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ABSTRACT

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Using a cross section of matched data from the employee and management questionnaires of the European Company Survey, this paper investigates the determinants of worker commitment and the potential contribution of commitment to establishment performance. An index of worker commitment is constructed from employer perceptions of the motivation of workers and their retention and absenteeism propensities, while the determinants of commitment are fashioned from observations taken from the worker representation side ordered along dimensions such as perceived organizational trust and involvement. The commitment index is then linked to establishment performance outcomes. Key findings from the commitment equation are the positive role of trust in management, the quality of information exchanged, and the degree of worker representation influence in respect of major decisions taken by management. In turn, commitment emerges as a key correlate of establishment financial performance and labor productivity growth. Our supplemental sensitivity analysis is supportive of the interpretation of commitment as a driver of performance.

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1. Introduction

The aims of the present paper are twofold: first, to explore the antecedents of worker commitment; and, second, to examine the role of commitment as a potential determinant of workplace labor productivity growth and financial performance. Commitment is defined as worker identification with and attachment to the organization.[1] Although long considered as a key factor in the sociology and psychology of work (Braverman, 1974; Karasek, 1979), and as a central element of the high-performance workplace literature (Boxall and Purcell, 2008), traditional economics treats an individual's preferences as fixed, with utility depending on pecuniary arguments alone. Latterly, employee decisions over the effort they supply to the organization have entered modern economic theory, shaping incentive models of worker compensation (Lazear, 2000) and the literature on efficiency wages (Akerlof, 1982). Moreover, the extent to which the interests of the employer principal and the employee agent diverge or are aligned clearly affect agency costs in the modern corporation (see Aghion and Tirole, 1997; Athey and Roberts, 2001); while more generally, Akerlof and Kranton (2000) formally incorporate identity into a general model of behavior and then demonstrate how this extension of the utility function can assist economic explanations of gender discrimination , poverty, and the household division of labor.

But it is Akerlof's subsequent work with Kranton on identity and labor relations or, more strictly, work incentives that provides the clearest theoretical lineage to the empirical applications considered here. By analogy with the army's training program at West Point, the authors build an argument that "inculcating in employees a sense of identity and attachment to an organization is critical to well-functioning enterprises" (Akerlof and Kranton, 2005: 10-11). Instilling commitment can lead employees to behave in concert with the goals of their organizations; specifically, by accepting high effort with reduced wage variation.

If the theoretical basis of the present paper is rooted in identity and the economics of organizations after Akerlof and Kranton, its practical orientation and focus on labor productivity and financial performance follow Brown et al. (2011). Thus, in common with these authors, we first investigate the determinants of a composite measure of workplace commitment, and then proceed to link that index to similar performance indicators. Apart from the fact our commitment index is based on management perceptions of employee motivation (rather than those of the employees themselves), the main difference is that we do not use average levels of the commitment index in the performance equation(s) but rather the actual values used in the first step. Furthermore, we also investigate the cross correlation between the commitment and performance equations as well as examine the endogeneity of the commitment index. Finally, reflecting the cross-country nature of our analysis, specific features of the labor market – type of worker representation, union density, and collective bargaining arrangement – receive attention in the performance equations alongside the commitment argument.

The structure of the paper is as follows. Section 2 contains the backdrop to the study in the form an enabling theoretical framework that is subsequently fleshed out in the modeling section. It also offers a review of the sparse *economic* literature directly examining the commitment-performance nexus and some links to the HRM (Human Resource Management) literature. Section 3 offers an amplification of the underlying Akerlof-Kranton model and presents our multilevel mixed effects ordered logistic models. Section 4 presents the unique cross-country dataset employed: the European Company Survey. It outlines the source and manner of construction of the three-component commitment index; the subjective performance indicators; the key aspects of employee representation used as determinants of that index, and the other arguments deployed in the commitment and performance equations. Our main findings are presented in section 5, including evaluation of the sensitivity of the results. A concluding section recounts our main findings.

2. Theoretical and Empirical Backdrop

2.1 Opening Theoretical Remarks

As noted earlier, the theoretical basis of the commitment model is contained in Akerlof and Kranton (2005) who construct an economic model of identity and work incentives, the backdrop to which is the principal agent model and the separation of ownership and control in organizations with delegated decision making. In their agency model, there are clear advantages to the organization in inculcating a sense of identity and attachment among its employees. In particular, the employer principal has an interest in inducing the employee agent to take an action that is more costly (i.e. involves more effort) than another to that agent in circumstances where the principal cannot observe the action taken by the agent and where it is not possible to infer that action from an observation of the agent's output. (A formalization of the model is given in section 3.) The problem for the organization resides in designing a contract that not only resolves information asymmetries by improvements in organizational communication or employee involvement that yield better informed choices and higher productivity but also incentivizes the agent to choose the costlier action either by increasing the payment for the action or by reducing its costs.

In introducing identity into the standard principal-agent model, and drawing on management and psychology theory, Akerlof and Kranton explore the latter option. They argue that employee utility is a function of the employee's identity and that identity can also be influenced by the (human resource) practices of the organization. These are to be seen as investments that lead the employee to consider himself/herself as an *insider* as opposed to an *outsider*. Insiders work in the organization's interest since if they were to deviate from that course of action they would sacrifice utility. Returning to the two effort scenarios mentioned earlier, if the firm can inculcate organizational citizenship this will lower the cost of effort and *reduce* the wage needed to stimulate choice of the high effort outcome**.** The advantages to the

firm from changing the worker from an outsider to an insider are two-fold. Not only is a worker who derives utility from the job willing to work for less overall pay but also less variation in pay is required to induce the worker to undertake the high-effort option. That is, where workers are risk averse there is an obvious cost advantage to firms from situations in which workers require less wage variation.

Akerlof and Kranton note that the pay incentive route in the basic principal-agent model is not without problems, with distortions arising from the measurement period, gaming the system, and workers' social preferences (see also Prendergast, 1999; Gibbons, 1998; Akerlof and Yellen, 1990). They also observe that although identity flattens the optimal wage schedule it is not a general result. Specifically, when the model admits of more than two effort levels, it may be optimal to increase the variation in pay to motivate the employee. *Vulgo*: monetary compensation and identity are not necessarily substitute incentives.

Finally, by way of application, Akerlof and Kranton offer many examples supportive of the predictions of their identity-augmented agency model drawn from outside of economics in the military and civilian workplaces.[2] For an economic (non-experimental) application, however, we turn to Brown et al. (2011).

2.2 Empirical Strategies

In exploring the determinants of a measure of worker commitment (and loyalty), Brown et al. (2011) provide the main economic study that seeks to directly apply the Akerlof-Kranton model. Although we focus on their attempt to operationalize that model, we shall also make reference to the management literature and to an empirical study by Gould-Willliams (2003) more grounded in that tradition.

Brown et al. themselves draw on the management literature to posit links between a set of HR practices and affective commitment. These are (*organizational) information and communication*, *employee involvement and participation* and *organizational trust*. Each is posited to help resolve information asymmetries *and* influence commitment at the employee level – the first by making workers aware of the organizational goals of the enterprise and the involvement of the worker in their achievement, the second via positive work attitudes, and the third by imparting a feeling of confidence in employer sincerity and effectuation – and thence *firm* performance.[3]

Beginning with their measure of employee commitment, Brown et al. use matched data from the Management and Employee Questionnaires of the 2004 British WERS (Workplace and Employee Relations Survey). The Employee Questionnaire inquires of employees how strongly they agree or disagree with the two statements: (a) *I share many of the values of my organization* and (b) *I feel loyal to my organization*. Answers to each question – the former demonstrating commitment and the latter loyalty – are arranged to follow five-point indices from 0 ('strongly disagree') to 4 ('strongly agree') of rising commitment and

loyalty, although in practice a hybrid combination of the two questions is constructed to form a single five-point *commitment-loyalty index* (CLI).

Brown et al. first explore the determinants of each ordered component/score of their CLI index and then consider whether this index in turn influences firm performance. The principal determinants of the CLI index are an extensive set of human resource practices all of which (with two exceptions) are constructed from responses to the Employee Questionnaire. They are grouped under the three headings noted earlier, namely organizational communication (comprising 4 five-point indices), employee involvement and participation (a set of 6 indices and 1 binary indicator), and organizational trust (4 five-point indices).

Turning to their outcome indicators, data from the Management Questionnaire are then used to construct subjective measures of relative workplace financial performance and labor productivity, this time on a four-point scale from 0 ('below average') to 3 ('a lot better than average').

The results of fitting a generalized ordered probit model for employee CLI suggest that establishments can exert control over the loyalty and commitment of their workforces, that is, foster attachments. Thus, the human resource practices are generally individually significant at the highest category of CLI and have the largest marginal effects level at this extreme of the CLI distribution. In turn, the results for performance indicate that employee commitment – simply proxied by the average level of the employee commitment loyalty index – is positively associated with productivity improvement and financial gains. The results are stronger for establishments in which the principal occupational group is professional or associate professional, which groups the authors conjecture have a greater degree of autonomy and discretion over the tasks performed.

The latter result may be linked to a parallel line of empirical inquiry based on the agency problem, namely the determinants of *workplace autonomy*. Thus, for example, in a comparatively recent economic study, again using WERS data, Green (2008) reports that *task discretion* is strongly associated with organizational commitment and that task discretion is positively associated with job skill. Organizational commitment is based on questions asking the employee respondents how far they agreed with the following statements*: I share many of the values of my organization, I feel loyal to my organization*, and *I am proud to tell people who I work for.* Task discretion is derived from ordered responses to five questions inquiring of respondents their degree of influence over five domains of control. Interesting aspects of the study include the use of instrumental variables for commitment derived from the management component of the WERS and estimation with establishment fixed effects, even if commitment is not modeled.

As noted earlier, the notion that bundles of HR practices can stimulate organizational performance and provide organizations with a sustainable source of competitive advantage is offered by the HRM literature, where the practices in question are commonly referred to as high *performance*, *high involvement*

and, indeed, *high commitment* practices (Whitfield and Poole, 1997). High commitment management HR systems in particular are held to shape employee behavior and attitudes by developing psychological links between organizational and employee goals. That is, they are designed to develop committed employees who can be trusted to use their discretion to carry out job tasks in a manner that is consistent with organizational goals (Arthur, 1994). Such high commitment HR practices, designed to "tap the discretionary efforts of individual workers," are well described by Gould Williams (2003) in a study of British local government employees. Gould-Williams' own model seeks to evaluate the impact of bundles of HR practices on job satisfaction, commitment, effort, and organizational performance. We focus here on his organizational commitment and performance outcomes, while noting at the outset that systems (and interpersonal) trust is seen as the essential lubricant or intervening variable explaining how HR practices influence employee commitment and organizational performance (as well as behavioral outcomes). Using cross section data obtained from a postal survey of public sector employees, Gould-Williams reports that a greater number of HR practices (of which high commitment practices were admittedly a minority) was associated with superior organizational performance, where performance is a subjective multidimensional measure comprising value for money, service quality, and service efficiency, Moreover, HR practices were found to have a significantly positive effect on systems trust, which in turn was associated with greater organizational commitment and organizational performance. The variables having the greatest direct predictive effect on organizational performance were, in order of importance, systems trust, commitment, and HR practices.

3. Modeling

As discussed in section 2, the main implication from the Akerlof and Kranton (2005) model is that good management ultimately fuels worker identity with the firm, or worker commitment. Identity seems to be especially relevant in circumstances where it is difficult to observe and reward effort. And even if worker motivation responds well to monetary incentives, it may nevertheless be profitable for firms also to initiate non-pecuniary incentives, seeking to inculcate identity (such as a sense of sharing in the organization's mission).

In this setting, a worker taste for *identity* implies that any deviation from the norm (i.e. some prescribed ideal) is utility decreasing. As a result, a worker who fully identifies with the organization (an *insider*) sacrifices utility by deviating from a high effort regime, no less than an outsider who deviates from a low-effort strategy. In a principal-agent framework it can be then shown that it is profitable for a firm to incur some cost q to inculcate identity among those who in principle value being a part of the firm so that they choose a high effort strategy – rather than pursue a low effort option – at a reduced wage cost. All is required therefore is a utility function that depends upon both pecuniary (w) and non-pecuniary arguments;

that is, $u(w, e, c) = \log w - e + I_c - t_c|e^*(c) - e|$, where e denotes actual worker effort and I_c is the identity taste for agent type c (either insider or outsider). For $t_c > 0$, the last term indicates the penalty from deviating from the norm, which is equal to $t_O|e_B - e_A|$ in the case of an outsider (O) and $t_N(e_A - e_B)$ for an insider (N). The prescribed effort level, $e^*(c)$, is assumed to be equal to e_B and e_A for an outsider and insider, respectively (i.e. $e^*(O) = e_B$ and $e^*(N) = e_A$, with $e_B < e_A$.)

Assuming that the participation and incentive constraints bind for workers of each type, and that the optimal wage for an insider (outsider) is given by w^N (w^O), it follows that $(\log w_H^O - \log w_L^O) > (\log w_H^N - \log w_L^N)$. It turns out that this condition requires that $t_O + t_N > 0$, a true statement as t_c is positive for any worker type. In other words, inducing elevated effort (H) is less costly in the case of an insider than for an outsider. It is then up to the firm to instill the required degree of worker identity through the selection of *good* HR practices. (The proof is contained in Appendix 1.)

Empirically, we proxy workplace commitment by using a composite measure based on three items extracted from Question P1 of the Management Survey, which inquires whether management encounters problems related to absenteeism, retention of workers and worker motivation. (The details of the construction of the composite are given in section 4 below.) The composite index is therefore based on management respondent perceptions rather than those of employees themselves as there is no employee-level information in the ECS data.

The lack of employee-level information also means that in our approach the drivers of workplace commitment will be exclusively based on the perceptions and characteristics of employee representation, along the selected domains of organizational trust (i.e. the trust of employee representation in management), quality of information exchange, and degree of involvement. We note, however, that by modeling workplace commitment – extracted from the Management Survey – on workplace representation characteristics – extracted from the Employee Representative Survey (ER) – we avoid contamination arising from having the RHS variables and the dependent variable being selected from the same self-reported source. While we cannot preclude the possibility that unobserved traits of the ER respondents may contaminate their scores, it is not likely that this unobserved heterogeneity is correlated with the unobserved traits that may contaminate the scores of the management respondents. Additionally, worker *identity* is likely influenced by the expression of worker voice.

Formally, in order to test the relationship between workplace commitment and workplace representation characteristics, we deploy a multilevel mixed effects ordered logistic model as follows:

$$\Pr(Worker\ commitment_{ij} > k\ |X_{ij}, \boldsymbol{\kappa}, \boldsymbol{u}_j) = \Lambda(X_{ij}\beta + \boldsymbol{u}_j - \kappa_k), \tag{1}$$

where worker commitment is observed as a categorical and ordered variable on a 1 to 4 scale (or $k = 1, 2, 3, 4$), with 1 being the lowest level. In this framework, κ_k denotes the cut-point for the commitment index category k. $\boldsymbol{u}_j$ gives the set of country random intercepts, while X_{ij} is the vector of employee representation

characteristics which are fully described in Section 4. $\Lambda(.)$ is the logistic cumulative distribution function, and i and j are indices indicating establishment and country, respectively. The specification also includes controls for industry affiliation and establishment size dummies.

Next we connect the commitment index to two alternative measures of establishment performance, now controlling for a full set of establishment characteristics extracted from the MM survey, including the type of workplace representation (union or otherwise) and workforce composition inter al., as described in section 4. Given that the dependent variable is an ordered variable, we again specify a multilevel mixed effects ordered logistic model as follows:

$\Pr\left(y_{ij} > k \mid Z_{ij}, worker\ commitment_{ij}, \boldsymbol{\kappa}, \boldsymbol{u}_j\right) = \Lambda(Z_{ij}\beta + \delta_1 worker\ commitment_{ij} +$

$\delta_2 union_{ij} + \delta_3 worker\ commitment * union_{ij} + \boldsymbol{u}_j - \kappa_k),$ (2)

where firm performance, y_{ij}, is observed as a categorical and ordered variable, both in the case of the financial situation of the establishment and its labor productivity, the two performance outcomes observed in our dataset. The former measure denotes the financial situation on a 1 to 5 scale (or $k =$1, 2, 3, 4, 5), with 1 being the lowest level. The latter measure indicates the establishment's current labor productivity in comparison to the situation three years earlier; it is reported on a 1 to 3 scale (or $k =$1, 2, 3), again from low to high. In this framework, κ_k denotes the cut-point for the corresponding firm performance category k. $\boldsymbol{u}_j$ gives the set of country random intercepts, while Z_{ij} is the vector of selected establishment characteristics.

To facilitate the interpretation of the results from models (1) and (2) we will report the coefficient estimates and the corresponding marginal effects. The latter are obtained by fixing the random effects at their theoretical mean (i.e. zero) and all control variables at their sample mean.

The findings will be firstly discussed in separate runs. As a robustness test, we shall also provide the results from a model that allows for cross-equation correlation. The exercise is designed to evaluate whether the estimates obtained in separate regressions are, in any obvious manner, sensitive to the presence of inter-dependence across the worker commitment and performance equations. To this end we use the recursive Conditional Mixed-Process (CMP) software (Roodman, 2011), which is also well-suited to situations where right-hand-side observables include endogenous variables. CMP fits seemingly unrelated regression models of a large family, including the case of a categorical left-hand-side variable and hierarchical (i.e. multi-level or clustered) data as in our case. In the presence of an endogenous variable, the simultaneous system becomes a recursive system similar to a two-stage least squares regression, the first-stage being given by the worker commitment equation and the second by the performance equation, subject to the existence of a valid instrument. In this case we will also test for the correlation in the error term across the first- and second-stage equations, where statistical significance denotes endogeneity in the system.

4. Data

Our study uses the cross-country information available in the two components of the 3rd European Company Survey (ECS) of 2013, namely the Management Questionnaire (MM) and the Employee Representative Questionnaire (ER). Our raw dataset in particular is a merged MM-ER file, made available by the European Foundation for the Improvement of Living and Working Conditions (file name: ECS2013_merged data file; version 11-02-20). The MM survey is based on responses of the most senior official responsible for human resources management on a variety of issues, including the employee representation structure present at the establishment. The corresponding respondent in the ER Questionnaire (identified in the ER raw data set by the variable er_type_er) is the person who is entitled to represent the opinions of the leading employee representation body at the workplace (see the *3rd ECS Technical Report*, p. 16/82). Based on the er_type_er variable we produce a complete allocation of workplace employee representation by country which is available in our online appendix. By construction, our estimation sample is made up of all the establishments with *formal* employee representation for which information from both questionnaires can be merged.[4] Although the raw data includes information on 32 European nations, our analysis is focused on the 28 member countries of the European Union, including (at that time) the United Kingdom.

In order to use the information on the characteristics of employee representation, especially in connection with effective involvement and influence in relevant decision making, we further restricted our sample to establishments in which major human resource decisions had been taken by management in the preceding 12 months. These decisions encompassed business situations that affected the entire establishment (e.g. changes in working time arrangements and various restructuring measures). The procedure implied a further reduction in sample size of approximately 25 percent to yield a total of 4,107 establishments with non-missing observations on the selected variables (having here as a reference our baseline Tables 1 and 2, below).

Using this restricted sample, we then generated several subsets of ER-survey based variables. The first subset concerns organizational trust and comprises two ordered variables denoting whether *management can be trusted*, and whether *management makes sincere efforts to involve the employee representation in the solving of joint problems*. The second subset is intended to capture the functioning and resources of employee representation and contains four dichotomous variables: *employee representative is elected*; *employee representative receives training*; *frequency of meetings with management*; and *time allocated to employee representation is sufficient*. The first variable indicates whether the representative was elected as opposed to being appointed; the second, whether the representative had received training related to his/her role; the third, the frequency of meetings (a 1 to 5

ordered variable such that the higher the value, the lower is the frequency); and the fourth indicates whether the time allocated to representation was adjudged sufficient by the respondent. In turn, the provision of information is flagged by a dichotomous variable indicating whether the information provided to the ER body on five issues affecting the establishment was "satisfactory." Where management was stated to have provided no information on this range of issues, we simply presumed that information provision was unsatisfactory (and coded the variable as zero). Finally, regarding the involvement in decision making, we constructed the following two sets of variables: first, dummies for *the ER body was only informed by management* and *the ER body was informed by management and asked to give its views or involved in the joint decision*; and, second, a separate dummy indicating that *the ER body had some or a strong influence on the management decision.* These variables are fully described in Appendix Table 1.

A major aspect of our data construction necessarily concerns the construction of the worker commitment index, a composite measure based on management perceptions of the motivation of workers and their retention and absenteeism propensities. The rationale is that a high rate of job rotation, a high level of absenteeism, and low worker motivation signal disaffection or lack of attachment to the organization. In practical terms, the composite is obtained by taking the average over the following three 1/0 dummies denoting whether there is (a) difficulty in retaining employees (there is difficulty in 10 percent of the cases); (b) low motivation of employees (in 22 percent of the cases); and (c) high level of sickness leave (in 21 percent of the cases). The derived index ranges between 0 and 1, with a mean of 0.8211.

Our proxy for worker commitment is only as good as the data. Perforce we have to rely on management's perceptions as there is no information in the dataset on workers' views of the degree to which they identify with the firm. Given the self-reported nature of the MM and ER data, however, the use of the former avoids our having both the dependent variable and the set of right-hand-variables (in our specification of the determinants of worker commitment) from the same data source. Another issue is that the three components of the index far from exhaust the admissible characterization of worker loyalty toward and shared values with the organization, thus raising the question of scale reliability. Here, we relied on the Cronbach alpha command in Stata to compute the scale reliability score of the generated three-item index. Given that the inter-item correlation is not always very high, we obtained a scale reliability score of only 0.386, and as such lower than the recommended threshold of 0.7. We also conducted factor analysis (principal factor component) with results similar to the analysis derived from Cronbach's alpha. As adding more items to the composite is simply not available to us, we carried out a sensitivity test in which models (1) and (2) included just one component at a time in separate regressions. We shall comment on the results of this experiment in the next section.

Establishment performance and establishment characteristics are sourced from the MM survey. As regards performance, survey respondents are asked to rate both the current financial situation and the labor

productivity status of the establishment. In the case of the former indicator, the generated variable is coded as an ordered variable on a 1 to 5 ascending scale, where category 1 denotes 'very bad' and category 5 'very good.' For the latter indicator, current labor productivity is compared with the situation some three years earlier on a 1 to 3 scale, again in ascending order from low to high, where category 1 denotes that labor productivity had 'decreased,' category 2 that it was 'about the same,' and category 3 that it had 'increased.' Finally, establishment-level characteristics include sector (industry) affiliation, establishment size (number of employees), single versus multi-establishment organization, private versus public ownership, workforce composition by skill and occupation, collective agreement status, and the ER-based union density variable. All the included variables are described in Appendix Table 1, which also presents the corresponding summary statistics (mean, standard deviation, and minimum and maximum values).

5 Findings

5.1 Main Results

The relationship between worker commitment and the characteristics of worker representation is presented in Table 1, where, it will be recalled, the left-hand-side variable is a composite based on management perceptions of the motivation of workers and their retention and absenteeism propensities, and the corresponding right-hand-side variables are based on the views of the employee representative in matters connected to organizational trust, quality of information exchange, and degree of involvement in decision making. The table therefore provides the coefficients and marginal effects of the multilevel mixed effects ordered logistic model presented in equation (1). Specifically, the coefficient estimates in the first column indicate whether a particular characteristic is statistically associated with worker commitment and the corresponding sign of that association. The marginal effects in the remaining columns give the order of magnitude of the (conditional) correlation by worker commitment level, from the lowest (outcome category 1) to the highest (category 4), where the latter category indicates that management considers workers are motivated, loyal (in the sense of absence of difficulty in retaining employees), and not prone to absenteeism.

[Table 1 near here]

In this framework, trust in management and provision of information to the ER body emerge as two key correlates. From the first column of the table, it can be seen that they are positively associated with worker commitment at the 0.01 and 0.05 levels, respectively. The influence of employee representation in the case of major HR decisions is also statistically significant, but only at the 0.10 level. There is, however, no evidence indicating that the other covariates are equally relevant. It is surprising that the provision of information and involvement in major decisions is insignificant. The suggestion may well be that ultimately only influence matters, or perhaps that once some general provision of information has been secured the degree of participation or involvement in decision making is of secondary importance.

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The marginal effects are provided in the next four columns of the table. For example, the marginal effect of 0.035 reported in first row of the last column means that a 1-unit change in the organization trust argument is associated with an increase of 0.035 in the probability that the worker commitment score is the highest (viz. outcome category 4). Similar magnitudes are reported for the variables *Information provided by management to the ER body is satisfactory* and *The ER body had some or a strong influence on the decision making*, at 0.048 and 0.037, respectively. The marginal effects for outcome categories 1, 2 and 3 are smaller although of a similar level of significance.

Industry affiliation and establishment size are the only additional extra covariates included in the regression. As we shall see, controls for the full set of establishment characteristics are introduced in the implementation of model (2) below. Also reported at the base of the table is the log-likelihood ratio statistic to test the null of an ordinary ordered logistic model. Observe that the null is comfortably rejected in favor of the mixed effects specification with controls for country random intercepts.

In Table 2 we examine the potential role of worker commitment and type of workplace representation in influencing establishment performance, as specified in model (2). We now control for an extended set of establishment characteristics, including workforce composition and type of collective agreement, inter al., although the estimation sample is the same as in Table 1. We again provide the estimated coefficients and the corresponding marginal effects for the two separate establishment performance outcomes – the financial situation and labor productivity growth – in panels A and B of the table, respectively.

[Table 2 near here]

Three striking results emerge from panel A of Table 2: the high statistical significance of the worker commitment, union form of workplace representation, and worker commitment*union agency interaction arguments. A higher worker commitment level is clearly positively associated with an improved financial situation, while an opposite result is reported for the presence of a union agency at the workplace. Interestingly, however, the interaction term between union agency and worker commitment is strongly positive, which suggests that worker commitment increases establishment performance more for union agency than for its works council counterpart. We note here that we are oversimplifying the interpretation of the interaction term. Indeed, given that logistic model (2) is nonlinear, the interpretation of the interaction term is not immediate (see Buis, 2010). To ascertain that the information extracted from the positive interaction term in Table 2 is nevertheless truly indicative, we ran an alternative mixed-effects linear regression model. In this case, the dependent variable is simply assumed to be continuous, making the interpretation of the interaction term straightforward. That is, the coefficient indicates exactly the corresponding marginal effect (or the effect of a 1-unit change in worker commitment in union workplaces in comparison with the case under work council representation). It transpires that the estimated marginal

effect of the interaction term in the linear case is indeed positive and highly significant at 0.292. (The worker commitment and the union terms are also highly statistically significant and of the expected signs; these coefficient estimates are reported in the second column of Table 4 below.) For their part, the marginal effects for the set of establishment controls are rather small and insignificant in most cases. The main relationship is, therefore, between performance and the level of worker commitment and the type of workplace representation, with all other establishment-level variables playing a minor role.

Turning to our second outcome indicator, the results in panel B of Table 2 show that worker commitment is strongly positively associated with labor productivity growth. Moreover, the magnitude of the marginal effect is quite sizable: a 1-unit change in the worker commitment composite (equivalent to a change from the lowest level to the highest level of commitment) is now associated with an increase of approximately 20 percentage points in the probability of observing the highest labor productivity growth outcome (outcome category 3). There is, however, nothing to suggest that the workplace representation variable plays a role. Rather it seems that type of worker representation is more of an issue whenever distributional matters are at stake (as in the case of the financial/profit situation in panel A), and that as a consequence once worker motivation, loyalty, and a low level of absenteeism are in place, workplace employee representation is likely to be of lesser importance. Again, with a few exceptions, establishment characteristics are never highly significant.[5]

5.2 Sensitivity of the Results
The worker commitment variable in Tables 1 and 2 is a composite based on three items: worker motivation, worker retention, and worker absenteeism. We now evaluate the determinants of worker commitment considering each of its elements one at a time in separate regressions. The composite has in principle the advantage of a modest variety of component indicators, and we would therefore expect that the results from these separate runs will be of inferior analytical quality. As shown in Appendix Table 2, only the results provided in the second column of the table – based on the management perceptions of worker motivation – closely resemble the coefficients earlier reported in the first column of Table 1 based on the 3-item composite. The other two cases, given in the last two columns of Appendix Table 2, while mostly maintaining the coefficient signs, fail in general to achieve the same level of statistical significance. There is therefore no evidence that any single item conveys a better information set than the worker commitment composite which outperforms the disaggregations.

We also replicated Table 2, again replacing the original worker commitment index sequentially by each of the three components. The exercise is carried out for both establishment performance outcomes, in panels A and B of Appendix Table 3. As before, the worker motivation case offers again the best replication both from the point of view of statistical significance and magnitude of the estimated coefficients, especially

in panel B. But clearly any single item fails short of capturing the information richness offered by the composite.

Next, we jointly estimate the worker commitment and establishment performance equations, allowing for correlation across the two equations. The coefficients of the joint model are estimated using the CMP (Roodman, 2011) software, where the two equations in the system are both specified as ordered probit models with country intercepts. The results are reported in Table 3. Given that the cross-correlation is statistically different from zero in the financial situation case alone, no results are provided for the alternative labor productivity growth outcome. As a practical matter, the cross-correlation in the case of the latter is equal to -0.026, with a 95 percent confidence interval of (-0.219, 0.168) that does not reject the null of no interdependence. For the former, the correlation across equations is significant, with a coefficient of -0.249 and a 95 percent confidence interval of (-0.428, -0.051).

[Table 3 near here]

To facilitate interpretation, we reproduce in the first column of Table 3 the coefficients earlier reported in Tables 1 and 2, where the worker commitment and establishment performance equations were estimated separately. Observe that the set of right-hand-side variables is the same as in Tables 1 and 2, as is the estimation sample. The main result is the strong *stability* in the estimated parameters across the two columns of the table with respect to their sign, size, and statistical significance. In no case was there a change in coefficient sign, although the magnitude of the coefficients is generally smaller in the second column with the principal exception of the worker commitment argument which is now larger albeit of the same level of statistical significance.

Our final sensitivity test is provided by an instrumental variables approach that assumes worker commitment is endogenous in performance equation (2). For example, the perception of worker commitment might be generated by a favorable assessment of establishment performance. If so, we would have a problem of reverse causality.

Finding a valid instrument using a single cross-sectional data point is challenging. In our approach we make the assumption that a firm's policy favoring long-term employment affects worker commitment – and that through this channel (and only through this channel) it affects establishment performance. The MM-based survey question H11 provides the basis for our *excluded* instrument. Specifically, we use the variable HRLONG (indicating whether *Employees are hired with the intention to employ them for a long time*) to generate the selected instrument. (The variable is fully described in Appendix Table 1.)

As in Table 3, we rely on the conditional mixed-process (CMP) estimator in order to accommodate our chosen multilevel mixed effects model in equation (2). In practice the CMP procedure amounts to a two-stage least squares (2SLS) approach in the first stage of which we specify worker commitment as function of the excluded instrument, while in the second stage we estimate the establishment performance

equation. We again focus on the *financial performance* outcome as we were unable to find a valid instrument for the alternative labor productivity outcome. We also simplify the estimation routine (and the corresponding interpretation) by assuming a *continuous*, rather than ordered, dependent variable. Given these caveats, the purpose of our instrumental variable exercise is necessarily modest, the intention being to offer a first-pass discussion of the possible consequences of the presence of endogeneity in the performance equation.

Following the procedures recommended by Angrist and Pischke (2009: 212-213), we discuss instrument relevance – or validity of our IV approach – by reporting (a) the coefficient and significance of the excluded instrument in the first-stage worker commitment equation; and (b) the coefficient of the excluded instrument in the reduced-form performance equation. Strong statistical significance in (a) will be interpreted as confirmation that the selected instrument affects the *treatment* (i.e. worker commitment), while significance in (b) is hopefully indicative of a causal relationship between worker commitment and establishment performance. The performance equation in the reduced-form is specified as a function of the excluded instrument only (plus the selected set of control variables).

Beginning with the diagnostic tests presented at the base of Table 4, we found that the excluded instrument (i.e. the HRLONG variable) in the first-stage equation is positive and highly statistically significant, with a coefficient of 0.0278 and a standard error of 0.0065. The variable is also both highly statistically significant and positive in the reduced-form equation (coefficient: 0.1021; s.e.: 0.0229). For its part, the significance of the cross-equation correlation coefficient – with a 95 percent confidence interval of (-0.5005, -0.0004) – confirms the existence of endogeneity in the system comprising the first- and second-stage equations. These results strongly suggest that we have controlled for the possible endogeneity of the worker commitment in the performance equation.

[Table 4 near here]

The full set of estimates obtained from the second-stage equation of the 2SLS procedure are given in the third column of Table 4. Given that our CMP implementation assumes linearization of model (2), we also offer in the second column of the table a replication of Table 2, now using a multilevel mixed-effects *linear* regression rather than the original mixed multilevel mixed effects *ordered logistic* model. In practice this amounts to run the *mixed* command in Stata rather than *meologit*. The results of the latter are reproduced in the first column of the table.

Returning to the third column of the table, observe that the worker commitment and workplace employee representation arguments are both statistically significant and of the expected sign; that is, positive in the former case and negative in the latter. The coefficient estimate of 1.492 shown in the first row implies that a change in worker commitment from its minimum to its maximum level (i.e. a 1-unit change in worker commitment) is associated with an increase in the mean financial outcome from 2.358 to

3.850, while the coefficient estimate for the presence of a union agency given in the second row, implies a reduction of 0.259 in the financial outcome. The worker commitment*union interaction term also maintains its positive sign and high level of significance. In this case, a 1-unit change in worker commitment in union establishments implies a 0.310 increase in the financial outcome relative to the case of works council representation. Clearly, although the distinct models reported in the three columns of Table 4 do not yield the same coefficient magnitudes, there is nevertheless a strong stability with respect to both statistical significance and sign.

The results from Tables 3 and 4 are therefore rather encouraging. That is, there is no real indication that the findings reported in Table 2 are other than strongly suggestive that worker commitment is a key positive determinant of both establishment performance outcomes.

6. Conclusions

Using multilevel mixed effects ordered logistic models for a cross section of matched data from the employee and management component questionnaires of the 2013 European Company Survey, this paper has investigated the determinants of worker commitment and explored the potential contribution of heightened commitment to establishment performance. An index of worker commitment is constructed from employer perceptions of the motivation of workers and their retention and absenteeism propensities. In the absence of employee-level information, the antecedents of commitment are constructed from observations of the representative of the leading formal worker representation body at the workplace on the nature and practice of worker representation with a bearing on organizational trust, quality of information exchange, and degree of employee involvement. The commitment index is then linked to two subjective measures of establishment performance having to do with the financial situation and labor productivity growth of the organization. Additional arguments in the performance equations include union workplace representation (the default being works councils), the structure of collective bargaining, and union density. The interconnection between the commitment and performance equations is also explored via a recursive multi-level, conditional mixed-process estimation with CMP, and the robustness of our results is further examined through instrumentation of the commitment index. Key findings from the commitment equation are the positive role of trust in management, the quality of information exchanged, and the degree of worker representation influence in respect of major decisions taken by management. In turn, the financial performance and labor productivity growth equations were each seemingly dominated by the (favorable) influence of commitment. However, the presence of a union representative agency was negatively correlated with performance, and strongly significantly so for financial performance. However, in this case the interaction term with commitment was positive, suggesting that commitment served to improve financial performance more for union than for works council agencies. Moreover, neither collective

bargaining nor (in separate estimations) establishment unity density was correlated with either performance outcome. Finally, material support for a positive causal influence of worker commitment on performance was adduced from our SUR regressions and IV analysis.

Acknowledgment

Endnotes

1. Meyer and Allen (1991) offer an analytical view of organizational commitment in which they distinguish between affective, continuance, and normative commitment. Affective commitment is the emotional attachment of an employee to organizational values. Continuance commitment is a measure of the willingness of an employee to continue working for the same organization, while normative commitment deals with the feelings of obligation/sense of responsibility of the employee towards the organization. The type of commitment identified in the present paper, in referring to how much an employee feels part of an organization, is therefore affective commitment.

2. They also modify the model to capture different *levels* of identity within an organization.

3. Here the authors cite the management studies of Anderson and Martin (1995), Cassar (1999), and Boon et al. (2006) among others.

4. Note that we draw a distinction between formal and informal workplace representation. Formal representation excludes any ad hoc form of worker representation which is classified as being informal. Purely occupational safety and health committees are also treated as informal representation.

5. Partly given the unimpressive results for collective bargaining status, we decided not to include the establishment union density variable in Table 2. A further reason was that use of this additional control would result in the loss of a further 200 observations. Nevertheless, as a practical matter, rerunning the equations in both panels of the table to include workplace density changed neither the significance nor the sign of the worker commitment, union, and worker commitment*union coefficients, and its coefficient estimate was statistically insignificant.

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Appendix 1: Worker Identity and the Selection of Good Management Practices

In the following, we illustrate the proof for w_L^O and w_H^O, the optimal wages for the outsider, where L and H denote the expenditure of low and high effort.

For the optimal wage w_L^O, the participation constraint is satisfied by equality. Using the utility function and the prescribed level of effort, $e^*(O) = e_B$, we have $\log w_L^O - e_B + I_O = \bar{u} \Leftrightarrow \log w_L^O = \bar{u} + e_B - I_O \Leftrightarrow w_L^O = \exp(\bar{u} + e_B - I_O)$. $\bar{u}$ denotes the reference utility. For the optimal wage w_H^O, the incentive compatibility constraint binds and, given that in this case the outsider chooses the high effort e_A, we have $\frac{1}{2}\log w_H^O + \frac{1}{2}\log w_L^O - e_A + I_O - t_O(e_A - e_B) = \log w_H^O - e_B + I_O$. Manipulating further, and using $\log w_L^O - e_B + I_O = \bar{u}$ from the participation constraint, we obtain $\log w_H^O = \bar{u} + e_B - I_O + 2(e_A - e_B)(1 + t_O)$, which is equivalent to $w_H^O = \exp(\bar{u} + e_B - I_O + 2(e_A - e_B)(1 + t_O))$. (Observe that if the effort is low, the outsider gets w_L^O; if the effort is high the outsider either gets w_L^O or w_H^O with an identical probability of ½.) For an outsider, the (log) difference in optimal wages w_L^O and w_H^O is therefore given by $2(e_A - e_B)(1 + t_O)$. A similar proof can be provided for w_L^N and w_H^N, the optimal wages for an insider. In this case the log difference is given by $2(e_A - e_B)(1 - t_N)$. Finally, given that $2(e_A - e_B)(1 + t_O) - 2(e_A - e_B)(1 - t_N) = 2(e_A - e_B)(t_O + t_N) > 0$ (as t_c is positive for any worker type and $e_A > e_B$), we have the main proposition that inducing a high effort is less costly in the case of an insider than in the case of an outsider.

Table 1: Worker Commitment [as perceived by management] and Its Determinants

Variables	Worker Commitment				
	Coefficient	Marginal effects (worker commitment category in ascending order)			
		1	2	3	4
Organizational trust:					
Management can be trusted	0.151***	-0.003**	-0.014***	-0.019***	0.035***
	(0.056)	(0.001)	(0.005)	(0.007)	(0.013)
Management makes sincere efforts to involve the employee representation in the solving of joint problems.	0.052	-0.001	-0.005	-0.006	0.012
	(0.055)	(0.001)	(0.005)	(0.007)	(0.013)
ER resources and functioning:					
Employee representative is elected	-0.063	0.001	0.006	0.008	-0.015
	(0.094)	(0.002)	(0.009)	(0.012)	(0.022)
Employee representative receives training	-0.129*	0.003*	0.012*	0.016*	-0.030*
	(0.069)	(0.001)	(0.006)	(0.009)	(0.016)
Time allocated to employee representation is sufficient	0.157	-0.003	-0.014	-0.019	0.037
	(0.097)	(0.002)	(0.009)	(0.012)	(0.023)
Frequency of meetings with management	0.015	-0.000	-0.001	-0.002	0.003
	(0.038)	(0.001)	(0.003)	(0.005)	(0.009)
Provision of information to the ER body:					
Information provided by management to the ER body is satisfactory	0.203**	-0.004**	-0.019**	-0.025**	0.048**
	(0.089)	(0.002)	(0.008)	(0.011)	(0.021)
Provision of information to the ER body and involvement in the case of major HR decisions: (Reference category: The ER body was not informed by management.)					
The ER body was only informed by management	0.055	-0.001	-0.005	-0.007	0.013
	(0.118)	(0.002)	(0.011)	(0.014)	(0.028)
The ER body was informed by management and asked to give their views or involved in joint decision	-0.018	0.000	0.002	0.002	-0.004
	(0.112)	(0.002)	(0.010)	(0.014)	(0.026)
ER influence in the case of major HR decisions:					
The ER body had some or a strong influence on the decision making	0.158*	-0.003*	-0.014*	-0.019*	0.037*
	(0.085)	(0.002)	(0.008)	(0.011)	(0.020)
Industry dummies	Yes				
Establishment size dummies	Yes				
Country random intercepts	Yes				
Log-likelihood ratio	134.81				
Number of observations	4,107				

Table 2: Establishment Performance: The Role of Worker Commitment and Type of Employee Representation, and Other Determinants

Variables	Outcome (Establishment performance)									
	A. Financial situation						B. Labor productivity growth			
	Coefficient	Marginal effects (outcome category in ascending order)					Coefficient	Marginal effects (outcome category in ascending order)		
		1	2	3	4	5		1	2	3
Worker commitment and workplace representation type:										
Worker commitment	1.183***	-0.020***	-0.092***	-0.150***	0.135***	0.126***	0.826***	-0.075***	-0.123***	0.198***
	(0.163)	(0.004)	(0.014)	(0.021)	(0.023)	(0.020)	(0.173)	(0.017)	(0.026)	(0.041)
Union	-0.614***	0.010***	0.048***	0.078***	-0.070***	-0.066***	-0.224	0.020	0.033	-0.054
	(0.212)	(0.004)	(0.017)	(0.027)	(0.025)	(0.023)	(0.224)	(0.020)	(0.033)	(0.054)
Worker commitment*union	0.612***	-0.010**	-0.047**	-0.078**	0.070**	0.065**	0.049	-0.004	-0.007	0.012
	(0.237)	(0.004)	(0.019)	(0.030)	(0.028)	(0.026)	(0.251)	(0.023)	(0.037)	(0.060)
Collective agreement: (Ref. category: No collective agreement)										
Company level bargaining	0.112	-0.002	-0.009	-0.014	0.013	0.012	0.105	-0.010	-0.015	0.025
	(0.106)	(0.002)	(0.008)	(0.013)	(0.013)	(0.011)	(0.112)	(0.011)	(0.016)	(0.027)
Higher than company level	0.030	-0.001	-0.002	-0.004	0.004	0.003	0.123	-0.012	-0.018	0.030
	(0.103)	(0.002)	(0.008)	(0.013)	(0.013)	(0.011)	(0.108)	(0.011)	(0.015)	(0.026)
Mixed level	0.146	-0.002	-0.011	-0.018	0.017	0.016	0.278**	-0.025**	-0.041**	0.067**
	(0.106)	(0.002)	(0.008)	(0.013)	(0.012)	(0.011)	(0.111)	(0.011)	(0.016)	(0.027)
Workforce composition:										
Workers with an OEC	-0.001	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Female workers	0.003*	-0.000*	-0.000*	-0.000*	0.000*	0.000*	0.004**	-0.000**	-0.001**	0.001**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Workers with a university degree	0.002*	-0.000*	-0.000*	-0.000*	0.000*	0.000*	0.002	-0.000	-0.000	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Part-time workers	-0.005**	0.000**	0.000**	0.001**	-0.001**	-0.001**	-0.001	0.000	0.000	-0.000
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
Private sector	0.411***	-0.007***	-0.032***	-0.052***	0.047***	0.044***	0.181*	-0.016*	-0.027*	0.043*
	(0.095)	(0.002)	(0.008)	(0.012)	(0.012)	(0.011)	(0.100)	(0.009)	(0.015)	(0.024)
Single establishment	-0.063	0.001	0.005	0.008	-0.007	-0.007	-0.089	0.008	0.013	-0.021
	(0.064)	(0.001)	(0.005)	(0.008)	(0.007)	(0.007)	(0.068)	(0.006)	(0.010)	(0.016)
Industry dummies	Yes						Yes			
Establishment size dummies	Yes						Yes			
Country random intercepts	Yes						Yes			

Log-likelihood ratio	147.80					171.66			
Number of observations	4,107					4,107			

Notes: The multilevel mixed-effects ordered logistic model is given in equation (2) in the text and is estimated using the *meologit* command in Stata 15. The dependent variable is an ordered variable on a 1 to 5 and 1 to 3 scale in panels A and B, respectively. The description of all included variables is given in Appendix Table 1. The estimation sample includes all establishments with a major human resource decision in the last 12 months. The log-likelihood ratio tests the null of an ordinary ordered logistic model versus the multilevel mixed effects ordered logistic model. The null is always comfortably rejected in favor of the mixed effects specification. ***, ** and * denote statistical significance at the 0.01. 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.

Sources: 2013 ECS, Management and Employee Representative Questionnaires; ECS2013_merged data file (version 11-02-20).

Table 3: The Financial Performance and Worker Commitment Equations under Cross-Equation Interdependence

Variables	Coefficients	
	First columns of Tables 1 and 2; panel A	Joint estimation with cross-equation interdependence
Worker commitment equation:		
Management can be trusted	0.151*** (0.056)	0.123*** (0.033)
Management makes sincere efforts to involve the employee representation in the solving of joint problems.	0.052 (0.055)	0.023 (0.031)
Employee representative is elected	-0.063 (0.094)	-0.007 (0.055)
Employee representative receives training	-0.129* (0.069)	-0.090** (0.040)
Time allocated to employee representation is sufficient	0.157 (0.097)	0.081 (0.055)
Frequency of meetings with management	0.015 (0.038)	0.016 (0.022)
Information provided by management to the ER body is satisfactory	0.203** (0.089)	0.140*** (0.051)
The ER body was only informed by management	0.055 (0.118)	0.011 (0.068)
The ER body was informed by management and asked to give their views or involved in joint decision	-0.018 (0.112)	-0.034 (0.065)
The ER body had some or a strong influence on the decision making	0.158* (0.085)	0.094* (0.049)
Industry dummies	Yes	Yes
Establishment size dummies	Yes	Yes
Establishment performance equation:		
Worker commitment	1.183*** (0.163)	1.484*** (0.330)
Union	-0.614*** (0.212)	-0.285** (0.120)
Worker commitment*union	0.612*** (0.237)	0.337** (0.133)
Private sector	0.411*** (0.095)	0.219*** (0.053)
Single establishment	-0.063 (0.064)	-0.041 (0.036)
Company level bargaining	0.112 (0.106)	0.048 (0.060)
Higher than company level	0.030 (0.103)	-0.000 (0.059)
Mixed level	0.146 (0.106)	0.063 (0.060)
Workers with an OEC	-0.001 (0.001)	-0.000 (0.0007)
Female workers	0.003* (0.001)	0.001** (0.0007)
Workers with a university degree	0.002* (0.001)	0.001** (0.0007)
Part-time workers	-0.005** (0.002)	-0.002** (0.0011)
Cross-equation correlation (s.e.) [95% confidence interval]		-0.249 (0.097) [-0.428; -0.051]
Industry dummies	Yes	Yes
Establishment size dummies	Yes	Yes

Number of observations	4,107	4,107

Notes: The first column reproduces the first columns of Tables 1 and 2 (Panel A. Financial situation). The joint estimation with cross-equation correlation in the second column is implemented using CMP in Stata 15, where the two equations in the system are both specified as ordered probit models, with country intercepts. The set of right-hand-side variables is the same as in Tables 1 and 2, as well as the estimation sample. ***, and ** denote statistical significance at the 0.01 and 0.05 levels, respectively; standard errors are given in parentheses.

Table 4: Establishment Performance. The Role of Worker Commitment and Type of Employee Representation, with an Endogenous Variable

Variables	Establishment performance (Financial situation)		
	Coefficients		
	Table 2 (Performance equation with an ordered dependent variable)	Replication of Table 2 (Performance equation with a continuous dependent variable)	Instrumental variable approach (Performance equation with a continuous dependent variable)
Worker commitment and workplace representation type:			
Worker commitment (Instrumented in the third column by long-term employment policy; HRLONG)	1.183***	0.541***	1.492***
	(0.163)	(0.074)	0.506
Union	-0.614***	-0.293***	-0.259***
	(0.212)	(0.096)	0.098
Worker commitment*union	0.612***	0.292***	0.310***
	(0.237)	(0.107)	0.107
Collective agreement: (Ref. category: No collective agreement)			
Company level bargaining	0.112	0.032	0.040
	(0.106)	(0.048)	0.050
Higher than company level	0.030	-0.008	0.006
	(0.103)	(0.047)	0.049
Mixed level	0.146	0.040	0.039
	(0.106)	(0.048)	0.050
Workforce composition:			
Workers with an OEC	-0.001	-0.000	-0.0009
	(0.001)	(0.001)	0.0006
Female workers	0.003*	0.001**	0.0014**
	(0.001)	(0.001)	0.0006
Workers with a university degree	0.002*	0.001*	0.0006
	(0.001)	(0.001)	0.0006
Part-time workers	-0.005**	-0.002**	-0.0016*
	(0.002)	(0.001)	0.0009
Private sector	0.411***	0.165***	0.155***
	(0.095)	(0.043)	0.044
Single establishment	-0.063	-0.033	-0.031
	(0.064)	(0.029)	0.029
Industry dummies	Yes	Yes	Yes
Establishment size dummies	Yes	Yes	Yes
Country intercepts	Yes	Yes	Yes
Number of observations	4,107	4,107	4,060

Instrument relevance:
Coefficient of the excluded instrument in the *first-stage equation*: 0.0278 (s.e.: 0.0065); statistically significant at the 0.01 level.
Coefficient of the excluded instrument in the *reduced-form equation* for performance: 0.1021 (s.e.: 0.0229); statistically significant at the 0.01 level.
Cross-equation correlation: -0.2684 (0.1300); 95% confidence interval: (-0.5005, -0.0004).

Notes: The models in the first two columns are estimated using *meologit* and *mixed* commands in Stata 15, respectively. The model in the third column is estimated using CMP in Stata 15. ***, and ** denote statistical significance at the 0.01 and 0.05 levels, respectively; standard errors are given in parentheses.

Appendix Table 1: Variable Definition and Summary Statistics of Selected Variables

Variables	Definition	Mean	s.d.	Min.	Max.
MM survey-based variables					
Performance:					
Financial situation	Ordered variable on a 1 to 5 scale: 1 is the lowest level.	3.585	.905	1	5
Labor productivity growth	Ordered variable on a 1 to 3 scale: 1 is the lowest level. The establishment's current labor productivity is compared to that obtaining three years earlier.	2.440	.677	1	3
Worker Commitment:					
Worker Commitment	Worker Commitment is a composite measure obtained by taking the average over three items: *No difficulty in retaining employees* (KORETEN); *No low motivation of employees* (KOLOMOT); and *No high level of sickness leave* (KOSICK). It is a proxy for workers' loyalty to the organization.	.823	.251	0	1
Workforce composition:					
Workers with an OEC	Percentage of employees who have an open-ended contract (OEC).	84.197	22.467	0	100
Female workers	Percentage of employees who are female.	41.767	26.761	0	100
Workers with a university degree	Percentage of employees who have a university degree.	29.398	27.684	0	100
Part-time workers	Percentage of employees who work part-time (i.e. fewer hours than the usual full-time arrangement).	14.633	18.309	0	100
Collective agreement:					
No collective agreement	1/0 dummy: Individual agreement (i.e. no collective agreement).	.143	.351	0	1
Company level	1/0 dummy: Company-level agreement.	.216	.412	0	1
Higher than company level	1/0 dummy: Higher than company-level agreement.	.368	.482	0	1
Mixed level	1/0 dummy: Mixed-level agreement (i.e. company-level and higher than company-level).	.270	.444	0	1
Single establishment	1/0 dummy: 1 if single independent company or organization.	.564	.495	0	1
Private sector	1/0 dummy: 1 if establishment belongs to the private sector. A public sector organisation is either wholly owned by the public authorities or they own more than 50%.	.757	.428	0	1
(Excluded) instrument:					
Long-term employment policy	Ordered variable on a 1 to 4 scale indicating whether employees are hired by management with the intention to employ them for a long time; 1 is the lowest level.	.345	0.609	1	4
ER survey-based variables:					
Workplace representation and labor organization:	1/0 dummy: 1 if the respondent (i.e. the ER interviewee) is from the union; 0 if the respondent is from the works council. Note that if there is a unique union (works council) agency at the workplace, then the respondent is necessarily from the union (works council). If the works council and the union agencies coexist at the workplace and the employee representative respondent is from the works council (union), then the works				

	council (union) is adjudged to be more influential and correspondingly the works council (union) status is allocated. This interpretation is based on the fact that the interviews are always conducted with the "highest-ranking employee representative of the workplace employee representation body that represents the highest proportion of employees at the establishment."				
Union	1/0 dummy: 1 if there is a union agency at the workplace, 0 if works council.	.458	.498	0	1
Establishment union density	Union density at the establishment. (In percent.)	49.7	34.025	0	100
Organizational trust:					
Management can be trusted	Ordered variable on a 1 to 4 scale: 1 is the lowest level.	2.967	.705	1	4
Management makes sincere efforts to involve the employee representation in the solving of joint problems.	Ordered variable on a 1 to 4 scale: 1 is the lowest level.	2.968	.720	1	4
Employee representation functioning and resources:					
Employee representative is elected	1/0 dummy: 1 if the ER interviewee was elected, 0 if appointed	.817	.386	0	1
Trained employee representative	1/0 dummy: 1 if the ER representative has received training related to his/her role in the last 12 months	.487	.499	0	1
Time allocated to employee representation is sufficient	1/0 dummy: 1 if time allocated to employee representation is sufficient (i.e. either the ER representative has some number of hours per week that he/she considers sufficient or he/she can use as much time as is necessary or he/she is a full-time employee representative. This variable is generated using the raw variables q11 to q13.	.870	.335	0	1
Frequency of meetings with Management	The variable indicates how often the ER body meets with management: 1 if meetings with management are at least once a week; 2 if at least once a month; 3 if at least once every quarter; 4 if at least once a year; 5 if less than once a year.	2.506	.926	1	5
Provision of information:					
Information provided by management to the ER body is satisfactory	1/0 dummy: 1 if the information provided by management in the last 12 months to the ER body was in general satisfactory; 0 if management provided the ER body no information at all or it was considered unsatisfactory. The assessment by the employee representative is based on the information provided on the following issues: The financial situation of the establishment; The employment situation of the establishment; The introduction of new or significantly changed products or services in the establishment (new); The introduction of new or significantly changed processes to produce goods or provide services in the establishment; Strategic plans with regard to the establishment (e.g. business targets, plans for investments and plans to expand activities). The variable is generated using the raw variables q21 and q25. The corresponding Stata coding is available upon request.	.790	.407	0	1
Information and involvement in major decisions:					
The ER body was not informed by management	1/0 dummy: 1 if the ER body was not informed by management, not asked to give their views ahead of the decision nor involved in joint decision making with management.	.132	.339	0	1

The ER body was only informed by management	1/0 dummy: 1 if the ER body was informed by management, but not asked to give their views ahead of the decision nor involved in joint decision making with management.	.180	.384	0	1
The ER body was informed by management and asked to give their views or involved in joint decision	1/0 dummy: 1 if the ER body was informed by management and asked to give their views ahead of the decision or involved in joint decision making with management.	.686	.463	0	1
Influence in major decisions:					
The ER body had some or strong influence on the decision making	1/0 dummy: 1 if the ER body had some or a strong influence on the management decision.	.705	.456	0	1

Notes: The sample is restricted to establishments with a formal employee workplace representation in 28 European countries, in which a major HR decision had been taken by management in the last 12 months. A major decision is defined as one that affects the entire establishment, or a large part of it, in the following areas: organization of work processes; recruitment and dismissals; occupational health and safety; training and career development; working time arrangements; and restructuring measures. The variables with reference to Information and involvement *and* Influence in major decisions are based on survey questions 26 to 41 and the corresponding Stata coding is available upon request. Establishments are affiliated in eighteen distinct sectors and are grouped into five establishment size categories (10 to 19, 20 to 49, 50 to 249, 250 to 499, and at least 500 employees). With exception of the union density variable, the reported statistics refer to the estimation sample in Tables 1 and 2 (number of observations = 4,107).

Sources: 2013 ECS, Management and Employee Representative Questionnaires; ECS2013_merged data file (version 11-02-20).

Appendix Table 2: Replication of Table 1. Disaggregation of Worker Commitment [as perceived by management] and Its Determinants

Variables	Worker Commitment			
	Worker commitment as a composite (Table 1, first column)	Worker commitment as a single item based on worker motivation	Worker commitment as a single item based worker absenteeism	Worker commitment as a single item based on worker retention
Organizational trust:				
Management can be trusted	0.151***	0.137**	0.147**	0.104
	(0.056)	(0.067)	(0.070)	(0.093)
Management makes sincere efforts to involve the employee representation in the solving of joint problems.	0.052	0.126*	0.026	-0.069
	(0.055)	(0.066)	(0.069)	(0.091)
ER resources and functioning:				
Employee representative is elected	-0.063	-0.198*	0.119	-0.073
	(0.094)	(0.119)	(0.115)	(0.160)
Employee representative receives training	-0.129*	-0.105	-0.170**	-0.022
	(0.069)	(0.084)	(0.086)	(0.118)
Time allocated to employee representation is sufficient	0.157	0.085	0.238**	0.020
	(0.097)	(0.115)	(0.116)	(0.163)
Frequency of meetings with management	0.015	0.003	0.021	0.063
	(0.038)	(0.046)	(0.047)	(0.063)
Provision of information to the ER body:				
Information provided by management to the ER body is satisfactory	0.203**	0.243**	0.005	0.266*
	(0.089)	(0.105)	(0.111)	(0.147)
Provision of information to the ER body in the case of major HR decisions: (Reference category: The ER body was not informed by management.)				
The ER body was only informed by management	0.055	0.227	-0.101	-0.053
	(0.118)	(0.139)	(0.149)	(0.196)
The ER body was informed by management and asked to give their views or involved in joint decision	-0.018	0.084	-0.157	0.035
	(0.112)	(0.131)	(0.141)	(0.186)
ER influence in the case of major HR decisions:				
The ER body had some or a strong influence on the decision making	0.158*	0.207**	0.091	0.100
	(0.085)	(0.102)	(0.106)	(0.144)
Industry dummies	Yes	Yes	Yes	Yes
Establishment size dummies	Yes	Yes	Yes	Yes
Country random intercepts	Yes	Yes	Yes	Yes
Log-likelihood ratio	134.81	100.06	73.26	115.59
Number of observations	4,107			

Notes: The first column reproduces the first column of Table 1, where the dependent variable (worker commitment) is a composite based on three items proxying worker motivation, namely worker loyalty, and worker absenteeism. In the remaining columns, worker commitment is a single-item indicator, represented in turn given by each of the three component items. The model is estimated in separate regressions using the same set of right-hand-side variables. The estimation sample is also constant throughout. ***, ** and * denote statistical significance at the 0.01. 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.

Appendix Table 3: Replication of Table 2. Establishment Performance and the Role of Worker Commitment and Type of Employee Representation

	Outcome (Establishment performance)							
	A. Financial situation				B. Labor productivity growth			
Variables	Coefficients				Coefficients			
Worker commitment and workplace representation type:	Worker commitment as a composite (Table 1, first column)	Worker commitment as a single item based on worker motivation	Worker commitment as a single item based worker absenteeism	Worker commitment as a single item based on worker retention	Worker commitment as a composite (Table 1, first column)	Worker commitment as a single item based on worker motivation	Worker commitment as a single item based worker absenteeism	Worker commitment as a single item based on worker retention
Worker commitment	1.183***	0.762***	0.262***	0.523***	0.826***	0.585***	0.237**	0.169
	(0.163)	(0.101)	(0.099)	(0.129)	(0.173)	(0.106)	(0.104)	(0.140)
Union	-0.614***	-0.314**	-0.266*	-0.537***	-0.224	-0.186	-0.175	-0.256
	(0.212)	(0.141)	(0.147)	(0.197)	(0.224)	(0.146)	(0.154)	(0.212)
Worker commitment*union	0.612***	0.279*	0.178	0.424**	0.049	0.019	-0.017	0.063
	(0.237)	(0.144)	(0.147)	(0.198)	(0.251)	(0.150)	(0.156)	(0.214)
Collective agreement: (Ref. category: No collective agreement)								
Company level bargaining	0.112	0.409***	0.426***	0.418***	0.105	0.176*	0.189*	0.192*
	(0.106)	(0.095)	(0.095)	(0.095)	(0.112)	(0.100)	(0.100)	(0.100)
Higher than company level	0.030	-0.070	-0.065	-0.064	0.123	-0.090	-0.090	-0.090
	(0.103)	(0.064)	(0.064)	(0.064)	(0.108)	(0.068)	(0.068)	(0.068)
Mixed level	0.146	0.112	0.104	0.099	0.278**	0.110	0.105	0.105
	(0.106)	(0.106)	(0.106)	(0.105)	(0.111)	(0.112)	(0.112)	(0.112)
Workforce composition:								
Workers with an OEC	-0.001	0.014	0.029	0.022	-0.000	0.118	0.124	0.119
	(0.001)	(0.103)	(0.103)	(0.103)	(0.001)	(0.108)	(0.108)	(0.108)
Female workers	0.003*	0.134	0.167	0.139	0.004**	0.273**	0.292***	0.284**
	(0.001)	(0.106)	(0.106)	(0.106)	(0.001)	(0.112)	(0.111)	(0.111)
Workers with a university degree	0.002*	-0.000	-0.000	-0.000	0.002	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Part-time workers	-0.005**	0.002*	0.003*	0.002	-0.001	0.003**	0.004**	0.003**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Private sector	0.411***	0.003**	0.002*	0.003**	0.181*	0.002	0.002	0.002
	(0.095)	(0.001)	(0.001)	(0.001)	(0.100)	(0.001)	(0.001)	(0.001)
Single establishment	-0.063	-0.005**	-0.006***	-0.006***	-0.089	-0.001	-0.002	-0.002
	(0.064)	(0.002)	(0.002)	(0.002)	(0.068)	(0.002)	(0.002)	(0.002)
Industry dummies	Yes							

Establishment size dummies	Yes							
Country random intercepts	Yes							
Log-likelihood ratio	147.80	142.70	162.17	156.01	171.66	168.64	183.03	182.82
Number of observations	4,107							

Notes: In both panels A and B, the first column reproduces the first column of Table 2, where the worker commitment variable is a composite based on three items proxying worker motivation, namely worker loyalty, and worker absenteeism. In the remaining columns, worker commitment is a single-item indicator, represented in turn by each of the three component items. The model is estimated in separate regressions using the same set of right-hand-side variables. The estimation sample is also constant throughout. ***, ** and * denote statistical significance at the 0.01. 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.