital status, and country. The cohort is therefore the unit of analysis in this modeling procedure, with the information on each of the included variables given by the group average over all individuals in the same cohort. The construction generates a raw total of 6,600 cohorts and a maximum of 30 to 50 individuals in each cohort.

To simplify, we specify the pseudo-panel model in a compact manner as follows:

$$y_{ht}^* = X_{ht}^* B + \alpha_h^* + \omega_{ht}, \quad (2)$$

with subscript  $h$ ,  $h=1, 2, \dots, H$ , denoting the constructed cohort and  $t$  is the year (wave). In this framework, superscript  $*$  indicates we are now using the group (cohort) average, while  $\alpha_h^*$  denotes the cohort fixed effect.  $X_{ht}^*$  contains all the relevant worker-, establishment-, and household-level variables also calculated at cohort level.

Finally, we deploy an endogenous treatment effects model to address the possible endogeneity of our key variable of interest, namely workplace representation. The issue therefore is whether the effect of worker representation on job satisfaction, captured by  $\delta$  in model (1), is due to unobservables that are correlated both with worker representation *and* job satisfaction.

Formally, the procedure amounts to specifying an equation for the outcome indicator,  $y_{it}$ , and an equation for the endogenous binary treatment,  $T_{it}$ , as follows (omitting the subscript  $c$  for country):

$$y_{it} = \Psi_{1it} B_1 + dT_{it} + e_{it}, \quad (3)$$

$$T_{it} = \{1 \text{ if } \Psi_{2it} B_2 + bW_{it} + u_{it} > 0; 0 \text{ otherwise}\}, \quad (4)$$

where worker job satisfaction and workplace representation are the selected outcome and treatment variables, respectively, and  $\Psi_{1it}$  and  $\Psi_{2it}$  are used to model the outcome and treatment.  $W_{it}$  is the selected instrument and is given by the mean incidence of formal workplace representation at country, industry, and establishment size level, which information is extracted from the companion Eurofound European Company Survey (ECS). In particular, the mean incidence to be assigned to the 2010 EWCS data is based on the 2009 ECS, while for the 2015 EWCS we used the 2013 ECS. In both cases, we note that the information about the presence of a formal representation is based on the Management component of the ECS questionnaire (European Foundation for the Improvement of Living and Working Conditions, 2010 and 2015).<sup>4</sup> Since the ECS survey is restricted to establishments with at least 10 employees, sample size in this exercise is necessarily smaller than in model (1), which is conducted for all individuals irrespective of establishment size of the main paid job.

Critical in the endogenous treatment effects model is the underlying assumption that the selected instrument is uncorrelated with  $e_{it}$  in (3). On the one hand, selection of the mean incidence of formal representation seems a natural choice as the probability of an individual being in an establishment with worker representation may be expected to increase with the mean incidence of worker representation observed at the corresponding industry (and country) level (Laszlo and Huang, 2022, reviewed earlier, follow a similar procedure). It will be recalled that this information is collected by the ECS. More demanding, however, is to assure that the instrument has no impact on job satisfaction, or  $Cov(W_{it}, e_{it}) = 0$ , for which no direct test is available. To exclude the possibility that the selected instrument is weak, a first step is to deploy the Wald test to evaluate whether there is endogeneity in the system, that is, whether there is correlation between the treatment-assignment errors and the outcome errors (or between the errors of the first-stage (treatment) and second-stage (outcome) equations). A second step is to implement a direct test on the validity of the t-ratio test/inference for  $d$ . According to Lee et al. (2021), validity of the t-ratio inference for  $d$  – that is, determining whether the slope coefficient of the variable of interest (i.e. the workplace representation) is zero – requires a first-stage F-statistic greater than 10 *and* the use of adjusted critical values. The F-statistic is given by the square of the t-ratio for the hypothesis that  $b = 0$  (in the first-stage/treatment equation). As a final test on the validity of the instrumental variable procedure, we will provide the results from a reduced-form equation implementation. In this case, worker job satisfaction depends on all the right-hand side variables except workplace representation, with the selected instrument

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<sup>4</sup> To assign the presence of a formal representation at establishment level in the 2009 ECS, we followed the same procedure as in Addison and Teixeira (2019, Table A.1). A similar procedure was followed in the case of the 2013 ECS.

now added as a regressor. An absence of a statistically significant association between job satisfaction and the instrument will provide further evidence in favor of the validity of the selected instrument.

To simplify the analysis, we again treat job satisfaction as a continuous variable and apply the Stata command *etregress* to obtain the key parameters of interest. In this case, the model amounts to specifying a linear equation for the outcome and an equation for the binary endogenous treatment. Estimation is by full maximum likelihood, with year, country, and occupation fixed effects included in the outcome equation, while country, occupation, industry, and establishment size fixed effects are introduced in the treatment equation. In this framework, the  $\hat{d}$  estimate gives the average treatment effect (ATE) on job satisfaction of being in an establishment with workplace representation.

## 5. Findings

We preface our main analysis with estimates from a standard log earnings regression model. As mentioned in section 3, the EWCS is mainly intended to assess working conditions across Europe with a view to contributing to European policy development on work and employment quality. As a result, the EWCS covers many issues related to individual (worker), household, and establishment-level characteristics, including the level of monthly earnings in the main job. A dataset possessing this richness will be used in the first instance to offer a pre-test of the validity of the data via estimates from an earnings regression derived from the same dataset. In particular, are the estimates from the earnings regression in the expected range?

(Table 1 near here)

Results are given in Table 1 for the two cross-sections of the EWCS in separate regressions and for the pooled case. As it is apparent, across all three columns of the table, positive and statistically significant estimates of the returns to education are obtained, along with some positive and significant associations between individual wage gains and worker representation at the plant level in the 2.5 to 5.7 percent range. These are not unexpected results. Moreover, the same is true of the remaining covariates; in particular, it is confirmed in the EWCS dataset that the gender wage gap is a sizable 16 to 17 percent. We would conclude that there is no reason to suspect that the EWCS data are not sufficiently reliable and tractable for job satisfaction analysis.

(Table 2 near here)

Table 2 shows the results of fitting our baseline job satisfaction model in equation (1). The specification in the first column of the table contains worker and establishment characteristics but not those of the household. The key variable of interest in the first row shows

that workplace representation is negatively associated with job satisfaction, meaning that individuals working in establishments with formal workplace representation record a lower level of job satisfaction, significant at the 0.01 level.<sup>5</sup> We also confirm the strong relationship between earnings and job satisfaction, typical in all studies that include the earnings variable.

The demographic variables (namely age and gender/male) also included in the specification in column (1) are negatively and positively associated with job satisfaction, respectively. The model also controls for job characteristics such as working hours, type of employment contract, tenure, and perceived job security. Tenure or length of service may of course be a function of job satisfaction and therefore an inherently endogenous factor. However, as the results from a model without the tenure term are virtually unchanged, we prefer to keep the variable as an additional regressor. Analogously, weekly working hours might also be construed as a positive function of job satisfaction. Yet, in common with findings from other studies, it transpires that both variables have a negative coefficient, so that endogeneity does not seem to dominate. Regarding the type of contract, it is transparently the case that atypical work – namely employment under a fixed-term contract and temporary agency work – is negatively associated with job satisfaction vis-à-vis a situation in which workers are covered by an indefinite, open-ended contract. In turn, job security is found to be positively associated with job satisfaction at the 0.01 level. Finally, regarding the role of meaningful work, the two selected indicators in question (*useful work* and *work well done*) are as expected clearly associated with job satisfaction, also at the 0.01 level.

A set of household variables are introduced in column (2), namely the presence of a spouse/partner, the presence of children, and household size. The main finding is that the results in column (1) continue to hold and that the presence of a spouse/partner is associated with greater job satisfaction, perhaps because spouses/partners are also in the labor force and together help meet household needs. Finally, we note that in both columns of Table 2 there is also a clear pattern of increasing dissatisfaction as establishment size increases. This inverse relationship is often attributed to increased individual alienation in larger organizations.

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<sup>5</sup> The virtue of OLS specification resides in its simplicity and directness, and BBG and others have concluded that there is no material analytical gain in replacing the assumed continuity of the outcome variable by the raw ordered variable. Nevertheless, we ran an ordered probit version of the job satisfaction model in Table 2. The corresponding worker representation coefficient estimate was both negative and highly statistically significant. Full results are available from the authors upon request, including the marginal effects for each of the four possible ordered outcomes (i.e., 1=Not at all satisfied, 2=Not very satisfied, 3=Satisfied, and 4=Very satisfied), each of which is statistically significant and of the expected sign. In particular, for outcome 4 the marginal effect strongly suggests a lower probability of job satisfaction being at the highest level when there is workplace representation.



In Online Appendix 3 we present the results from deploying four selected alternative indicators of well-being: satisfaction with pay, satisfaction with leisure activities, satisfaction with life, and satisfaction with household income. For example, when regressing satisfaction with pay on the set of included covariates we confirmed the negative relationship with workplace representation. This is an expected relationship as, presumably, satisfaction with working conditions in the main job includes satisfaction with pay as a major component. Interestingly, workplace representation was also found to be positively associated with increased leisure activity and satisfaction with life in general (significant at the 0.01 level), while satisfaction with household income was not associated with worker representation, which may suggest that in this case household characteristics are likely to hold sway. Lastly, observe that schooling is strongly related with leisure and life satisfaction, suggesting that the returns to education extend beyond wage gains.

(Table 3 near here)

The results reported for our baseline model in Table 2 may be driven by the presence of unobserved person (worker) fixed effects. As was discussed in section 4, although there is no longitudinal component in the EWCS, it is nonetheless possible to construct a pseudo-panel with cohort fixed effects. We next present the results of an experiment in which the constructed cohort is observed over time, namely in the consecutive EWCS waves of 2010 and 2015. Our interest in this case is test whether the conditional correlation obtained in Table 2 continues to hold after controlling for cohort fixed effects.

First-difference estimates of the pseudo-panel model are given in Table 3. In the interests of parsimony, we only present results for the same set of characteristics as were presented in the second column of Table 2. Clearly, the result regarding the role of workplace representation on job satisfaction is confirmed, with a coefficient of -0.058 (significant at the 0.01 level). There is therefore the suggestion that the negative relationship between job satisfaction and worker representation earlier reported in Table 2 is likely more than mere conditional correlation.

(Table 4 near here)

However, causality issues are directly tackled in Table 4, in which we estimate a linear regression model with an endogenous binary treatment. Note in the first instance that the methodology being implemented here allows us to select different sets of control variables for the first-stage (treatment) and second-stage (outcome) equations. The first-stage results, from equation (4), are presented in panel (b) of the table. The equation uses as an instrument the mean incidence of formal representation at country-industry-establishment size level extracted from the European Company Survey (ECS). This means that 924 (= 28 x 11 x 3) cells, combining

country, industry, and establishment size, were assigned to the original EWCS dataset. As mentioned in the modeling section, the sample in this case is restricted to individuals who work in establishments with at least 10 employees and is therefore smaller than in Table 2 which covers workers in all establishments.

As expected, the selected instrument is positive and also highly statistically significant in the first-stage equation, thus confirming the assumed relationship between the probability of an individual being in an establishment with workplace representation and the mean incidence observed at the corresponding country-industry-establishment size level.

The results from the second-stage (outcome) equation are given in panel (a) of the table. As can be seen, the coefficient estimate for the key variable of interest – workplace representation – is highly significant and negative, at -0.098. The t-ratio test therefore rejects the null that the slope coefficient of the variable of interest is zero. In other words, assuming validity of t-ratio inference, and given that the coefficient can be interpreted as the average treatment effect (ATE) on job satisfaction, the implication is that on average individuals in establishments with workplace representation will score a lower job satisfaction than their counterparts in establishments without representation. In short, not only is there evidence of a negative association between representation and job satisfaction but also an indication that causality is present. The Wald test in turn, given at the bottom of the table, also indicates that the null of independence of the first-stage equation and second-stage equation (described next) is rejected at the 0.05 level. This finding is interpreted as an indication that the presence of endogeneity in the system is confirmed. According to Lee et al. (2021), however, validity of the t-ratio inference for  $\hat{\alpha}_{IV}$  requires further analysis. In the first place, it requires that the F statistic obtained from the first-stage equation (that is, the square of the t-ratio for the hypothesis that the instrument is equal to zero) is greater than 10. Secondly, it also requires the use of adjusted standard errors, based on the first-stage F statistic.

(Table 5 near here)

This test is reported in Table 5, with the results from the t-ratio test for the instrument given at the top of the table. As can be seen, the F-statistic is quite large, at 19.987, implying an adjusted factor for the standard error of 1.315. Based on this adjusted factor, a 95% confidence interval for the workplace representation coefficient in the outcome equation can be then constructed as shown in the second main row of the table. As a result of this procedure, we conclude that workplace representation is significant at the 0.05 level, as shown at the foot of the table.

(Table 6 near here)

As an additional test on the validity of the selected instrument, we present results from a reduced-form equation in Table 6. The goal here is to examine the exclusion restriction, that is, the implicit assumption that the instrument is correlated with treatment but has no direct impact on the outcome. Satisfaction of the first requirement follows directly from the first-stage results; while the second requirement can be indirectly tested by running a model in which job satisfaction depends on all the observables except workplace representation, with the selected instrument now added as a regressor. As can be seen, the coefficient on the instrument in the reduced-form equation is not statistically significant.

## 6. Conclusions

This paper has investigated the relationship between worker job satisfaction and worker representation at the workplace. It marks a clear shift away from the traditional focus on union membership because its sample of almost exclusively EU nations have industrial relations systems that diverge markedly from those of Anglophone countries, studies of the latter having contributed the bulk of the trade union and worker well-being literature. We focus on a more encompassing metric than union membership albeit one that remains centered at establishment level. Our dataset comprises two waves of the European Working Conditions Survey (EWCS), which is also new to this line of inquiry.

Our analysis of cross-section and pooled cross-section data indicated that workers in establishments with workplace representation have less job satisfaction than their counterparts in plants without formal representation. We then proceeded beyond conditional correlation by constructing a pseudo-panel with cohort fixed effects to take account of unobserved worker heterogeneity. Our first-difference estimates suggested that the negative relationship between worker representation and job satisfaction earlier reported in cross section persists. Causality issues were more directly tackled using an endogenous treatment effects model to address the possible endogeneity of worker representation and a variety of tests deployed to establish the validity of our IV procedure. We concluded that our findings were supportive of a causal negative relationship between job satisfaction and worker representation.

It is against this backdrop that we would contend that recent claims that a shift in the relationship between union membership and job satisfaction reported for the United States and the United Kingdom *also* applies to the continental European experience is likely premature. The diversity of finding in modern European studies using union membership data that we have also charted is arguably supportive of this interpretation too. Be that as it may, our research uses worker representation and more study of the negative results reported here is warranted no less than the intriguing result in some union membership studies of distinct cohort effects.

## References

- Addison, John T., and Paulino Teixeira (2019). "Strikes, Employee Workplace Representation, Unionism, and Industrial Relations Quality in European Establishments." *Journal of Economic Behavior and Organization* 159: 109-133.
- Artz, Benjamin, and John S. Heywood. 2022. "Unions, Worker Participation and Worker Well-Being." In Zimmermann, Klaus F. (ed.), *Handbook of Labor, Human Resources and Population Economics*. Berlin and Heidelberg: Springer-Verlag.
- Artz, Benjamin, David G. Blanchflower, and Alex Bryson. 2021. "Unions Increase Job Satisfaction in the United States." NBER Working paper No. 28717. Cambridge, MA: National Bureau of Economic Research.
- Blanchflower, David, Alex Bryson, and Colin Green. 2022. "Trade Unions and the Well-Being of Workers." *British Journal of Industrial Relations* 60(2): 255-277.
- Borjas, George J. 1979. "Wages and Unions." *Journal of Human Resources* 14(1): 21-40.
- Bryson, Alex, Lorenzo Cappellari, and Claudio Lucifora. 2004. "Does Union Membership Really Reduce Job Satisfaction in Britain?" *British Journal of Industrial Relations* 42(3): 439-459.
- Bryson, Alex. 2001. "The Foundation of 'Partnership'? Union Effects on Employee Trust in Management." *National Institute Economic Review* 176(1): 91-104.
- Bryson, Alex, and Michael White. 2016. "Not So Dissatisfied After All? The Impact of Union Coverage on Job Satisfaction." *Oxford Economic Papers* 68(4): 898-919.
- Caroli, Eve, and Mathilde Godard, 2016. "Does Job Insecurity Deteriorate Health?" *Health Economics* 25(2); 131-147.
- European Foundation for the Improvement of Living and Working Conditions, TNS Infratest Sozialforschung (Munich). 2010. European Company Survey, 2009. [data collection]. UK Data Service. SN: 6568, DOI: 10.5255/UKDA-SN-6568-1
- European Foundation for the Improvement of Living and Working Conditions. 2015. European Company Survey, 2013. [data collection]. UK Data Service. SN: 7735, DOI: 10.5255/UKDA-SN-7735-1.
- European Foundation for the Improvement of Living and Working Conditions. 2020. European Working Conditions Survey Integrated Data File, 1991-2015. [data collection]. 8th Edition. UK Data Service. SN: 7363, DOI: 10.5255/UKDA-SN-7363-8.
- Freeman, Richard B. 1978. "Job Satisfaction as an Economic Variable." *American Economic Review, Papers and Proceedings* 68(2): 135-141.
- Goerke, Laszlo, and Yue Huang. 2022. "Job Satisfaction and Trade Union Membership in Germany." *Labour Economics* 78: 102238.
- Laroche, Patrice. 2016. "A Meta-Analysis of the Union-Job Satisfaction Relationship." *British Journal of industrial Relations* 54(4): 709-741.

Laroche, Patrice. 2017. "Union Membership and Job Satisfaction: Initial Evidence from French Linked Employer-Employee Data." *Human Resource Management Journal* 27(4): 648-668.

Lee, David S., Justin McCrary, Marcelo J. Moreira, and Jack R. Porter. 2021. "Valid t-ratio Inference for IV." NBER Working Paper 29124. Revised version, March 2022. Cambridge, MA: National Bureau of Economic Research.

Nikelova, Milena, and Femke Cnossen (2020). "What Makes Work Meaningful and Why Economists Should Care About It." *Labour Economics* 66: 101847.

Pfeffer, Jeffrey, and Alison Davis-Blake. 1990. "Unions and Job Satisfaction: An Alternative View." *Work and Occupations* 17(3): 259-283.

Van der Meer, Peter H. (2019). "What Makes Workers Happy: Empowerment, Unions or Both?" *European Journal of Industrial Relations* 25(4): 363-376.

Table 1: Earnings regression model estimates

Variable	2015 (1)	2010 (2)	2010 and 2015 (3)
Establishment size (ref.: 1 {i.e., interviewee works alone})			
2 to 9 employees	0.025	0.125***	0.067***
	(0.023)	(0.016)	(0.013)
10 to 49 employees	0.065***	0.170***	0.110***
	(0.023)	(0.016)	(0.013)
50 to 249 employees	0.075***	0.199***	0.134***
	(0.023)	(0.016)	(0.013)
250 or more employees	0.119***	0.242***	0.178***
	(0.024)	(0.017)	(0.014)
Workplace representation	0.057***	0.025***	0.056***
	(0.006)	(0.006)	(0.004)
Schooling level (ref.: Pre-primary education)			
Primary education	0.009	-0.005	0.009
	(0.051)	(0.048)	(0.033)
Lower secondary	0.091*	0.061	0.063**
	(0.048)	(0.046)	(0.031)
Upper secondary education	0.152***	0.130***	0.129***
	(0.048)	(0.046)	(0.031)
Post-secondary	0.189***	0.160***	0.177***
	(0.049)	(0.048)	(0.032)
1 <sup>st</sup> stage of tertiary education	0.347***	0.276***	0.300***
	(0.049)	(0.047)	(0.031)
2 <sup>nd</sup> stage of tertiary education	0.579***	0.409***	0.483***
	(0.055)	(0.056)	(0.037)
Age	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)
Male	0.167***	0.157***	0.157***
	(0.006)	(0.006)	(0.004)
Weekly hours	0.007***	0.018***	0.019***
	(0.000)	(0.000)	(0.000)
Type of contract (ref.: Open-ended contract)			
Fixed term contract	-0.098***	-0.112***	-0.129***
	(0.009)	(0.009)	(0.006)
Temporary employment agency contract	-0.124***	-0.135***	-0.139***
	(0.029)	(0.025)	(0.017)
Apprenticeship or other training scheme	-0.507***	-0.406***	-0.464***
	(0.048)	(0.044)	(0.027)
Other	-0.138***	-0.169***	-0.210***
	(0.014)	(0.013)	(0.009)
Tenure	0.005***	0.005***	0.005***
	(0.000)	(0.000)	(0.000)
Constant	6.809***	6.053***	6.190***
	0.068	0.069	0.047

R <sup>2</sup>	0.81	0.81	0.78
N	18,042	17,365	40,567

*Notes:* The dependent variable in all three columns is the log of nominal monthly earnings. In columns (1) and (3) the sample is restricted to paid employees with a monthly earnings of at least 100 Euros; in column (2), the sample is further restricted to full-time employees. The OLS regressions include country, industry, occupation, and also in column (3) year (i.e., wave) fixed effects. All variables are defined in Appendix Table 1. \*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.

Sources: 2010 and 2015 European Working Conditions Surveys.

Table 2: Determinants of worker job satisfaction

Variable	Without household characteristics included (1)	With household characteristics included (2)
Workplace representation	-0.023*** (0.007)	-0.022*** (0.007)
Useful work	0.190*** (0.005)	0.190*** (0.005)
Work well done	0.104*** (0.005)	0.104*** (0.005)
Log monthly earnings	0.139*** (0.009)	0.141*** (0.009)
Job security	0.020*** (0.007)	0.019*** (0.007)
Schooling level (reference: Pre-primary education)		
Primary education	0.066 (0.057)	0.065 (0.057)
Lower secondary education	0.048 (0.054)	0.048 (0.054)
Upper secondary education	0.049 (0.054)	0.049 (0.054)
Post-secondary education	0.024 (0.055)	0.024 (0.055)
1 <sup>st</sup> stage of tertiary education	0.062 (0.055)	0.061 (0.055)
2 <sup>nd</sup> stage of tertiary education	0.059 (0.065)	0.055 (0.065)
Age	-0.002*** (0.000)	-0.002*** (0.000)
Male	0.028*** (0.008)	0.023*** (0.008)
Weekly hours	-0.006*** (0.000)	-0.006*** (0.000)
Type of contract (ref.: Open-ended contract):		
Fixed term contract	-0.021* (0.011)	-0.022** (0.011)
Temporary employment agency contract	-0.060** (0.030)	-0.063** (0.030)
Apprenticeship or other training scheme	0.150*** (0.047)	0.139*** (0.048)
Other	-0.059*** (0.015)	-0.059*** (0.015)
Tenure	-0.001** (0.000)	-0.001*** (0.000)
Establishment size (ref.: interviewee works alone)		



2 to 9 employees	-0.019	-0.018
	(0.023)	(0.023)
10 to 49 employees	-0.047**	-0.046**
	(0.022)	(0.022)
50 to 249 employees	-0.071***	-0.070***
	(0.023)	(0.023)
250 or more employees	-0.088***	-0.086***
	(0.024)	(0.024)
Spouse		0.015*
		(0.008)
Children		-0.039***
		(0.009)
Household size		0.011***
		(0.004)
R <sup>2</sup>	0.18	0.18
N	38,006	37,940

*Notes:* Worker job satisfaction in main job is the dependent variable. The sample is restricted to paid employees with a monthly earnings of at least 100 Euros. The regressions include country, industry, occupation, and year fixed effects. All variables are defined in Appendix Table 1. \*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.

Sources: 2010 and 2015 European Working Conditions Surveys.

Table 3: First difference estimates of worker job satisfaction using a pseudo-panel

Variable	Coefficient (s.e.)
Workplace representation	-0.058*** (0.019)
Useful work	0.184*** (0.012)
Work well done	0.096*** (0.011)
Log monthly earnings	0.100*** (0.018)
Job security	0.029 (0.018)
Weekly hours	-0.005*** (0.0009)
Tenure	0.0003 (0.001)
Children	-0.023 (0.026)
Household size	-0.00007 (0.010)
Constant	0.058*** (0.008)
R <sup>2</sup>	0.1371
N	5,207

*Notes:* The pseudo-panel is based on the 2010 and 2015 EWCS cross sections. Using these two data points, we generate different cohorts and run a model in first differences. By construction, in each cohort workers share the same birth year, gender, schooling level (aggregated into three categories, namely primary education or less, secondary, and tertiary education), marital status (i.e., whether there is a spouse or partner in the household), and country. The cohort is therefore the unit of analysis in this model, with the information on each of the included variables given by the group average over all individuals in the same cohort. The variables used in the construction of the cohorts are dropped from the regression. The model in first-differences controls for industry, occupation, type of contract, and establishment size. \*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.

Sources: 2010 and 2015 European Working Conditions Surveys.

Table 4: Results from an endogenous treatment-regression model

Panel (a): Second-stage (outcome) equation (dependent variable: worker job satisfaction)		
Variable	Coefficient	(s.e.)
Workplace representation	-0.098***	(0.030)
Useful work	0.195***	(0.012)
Work well done	0.101***	(0.008)
Log monthly earnings	0.141***	(0.027)
Job security	0.023***	(0.009)
Primary education	0.061	(0.081)
Lower secondary	0.053	(0.080)
Upper secondary education	0.055	(0.071)
Post-secondary	0.028	(0.080)
1 <sup>st</sup> stage of tertiary education	0.071	(0.073)
2 <sup>nd</sup> stage of tertiary education	0.064	(0.068)
Age	-0.001***	(0.0005)
Male	0.029**	(0.012)
Weekly hours	-0.006***	(0.0007)
Fixed term contract	-0.012	(0.015)
Temporary employment agency contract	-0.058	(0.049)
Apprenticeship or other training scheme	0.149*	(0.077)
Other	-0.025	(0.033)
Tenure	-0.0004	(0.0006)
Spouse	0.005	(0.009)
Children	-0.041***	(0.010)
Household size	0.015***	(0.004)
Constant	1.150***	(0.207)
Panel (b): First-stage (treatment) equation (dependent variable: workplace representation)		
Mean incidence of formal representation	0.447***	(0.100)
Age	-0.003***	(0.001)
Male	0.039	(0.026)
Weekly hours	0.004***	(0.001)
Fixed term contract	-0.099***	(0.036)
Temporary employment agency contract	0.026	(0.078)
Apprenticeship or other training scheme	0.155	(0.096)
Other	-0.438***	(0.097)
Tenure	0.021***	(0.002)
50 to 249 employees	0.309***	(0.046)
250 or more employees	0.630***	(0.065)
Constant	-0.843***	(0.015)
Rho	0.070	(.030)
Wald test	chi2(1)= 5.26 [p-value=0.0218]	
N	27,487	

Notes: The endogenous treatment-regression model comprises an equation for the outcome indicator (i.e., job satisfaction) and an equation for the endogenous treatment (i.e., workplace representation), and is estimated using the *etregress* command in Stata 15. Year, country, and occupation fixed effects are included in the outcome equation; country, occupation, industry, and establishment size fixed effects are included in the treatment equation. The Wald test at the foot of the table rejects the null of independence of the two equations at the 0.05 level. The model implementation is conducted using only those individuals who work in establishments

with at least 10 employees. Since the selected instrument – the mean incidence of formal representation at country/industry/establishment size level – is based on the European Company Survey-ECS, and the ECS is restricted to establishments with at least 10 employees, sample size is smaller than in Table 2. For the 2010 EWCS data point, the mean incidence is based on the 2009 ECS; for the 2015 data point, we used the 2013 ECS. In both cases, the information about the presence of a formal representation is based on the Management Questionnaire of the ECS. The establishment-size reference category in this table is given by establishments with 10 to 49 employees. \*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.

Sources: 2010 and 2015 European Working Conditions Surveys; 2009 and 2013 European Company Surveys.

Table 5: Analysis of the validity of the t-ratio inference for the endogenous variable

Testing $b=0$ in the first-stage (treatment) equation in Table 5:	
Mean incidence of formal representation	0.4477
s.e.	0.1001
t	4.4707
First-stage F-statistic	19.9873
Table 3/Panel A (Lee et al., 2021)	This computation is for F-statistic equal to 20.914 and Adjusted factor equal to 1.315
Testing $H_0 (\hat{d}_{IV}=0)$ in the outcome equation in Table 5:	
$\hat{d}_{IV}$	-0.09865
s.e.	0.03021
t	3.2650
Adjusted s.e. ("0.05tF SE") (=adjusted factor x s.e.)	0.03973
t  corrected (= $\hat{d}_{IV}$ / Adjusted s.e. ("0.05tF SE"))	2.4829
95% confidence interval for $\hat{d}_{IV}$ : $\hat{d}_{IV} \pm 1.96 \times "0.05tF SE"$	(-0.02078; -0.17653) $\hat{d}_{IV}$ is significant at 5%.

Notes: According to Lee et al. (2021), validity of the t-ratio inference for  $\hat{d}_{IV}$  requires (a) F greater than 10, and (b) the use of adjusted critical values, where F is given by the square of the t-ratio for the hypothesis that  $b = 0$  (in the first-stage equation).

Sources: 2010 and 2015 European Working Conditions Surveys; 2009 and 2013 European Company Surveys.

Table 6: Results from the reduced-form equation

Variable	Coefficient (s.e.)
Mean incidence of formal representation	0.011
	(0.036)
Useful work	0.196***
	(0.013)
Work well done	0.101***
	(0.009)
Log monthly earnings	0.136***
	(0.027)
Job security	0.026***
	(0.009)
Schooling level (reference: Pre-primary education)	
Primary education	0.065
	(0.077)
Lower secondary	0.057
	(0.075)
Upper secondary education	0.059
	(0.066)
Post-secondary education	0.029
	(0.076)
1 <sup>st</sup> stage of tertiary education	0.071
	(0.069)
2 <sup>nd</sup> stage of tertiary education	0.069
	(0.067)
Age	-0.002***
	(0.000)
Male	0.033**
	(0.013)
Weekly hours	-0.007***
	(0.001)
Type of contract (ref. Open-ended contract)	
Fixed term contract	-0.008
	(0.016)
Temporary employment agency contract	-0.054
	(0.048)
Apprenticeship or other training scheme	0.148*
	(0.079)
Other	-0.005
	(0.032)
Tenure	-0.001*
	(0.001)
Establishment size (ref.: 10 to 49 employees)	
50 to 249 employees	-0.031*
	(0.016)

250 or more employees	-0.052
	(0.030)
Constant	1.149***
	0.207
R <sup>2</sup>	0.18
N	27,487

*Notes:* Worker job satisfaction is the dependent variable. The model includes all individual- and household-level characteristics, and is estimated by OLS. The selected instrument (i.e., the mean incidence of formal representation) is included in the set of regressors but not the workplace representation variable. Year, country, occupation, industry, and establishment size fixed effects are also included in the regression. The estimation sample is the same as in Table 5. Clustered (by country) standard errors are given in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Sources: 2010 and 2015 European Working Conditions Surveys; 2009 and 2013 European Company Surveys.

Appendix Table 1: Variable definition

Variable	Definition	Raw variable in the ewcs_1991-2015_ukda_18mar2020.dta file and the corresponding question number in the 2015 EWCS survey
<b>Worker well-being indicators:</b>		
Job satisfaction	Ordered variable in a 1 to 4 scale: 1 is the lowest level. 1=Not at all satisfied /2=Not very satisfied /3=Satisfied /4=Very satisfied	y15_Q88 Q88: On the whole, are you very satisfied, satisfied, not very satisfied or not at all satisfied with working conditions in your main paid job?
Satisfaction with pay	Ordered variable in a 1 to 5 scale: 1 is the lowest level. 1=Strongly disagree /2=Tend to disagree /3=Neither agree nor disagree /4=Tend to agree /5=Strongly agree	y15_Q89a Q89: To what extent do you agree or disagree with the following statements about your job? A. Considering all my efforts and achievements in my job, I feel I get paid appropriately.
Satisfaction with life	Ordered variable in a 1 to 6 scale: 1 is the lowest level. 1=At no time /2=Some of the time /3=Less than half of the time /4=More than half of the time /5=Most of the time /6=All of the time	y15_Q87e Q87: Please indicate for each of the five statements which is the closest to how you have been feeling over the last two weeks. E. My daily life has been filled with things that interest me.
Satisfaction with household income	Ordered variable in a 1 to 6 scale: 1 is the lowest level. 1=With great difficulty /2=With difficulty /3=With some difficulty /4=Fairly easily /5=Easily /6=Very easily	y15_Q100 Q100: A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total monthly income, is your household able to make ends meet?
Satisfaction with leisure activities	Ordered variable in a 1 to 5 scale: 1 is the lowest level. 1=Never / 2=Less often / 3=Several times a month / 4=Several times a week /5=Daily	y15_Q95g Q95: In general, how often are you involved in any of the following activities outside work? G. Sporting, cultural or leisure activity outside your home.
<b>Worker-level variables:</b>		
Schooling	Seven schooling dummies: Pre-primary education Primary education or first-stage of basic education Lower secondary or second stage of basic education Upper secondary education Post-secondary non-tertiary education	y15_ISCED_It Q106: What is the highest level of education or training that you have successfully completed? ISCED classification The raw variable is missing in 2010 in the case of Germany. For the pseudo-panel we generated three dummies: primary, secondary, and tertiary education.



	1 <sup>st</sup> stage of tertiary education 2 <sup>nd</sup> stage of tertiary education	
Occupation	Ten occupation dummies (ISCO 88 one-digit categories): Armed forces occupations Managers Professionals Technicians and associate professionals Clerical support workers Service and sales workers Skilled agricultural, forestry and fishery workers Craft and related trades workers Plant and machine operators and assemblers Elementary occupations	y15_ISCO_88_1 Q6: ISCO 88 one-digit categories (10 occupations)
Type of contract	Five employment contract dummies: Open-ended contract Fixed term contract Temporary employment agency contract Apprenticeship or other training scheme Other	y15_Q11_It Q11: What kind of employment contract do you have in your main paid job?
Weekly hours	Number of hours usually worked per week in the main paid job.	y15_Q24 Q24: How many hours do you usually work per week in your main paid job?
Tenure	Years of service in the company/organization.	y15_Q17_It Q17: How many years have you been in your company or organization?
Gender	1/0 dummy: 1 if male.	y15_Q2a
Age	Age	y15_Q2b
Monthly earnings	Log of nominal monthly earnings. In euros.	inc_euro Q104: How much are your NET monthly earnings from your main paid job? Please refer to the average earnings in the recent months. (in Euros.)
Work well done	Ordered variable in a 1 to 5 scale: 1 is the lowest level. 1 to 5: 1=Never /2=Rarely /3=Sometimes /4=Most of the time /5=Always	y15_Q61h H. Your job gives you the feeling of work well done
Useful work	Ordered variable in a 1 to 5 scale: 1 is the lowest level. 1=Never /2=Rarely /3=Sometimes /4=Most of the time /5=Always	y15_Q61j J. You have the feeling of doing useful work

Job security	1/0 dummy: 1 if worker strongly agrees or tends to agree that he/she were to lose or quit his/her current job, it would be easy to find a job of similar salary; 0 otherwise.	y15_Q89h Q89/H. If I were to lose or quit my current job, it would be easy for me to find a job of similar salary
<b>Establishment-level variables:</b>		
Worker representation	1/0 dummy: 1 if there is a trade union, works council or a similar committee representing employees.	y15_Q71a Q71 Does the following exist at your company or organization...? A. Trade union, works council or a similar committee representing employees?
Industry	Ten industry of employer dummies: A-B Agriculture, hunting, forestry, fishery C-D Mining, quarrying and manufacturing E Electricity, gas, and water supply F Construction G Wholesale and retail trade; repair of motor vehicles H Hotels and restaurants I Transport, storage and communication J Financial intermediation K Real estate activities L Public administration and defence; social security M-N-O-P-Q Other services	y15_nace_r1_lt_11 Nace_rev1_11 - y10_nace_rev1 collapsed into 11 categories to make it comparable across surveys.
Establishment size	Five establishment-size dummies: Interviewee works alone 2 to 9 employees 10 to 49 employees 50 to 249 employees 250 or more employees	est_size We note that the raw variables est_size and workplace_size were missing in too many cases in 2015 and that some additional coding was required in order to include establishment size in the regression work. Q16. How many people in total work in the local unit of the establishment where you work?
<b>Household-level variables:</b>		
Spouse	1/0 dummy: 1 if spouse or partner in the household.	y15_Q1 and y15_Q3c_2/3/...
Children	1/0 dummy: 1 if children in the household.	y15_Q3c_2/3/...
Household size	Ordered variable in a 1 to 6 scale: 1 is the lowest level.	y15_Q1 Q1: Including yourself, how many people live in this household?
Paid employee	1/0 dummy: 1 if paid employee.	y15_Q7
Full time	1/0 dummy: 1 if full-time employee.	y15_Q2d. This variable is available in 2015 only.

Source: 2010 and 2015 European Working Conditions Survey. File: ewcs\_1991-2015\_ukda\_18mar2020.dta.