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Performance and the Conjunction of Better Management Practices and Non-Union Workplace Representation

John T. Addison,* Paulino Teixeira,** and Lutz Bellmann***

** Darla Moore School of Business, Durham University Business School, IZA Bonn, and CESifo Munich*
*** Univ Coimbra, CeBER, Faculdade de Economia, and IZA Bonn*
**** Department of Economics, University of Erlangen-Nuremberg, Institute for Employment Research (IAB), Nuremberg, and IZA Bonn*

Abstract
Using data from the European Company Survey for a cluster of nations possessing a common system of workplace representation, we consider two factors deemed important correlates of firm performance, namely the deployment of structured management practices and the presence of works councils. The outcome indicators are management's assessment of establishment financial performance and labor productivity growth. For the full sample of works council and non-works council establishments, we report that better management practices are strongly associated with improved establishment performance, independent of works council presence, while the autonomous 'contribution' of works council presence is negative and statistically significant in the case of the labor productivity outcome but not profitability. Management perceptions of different aspects of works council operation were then used to categorize works council types, but generally failed to produce a consistent pattern of finding with respect to the outcome indicators. The same was true of employee views of management, although in both cases the strong positive association between better management practices and both performance measures persisted. However, use of a *bilateral* measure of industrial relations quality yielded consistency. That is, distrust of the other side and disagreement as to the climate of industrial relations each recorded a significantly negative association with financial performance and labor productivity growth, while the relation between management practices and performance was unchanged.

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1. Introduction

Two of the more important concepts in the labor economics and contemporary management literatures are collective voice and management as a technology. The former construct emphasizes the importance of worker representation in providing information and governance in labor markets characterized by long-term relations and incomplete contracting and can be traced back to the early 1980s (e.g., Freeman and Medoff, 1984). The latter concept stresses the contribution of advanced management practices in the form of operations management, performance monitoring, target setting, and people management in improving performance. This perception of management as a science or technology is of more recent vintage (e.g., Milgrom and Roberts, 1990; Caroli and Van Reenen, 2001; Bloom and Van Reenen, 2007). The mechanisms underpinning higher productivity are vaguer under collective voice than for management practices, although both models are linked to high performance work practices of the human resource management literature (e.g., Cappelli and Neumark, 2001; Handel and Levine, 2004), even if the theory of voice is the better developed. In any event, each paradigm has garnered much empirical support in recent years.

Notwithstanding extensive research into the economic effects of worker representation upon performance (Black and Lynch, 2001; Addison, 2009; Hübler and Jirjahn, 2003; Mueller, 2012; Mueller and Stegmaier, 2017; Mueller and Neuschaeffer, 2021) and the substantial work on management practices as a science (Bloom and Van Reenen, 2007, 2010, 2011; Bloom et al., 2019, 2021; Feng and Valero, 2020), the two literatures have largely maintained an arms' length distance from one another. (The two instances where this is not the case are examined in section 2.) As a result, the conjunction of workplace representation and structured management practices has been little investigated.

The hallmark of the present paper is that it investigates both themes in a common performance framework. Given the cross-section nature of the data, our goal is less one of choosing between the two mechanisms than it is to investigate the potential impact of each in the presence of the other. That said, by construction, our country sample seeks to compare like-with-like ab initio by focusing upon a common system of worker representation at the workplace in nations belonging to the *Germanic cluster* (Altmeyer, 2005), whose system of works councils is a priori most favorable to the expression of collective voice. Moreover, we also offer sensitivity tests to convince the reader that part of the associations reported for worker representation can indeed be causal, by exploiting

differences in the perceptions held by management and worker representative of the other that are most indicative of a lack of mutual trust or poor industrial relations at the workplace.

The organization of the paper is as follows. Section 2 offers a literature review to both contextualize and evaluate the paper's topic and findings. Section 3 introduces our dataset, the 2013 European Company Survey, distinguishing between its Management (MM) and Employee Representative (ER) Questionnaire components, the broad samples they give rise to, and the manner of construction of the better management practices index and definition(s) of works council type. This information is formalized in section 4 in presenting the modeling exercise. Section 5 contains our detailed findings, starting with the analysis of our baseline model of firm performance on management practices and the presence (or otherwise) of workplace representation that it then modifies to incorporate types of representation derived from management attitudes toward employee representation both as a matter of principle and practice. We complete our analysis using a fully ER-MM merged sample comprising works council establishments alone, to ultimately focus on the role of mutual misperceptions in fashioning the implicit trust and workplace climate variables. A concluding section reviews our principal findings.

2. Literature Review

In this section, we provide a brief review of the two literatures, beginning with collective voice, which holds out the prospect that representation may shape the personnel policy of firms and contribute materially to their success. One key underlying premise of the model is that workers have important private information and valuable insights into how to improve their jobs. However, although different types of representation have been identified, the precise routes through which performance gains are realized remain something of a black box. The new management practices literature on the other hand is strong on mechanisms but has generally been silent on the issue of worker representation. Having discussed each approach, we will then turn to examine two empirical studies that have intermingled worker representation and management practices most directly.

2.1 Worker Representation

Initially, the centerpiece of collective voice was the *union* role in solving an organizational failure (principal agent, information asymmetry) problem. One route was by providing information that might otherwise be under-provided by reason of the public goods nature of shared working conditions at the workplace as well as complementarities

in worker effort inputs. It was argued that by aggregating employee preferences and communicating them, and via a coordination of effort inputs and increased cooperation between workers, unions can enable firms to select a more efficient mix of personnel policies. Inefficient outcomes may also be averted by the governance function of collective voice, which refers to the policing or monitoring of contracts that are incomplete, that is, containing employer promises that are not explicitly spelled out in the contract of employment. With union representation, employers can be prevented from engaging in opportunistic behavior. In its absence, the discipline exerted by the market through reputation effects may be too weak and workers may be expected to withhold some types of effort and forms of cooperation.

But the threat of credible punishment by the union depends upon power which in turn involves a hold-up problem of its own, recognition of which is explicit in the principal theoretical justification for *works councils* offered by Freeman and Lazear (1995) subject to legal limits being placed on the exercise of their powers. The advantages of works councils reside in their concatenation of information, consultation, and participation powers; rights that in principle facilitate the verification of management claims as to the state of nature, capitalize on the non-overlapping information sets of management and labor, and, by providing workers with greater job security, encourage them to take a longer-run view of the firm, respectively. The two balancing constraints in the paradigmatic German case are prohibitions on the right to strike or to engage in wage negotiations (unless ceded authority to do so under the relevant collective bargaining agreement). It is in this sense that Freeman and Lazear speak of a potential decoupling of the factors that determine the size of the firm surplus from those that determine its distribution.

Since theory does not provide an unambiguous answer, considerable attention has been given to estimating the economic impact of worker representation on firm performance. As far as the empirics are concerned, and focusing here on works councils in the German tradition, the evidence is mixed. Although the entity has increasingly been credited with having a favorable impact on firm performance (e.g., Mueller and Stegmaier, 2012; Addison et al., 2017), this outcome would seem to depend on a variety of moderating influences. One such influence is whether the establishment is covered by a sectoral collective agreement, with research suggesting that such coverage removes distributional conflict to the sectoral level, allowing the works council at local level to focus on production issues (Hübler and Jirjahn, 2003). Another is said to be the

managerial environment, with evidence suggesting that establishments having a positive attitude towards employee participation record greater work council participation in decision making or improved organizational performance (see, respectively, Jirjahn and Smith, 2017; van den Berg et al., 2011). A third moderating influence might be the passage of time on the reasoning that the efficient functioning of works councils depends on a learning process (Mueller and Stegmaier, 2017).

Moreover, German case studies have revealed a range of industrial relations regimes characterized by cooperative or antagonistic relations between the works council and management (e.g., Frege, 2002). Economic studies have taken up this heterogeneity issue. Perhaps the best- known contemporary examples exploit a *one-time* question about the attitude of the works council in decision making asked of the manager respondent in the 2006 wave of the IAB Establishment Panel. Outcomes investigated include the impact of the entity on firm performance, human resource problems, and plant closings, it being reported that less adversarial, although not necessarily consensual, councils are associated with more favorable outcomes (see Pfeifer, 2011; Arnold et al., 2018).

The main takeaway from this discussion is that the impact of works councils – as well as union agencies – is not a datum. It is partly for this reason that we do not discuss the association between the employee representation literature and employee involvement/high performance practices even if their interaction might seem to offer a means of peering inside the black box of collective voice. Another is that the evidence on the association between human resource management and performance is, with some key exceptions, "not robust in the time series dimension" (Bloom and Van Reenen, 2011: 1757).[1]

2.2 Management Practices as a Technology

The near tidal wave of research on management practices adopts a management as a technology approach, permitting the analyst to identify *best practice* among a core set of

[1] However, interesting causal treatments of the association between German works councils and innovative HRM practices are Wolf and Zwick (2002) and Zwick (2003). Both studies seek to control for the endogeneity of human resource practices as well as unobserved establishment heterogeneity using the two-step procedure of Black and Lynch (2001) that is extended by instrumenting human resource innovations and, ultimately, works councils in the second step. And, for a non-German, causal codetermination study, see the analysis of Harju et al. (2021) of a Finnish mandate designed to stimulate communications between the workforce and management via the introduction of board representation or advisory councils in firms with 150 employees.

management operations, including human resource management, the adoption of which would improve the technology of the typical firm. In short, they are the right ones for *all* firms to adopt. That all firms do not adopt them is explained by weak product market competition, poor governance in family-run businesses, labor market regulation, learning spillovers, and human capital deficits (Bloom and Van Reenen, 2007, 2010, 2011; Bloom et al., 2019). It is not contested that there are elements of contingency in management but rather that they are exceptional given that that better-managed firms in a nation earn higher profits, achieve faster growth, and record higher stock market valuations.

Viewed alongside the analysis of worker representation and the extensive literature on work organization, the management as a technology approach is at first blush rather austere. Moreover, to the extent that it recognizes formal workplace representation (subsumed under 'labor market regulation,' see 2.3, below) this would seem to be more of a constraint than a potentially positive influence. And while clearly influenced by the human resource management literature – most notably that component dealing with incentives and work organization – the measurement of management practices is guided more by the economics of management than human resource management theory. It is also seemingly the case that the management practice scores (see section 3, below) for rewarding workers for good performance typically fall below those for sanctioning underperformers (Bloom and Van Reenen, 2011: 1706). The latter observation is of course subject to the caveat that greater employee supervision may be productive of higher motivation, employee effort, and job satisfaction, and the empirical observation that well-managed firms tend to have better work-life balance measures (Bloom et al., 2009).

In fact, the management as a technology approach uses a searching survey methodology to fix international patterns of management quality and then seeks to address their antecedents and consequents. As described by its architects, Bloom and Van Reenen (2007), the World Management Survey (WMS) evaluation tool defines and scores some 18 management practices from 1 (worst practice) to 5 (best practice). (In econometric specification, the individual scores are converted from the one to five scale to *z*-scores with the unweighted average across *z*-scores serving as the main measure of overall management practice.) Abstracting from shop floor operations (e.g., the adoption of lean manufacturing techniques), the remaining practices are grouped into three main dimensions covering monitoring, targets, and incentives. The monitoring component seeks to assess how well companies track production and can build upon this as a basis

for continuous improvement, as well as the application of sanctions/rewards. Targeting focuses on the type, functionality, transparency, range and connectivity of performance indicators. That part of the survey dealing with incentives encompasses promotion practices, pay and bonuses, the treatment of star performers, and the firing/fixing of bad performers.

Scoring in the WMS proceeds using a sequence of open questions. That is, for each dimension managers are first asked a broad question followed by a series of further such questions linked to actual practices and examples until, in this open-ended procedure, the interviewer is able to make a determination of the firm's usual practices and fit them within the performance grid. The sampling frame of the first WMS in 2004 contained data on 732 randomly selected medium-sized firms from the United States, France, Germany, and the United Kingdom. The WMS has been administered in several waves since then, most recently in 2014 at which point the sample encompassed 11,383 firms in 34 countries.

A new *closed-question* mandatory survey of structured management practices, the Management and Organizational Practices Survey (MOPS), was fielded for the U.S. in 2011 and 2016 as a supplement to the 2015 and 2017 Annual Survey of Manufactures. It was developed and undertaken by the U.S. Census Bureau in collaboration with the WMS. It contains 16 questions covering monitoring, targets, and incentives. Although based on the WMS, the new survey also includes questions on other organizational practices such as decentralization (see Bloom et al., 2019: 1652-1655). Both empirical studies reviewed in subsection 2.3 use the new MOPS for the U.S. and its German counterpart – the GMOPS – conducted in 2014 and 2015.

From the outset the new management practices literature has paid careful attention to evaluating the quality of its survey data, and in matching the latter with information on firm financial statistics from independent data sources in a methodology that "combines the econometric advantages of large sample surveys with the measurement advantages of more detailed case study interviews" (Bloom and Van Reenen, 2007: 1391). A key result is the large spread in management practices across firms *and* countries, with a large tail of poorly scoring firms. Attention has focused on explaining this variation in management practices and charting the consequences of poor management practices.

Bloom and Van Reenen (2007) examine these issues using management practice data from the first wave of the WMS. The authors report that poor management practices are a combination of weak product market competition, allowing their persistence, and

family firms passing management control down by primogeniture. Taken together, product market competition and family firms seemingly account for approximately one-half of the long tail of badly managed firms and for respectively one-half and one-third of the French and British management gaps vis-à-vis the United States. In turn, better management practices are strongly associated with superior firm performance; specifically, in labor productivity, the rate of return on capital employed, Tobin's *Q*, (reduced) firm deaths, and the average annual growth rate in sales.

A plethora of subsequent studies has further investigated the sources of differences in management practices across firms and countries and the relationship between management scores and firm performance using both the updated WMS and the new MOPS and GMOPS. In addition to product market competition and (loose) labor market regulation, research has identified multinationals, exporters, the human capital of managers or of workers, and rapid information diffusion as key sources of improvement in management practices, while paying increased attention to causality (e.g., Gosnell et al., 2020).

2.3 The Scant Empirics of Management Practices and Worker Representation

Only very belatedly have studies of management as a technology considered the role of worker representation. To the best of our knowledge there are just two studies exploiting worker representation, with the first examining the role of union presence – or, more strictly, its absence – and the second taking works councils explicitly into account. In the first study, using U.S. data on structured management from two waves of the new MOPS covering 35,000 firms in 2010 and 2015, Bloom et al. (2019) examine the sources of improvement in management practices. Having reported that management practices explain more than one-fifth of the variation in plant productivity (and are also highly predictive of increased firm survival rates and faster growth), the focus shifts to an examination of right-to-work (RTW) laws. Among the key reasons for the choice of this argument is the availability of plausible causal identification strategies, namely difference-in-differences and a spatial regression discontinuity design.[2] The passage of

[2] The authors also examine learning spillovers from the entry of large plants, and in particular multinationals, where the identification strategy has a basis in the competition between counties to attract 'million-dollar plants,' exploiting differences between the winners and the immediate runners-up**.** The arrival of large new entrants in the winning county jurisdiction is found to increases the management scores of incumbent plants.

RTW laws is found to increase the adoption of (certain) structured management practices. This result is referred to as a "business environment" factor but could more directly be couched in terms of union weakness (and indeed RTW is found to have a negative and significant effect on the prevalence of highly unionized plants). Noting that RTW legislation increased structured management practices bearing on pay, promotion, and dismissals but had little effect on other practices, Bloom et al. (2019: 1670) argue that "unions frequently oppose (the former) such practices, which they believe give too much discretion to managers, so if unions are weakened by RTW then these incentives will likely become more prevalent."

In the second study, this time of the German Management and Organizational Practices Survey (GMOPS) covering 1,927 establishments in 2008 and 2013, Broszeit et al. (2019) focus on the drivers of the management scores and thence the relationship between management practices and establishment productivity. In their pooled OLS regression of the drivers of management score, in addition to plant size, foreign ownership, manager skills, and export propensity, the authors include the implementation of works councils as their indicator of labor market regulation. Unlike the former set of variables, there is found to be no significant correlation between works council presence and management productivity. Turning to the productivity equation, the authors' baseline regression records a strongly positive association between management score and value added per worker. Works council presence is also positively correlated with higher productivity and remains so across separate components of the management index. Dividing up the sample into three establishment size classes reveals that the correlation between management score and productivity is strongest for the largest establishments (>250 employees) but only weakly significant for the smallest (<50 employees), while for its part, works council presence fails to attain significance for the former.

Although the works council variable is omitted from a fixed effects panel estimation using the two years of data, it is included in a lagged model where labor productivity is measured in 2013 and all independent variables at their 2008 values. Here, the coefficient estimate for works council presence is both positive and statistically significant. But the latter association does not carry over to a management practices and productivity regression that incorporates worker and establishment specific fixed effects obtained from an individual level wage regression study sharing common plant identifiers. That is, the management score-establishment labor productivity nexus proves

robust to the introduction of these additional controls, while works council presence is no longer statistically significant for the reduced sample of matched establishments.

On the basis of these two studies, there is modest evidence that one type of workplace representation (works councils) if not others (unions) *may* have a positive correlation with labor productivity alongside management practices. On net, the implied negative correlation for union representation is the more compelling because of the attention paid to causality in the U.S. study, with RTW laws (unions) strengthening (weakening) management practices with attendant positive (negative) effects on labor productivity. More might have been expected of works councils in this regard, but admittedly its role is of secondary concern in the German study.

3. Data

Our establishment-level data on the Germanic cluster is extracted from the 2013 ECS-European Company Survey (European Foundation for the Improvement of Living and Working Conditions, 2015), available at *https://www.ukdataservice.ac.uk*/. The raw dataset comprises two components, the Management Questionnaire (MM) and the Employee Representative Questionnaire (ER). The former survey is based on responses of the most senior official responsible for human resources management. It provides information on a wide set of establishment characteristics, including workforce composition and several organizational features, as well as management's view of establishment performance, the general work climate, and the role of the workplace representation body. Of particular relevance to the current inquiry, it also contains detailed information on a variety of management practices which are enumerated below. The latter survey is based on the responses of the representative of the employee representative body at the workplace. It provides information on that body's views on management behavior and the work climate at the establishment, as well as the characteristics of employee representation and the employee representation body, inter al.

The required information on employee representation is based on the management response to a specific question on the employee representation structure present at the establishment, which in our selected sample of countries can only take the form of a works council. We therefore generate a dichotomous variable for formal employee representation, taking the value of 1 if there is a works council, 0 otherwise.

The Germanic cluster dataset is made up of 3,951 establishments with valid survey responses, namely 1,464 in Germany, 972 in Austria, 1,010 in the Netherlands, and 505 in Luxembourg. Approximately 50 percent of establishments have a works council, the presence of the entity being higher in the Netherlands and Luxembourg (circa 70 percent) and lower in Austria and Germany (at 46 and 32 percent, respectively).

Management practices are fairly extensively covered in the MM survey, and we have selected the five main domains summarized in Appendix Table 1. Specifically, they comprise *Domain 1*-Work organization practices and monitoring [3 items]; *Domain 2*-Team working [1 item]; *Domain 3*-Performance appraisal (1 item); *Domain 4*-Incentive/performance-based pay [5 items]; and *Domain 5*-Employee involvement [7 items].[3] Full information on each of the selected 17 management practices contained in domains 1 through 5 is provided in Appendix Table 2A, which also presents the coding of all generated variables used for estimation purposes.

Appendix Table 2B presents the distribution of management practices across establishments with and without a works council, the former being further disaggregated into two works council *types* deemed either to be 'constructive' or 'non-constructive' by the management respondent. The latter classification is based on a survey question (ER15A) inquiring of the management respondent whether the *employee representation helps in a constructive manner to find ways to improve workplace performance*. As described in Appendix Table 3, the generated dummy variable is based on the raw variable er15a which is constructed by allocating the 'strongly agree' and 'agree' responses to yield the *constructive* works council category.

In panel (a) of Appendix Table 2B, management practices have a lower incidence in non-works council establishments (shown in the first main column) than in the case of *constructive* works council (second main column) as the percentage of establishments in which the practice is absent (coded as '0') is always higher in the former. For *non-constructive* works councils, we observe that in most cases the practices are absent in a lower percentage than in non-works council establishments. However, there are

[3] We note that two possible additional domains are not included in this set, namely *Domain 6*-Skill development/training and *Domain 7*-Provision of information to employees and participation in decision making. The exclusion of domain 6 is justified because the Management Questionnaire only provides information on the proportion of employees who receive on- and off-the-job training, without addressing the qualitative nature of the schemes in question. In the case of *Domain 7*, the information is based on the subset of establishments that experienced a major organizational change (since 2010), which restriction implies a further reduction of approximately one-third in the size of our sample.

exceptions as in the cases of 'regular staff meetings,' 'suggestion schemes,' and 'employee surveys.' In panel (b), which reports the case of performance appraisal, an ordered variable on a 0 to 6 scale in ascending order of employee coverage, there is again evidence that the practice is more often found in constructive works councils. To illustrate, 55 percent of constructive works councils implement a performance appraisal (or an evaluation interview) for 100 percent of their workforce, as compared with 50 percent in the case of both non-works council and non-constructive works council establishments. Conversely, only 5 percent of constructive councils fail to evaluate their employees versus 8 and 17 percent in the case of non-constructive and non-works council establishments, respectively.

Alternatively, works council type may be constructed on the basis of responses to survey question ER15B yielding raw variable er15b**.** Here the management respondent is asked whether the *involvement of the employee representation often leads to considerable delays in important management decisions*. Details of the distribution of management practices for this alternative works council type – delaying or non-delaying – are available on request, but suffice it to say that for every single management practice the percentage of establishments in which the practice is absent is always higher in non-works council regimes than in works council regimes (irrespective of whether they are depicted as delaying or non-delaying).

Our selected management practices, as described in Appendix Tables 1 and 2, are ordered variables on either 0-1, 0-2 or 0-6 scales and are strictly generated from the raw MM survey. To assure a common scale across different items, we follow Bloom and Van Reenen (2007) and standardize all the generated variables. In the case of domain 1, for example, which it will be recalled contains 3 items, each item is standardized using the mean and standard deviation across all establishments. A single indicator is then constructed by taking, for each establishment, an unweighted average of the corresponding three *z*-scores. A similar procedure is used for all the other four domains. To obtain an overall, single-indicator of management practices for each establishment, we took the unweighted average across all single-domain indicators. In practice, this procedure generates both single-domain and overall indicators of mean zero. We also constructed an alternative overall management practice index based on a simple 'row total.' In this last case, we simply summed all the raw scores observed at establishment

level to obtain a single index that is contained in the 0-25 closed interval. Our regression analysis in section 5 will focus primarily on the former index.[4]

The information on establishment-level performance is based on management responses regarding the financial situation of the establishment. The answer is coded on a 1 to 5 scale in ascending order (from 'very bad' and 'bad' through 'neither good nor bad' to 'good' and 'very good'). We also collect information on labor productivity growth and generate an alternative performance measure that evaluates the establishment's current labor productivity in comparison with the situation obtaining three years earlier. The corresponding variable is coded on 1 to 3 ascending scale, denoting that labor productivity had 'decreased,' 'remained the same,' and 'increased,' respectively.

Establishment-level characteristics are also extracted from the MM questionnaire. They include sector (industry) affiliation, establishment size (number of employees), single versus multi-establishment organization, as well as workforce composition by skill and occupation, and type of collective agreement. These controls are described in Appendix Table 3.

Finally, a key aspect of our analysis is the possible misalignment in management and employee (representative) views on the overall work climate and trust in one another. To this end, we need employee representative responses from the ER questionnaire. Specifically, the respondent (i.e., the person who is entitled to represent the opinions of the leading employee representation body at the workplace) is asked to rate the current general work climate at this establishment (raw variable q44). The respondent is also asked whether *management can be trusted* (raw variable q42a_c) and whether the *relationship between management and employee representation can best be described as hostile* (raw variable q20c). By matching management and employee (representative) statements, we may then define a *dissonance* variable as the difference between the views of the two parties. Indeed, several alternative formulations of dissonance are considered below in section 5. The ER survey also contains information on union membership of the employee representation body and union density at establishment level, the impact of which will only be mentioned in passing.

[4] Although several other alternative approaches could have been implemented (e.g., single domains in separate regressions), evidence from other studies suggests that the results are not sensitive to the introduction of different summary measures (see Bloom and Van Reenen, 2007: 1367; Bloom et al., 2019: 1656).

4. Modeling

Management practices in production can be framed in a standard two-input setting, where firm output is, to simplify, solely a function of two management inputs, say human capital management practices (e.g., performance appraisal and incentive/performance-based pay) and other practices (e.g., lean production techniques), denoted as M_1 and M_2, respectively. Cost minimization under a standard a CES production function $Y = \left[a_1 M_1^{\rho} + a_2 M_2^{\rho}\right]^{1/\rho}$ amounts then to minimizing $\{w_1 M_1 + w_2 M_2\}$ subject to $Y^{\rho} = a_1 M_1^{\rho} + a_2 M_2^{\rho}$, which after some manipulation yields the relative demand function $log\frac{M_1}{M_2} = \frac{1}{\rho - 1} log\frac{w_1}{w_2}$, where $a_1$and a_2 have been set equal to 1 to simplify the derivation. Accordingly, relative demand $\frac{M_1}{M_2}$ depends inversely on relative prices, $\frac{w_1}{w_2}$ (for $\rho < 1$), while for a different parameterization of $a_1$and a_2, it can be shown to be also dependent on $\frac{a_1}{a_2}$, and in this case directly. Under the assumption that human resource focused practices cannot be fully efficient if, for example, the workforce is not sufficiently skilled, there is the implication that a greater strength of these practices should be anticipated in situations where the proportion of highly-educated workers, including management itself, is greater as the benefits of the former are increasing in the latter.

Management practices are supposed to have a positive effect upon measures of firm performance, such as labor productivity. Let us therefore consider a generalized Cobb-Douglas production function with two inputs, comprising labor (L) and the overall index of management practices (M), as follows:[5]

$$Y = AL^{\alpha} e^{\beta M}. \quad (1)$$

From (1) it follows that labor productivity is a function of the overall index of management practices; that is:

$$log\frac{Y}{L} = \log A + (\alpha - 1) logL + \beta M. \quad (2)$$

In order to analyze the role of management practices and establishment performance under different types of workplace representation, we propose to use the following multilevel mixed effects ordered logistic model specification:

$$Pr\,(y_{ij} > k\,|X_{ij}, M_{ij}, \boldsymbol{\kappa}, \boldsymbol{u}_j) = H(X_{ij}\beta + \delta M_{ij} + \boldsymbol{u}_j - \kappa_k), \quad (3)$$

[5] M can be thought as a single-dimension variable denoting *the extent to which firms adopt more structured practices* (Bloom et al., 2019: 1656).

where $H(.)$ is the logistic cumulative distribution function, y_{ij} is the selected (ordered) performance measure, M_{ij} signifies the overall management practice index, and i and j identify the establishment and country, respectively. κ_k denotes the cut-point for the corresponding firm performance category k, with k =1, 2, 3, 4, 5 for the financial situation response and k =1, 2, 3 for the labor productivity case; $\boldsymbol{u}_j$ gives the set of country random intercepts, while X_{ij} is the vector of establishment characteristics.[6]

This model is extended to encompass the presence of formal workplace representation. Denoting this (dummy) variable by R, and introducing the corresponding interaction term with the management practice variable (M), we have:

$$\Pr(y_{ij} > k \mid X_{ij}, M_{ij}, R_{ij}, \boldsymbol{\kappa}, \boldsymbol{u}_j) = H(X_{ij}\beta + \delta M_{ij} + \lambda R_{ij} + \eta M_{ij} * R_{ij} + \boldsymbol{u}_j - \kappa_k). \quad (4)$$

In this setting, the absence of a works council is the omitted category.

As was noted earlier, we also seek to investigate the state of industrial relations at the workplace. We first use the information on management's view of workplace representation contained in the raw variables er15a and er15b, in separate runs. For the former variable, we define three establishment groups: with a constructive council, with a non-constructive council, and without a council (the reference group). For the latter variable, we have establishments with a delaying council, with a non-delaying council, and without a council (the reference group). For each separate run, the corresponding model can therefore be specified as:

$$\Pr(y_{ij} > k \mid X_{ij}, M_{ij}, R_{ij}, \boldsymbol{\kappa}, \boldsymbol{u}_j) = H(X_{ij}\beta + \delta M_{ij} + \textstyle\sum_l \lambda_l R_{lij} + \sum_l \eta_l R_{lij} * M_{ij} + \boldsymbol{u}_j - \kappa_k), \quad (5)$$

where subscript l denotes the *type* of works council.

Again using er15a and er15b, we also implement an alternative formulation where the information on both variables is combined in a single framework. In terms of the regression model this amounts to creating three establishment groups: establishments without councils; establishments with councils that management construes as constructive and/or not imposing delays on decision making; and establishments with councils that are both non-constructive and delaying (the reference group). In this schema, the goal is to isolate the patently most negative case, flagged by a doubly unfavorable

[6] To examine the sensitivity of the results to model implementation we also ran an ordinary ordered logit model with country dummies and found that the marginal effects reported in section 5 have approximately the same magnitude, sign, and statistical significance. However, given that the null of an ordinary ordered logistic model against the multilevel mixed effects ordered logistic model is easily rejected by the data, our regression analysis is exclusively based on the latter specification.

management's assessment. The model specification is similar that given in equation (3) above.

Next, we introduce the employee representative's view of the state of industrial relations at the establishment. For this purpose, we use the 2013 ER-MM merged data file directly obtained from the European Foundation for the Improvement of Living and Working Conditions, noting that in this case the number of usable observations is necessarily smaller than in models (3) through (5) above. This is due to the fact that not all workplace representation bodies identified by the management respondent were interviewed (by reason of missing private address, refusal to answer, etc.). For estimation purposes our sample comprises 1,301 establishments with MM-ER merged information. By construction, all establishments necessarily have formal workplace employee representation and the corresponding model specification contains a 1/0 dummy flagging the type of industrial relations as perceived by the employee representative. In the first instance, our proxy is whether management can be trusted or not. Then, in separate runs, we introduce two alternative dummy variables denoting the type of management-employee representation relationship (designated as hostile or otherwise) and whether the general work climate is good or very good. In this case the model specification resembles equation (2) above to yield:

$$\Pr(y_{ij} > k \mid X_{ij}, M_{ij}, R_{ij}, \boldsymbol{\kappa}, \boldsymbol{u}_j) = H(X_{ij}\beta + \delta M_{ij} + \lambda R'_{ij} + \eta M_{ij} * R'_{ij} + \boldsymbol{u}_j - \kappa_k), \quad (6)$$

where R' denotes the works council type dummy.

Crucial to our inquiry is the use of a *bilateral* measure that reflects dissonance or deviation in the positions of the two parties. Here, establishment performance is seen a function of an indicator that tracks some underlying dysfunction within the establishment, as well as providing a measure that is less prone to feedback and reverse causation. In practice, we will experiment with several such indicators. Our preferred version contains two dissonance variables, namely Dissonance_1 and Dissonance_2. Dissonance_1 gives the cases where management rates the work climate as good or very good and the worker representative holds to the contrary that the work climate is bad, very bad, or neither good nor bad. For its part, Dissonance_2 simply reverses the stance of each party. These two terms give the differentiated effects of each type of dissonance vis-à-vis the default of no dissonance. (For the purposes of this exercise, the cases in which both parties rate the work climate as bad are discarded from the sample.) The model can now be written as:

$$\Pr(y_{ij} > k \mid X_{ij}, M_{ij}, R_{ij}, \boldsymbol{\kappa}, \boldsymbol{u}_j) = H(X_{ij}\beta + \delta M_{ij} + \lambda_1 Dissonance\_1_{ij} + \lambda_2 Dissonance\_2_{ij} + \boldsymbol{u}_j - \kappa_k)\,. \quad (7)$$

Finally, our regression analysis will report both coefficient estimates and 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.

5. Findings

Table 1 provides the results from model (3), using the two selected performance indicators, the financial situation and labor productivity growth, in columns A and B, respectively. Clearly, management practices are associated with higher performance throughout. In column A, for example, a 1-unit change in the overall index of management practices is associated with a better than 7 percentage point higher probability that the financial situation is ranked as the highest (i.e., outcome-category 5). The same change in the overall index in column B is associated with a 16 percentage point increase in the probability that labor productivity is higher than the level observed three years earlier (outcome-category 3). These are sizable marginal effects, and each is statistically significant at the 0.01 level. Conversely, the marginal effects are negatively signed in the case of outcome categories 1 to 3 (1 to 2) in column A (column B) and again highly statistically significant. Only the marginal effect for outcome-category 4 in column A is poorly determined.

[Table 1 near here]

We control for a variety of establishment-level characteristics that are expected to be associated with establishment performance. The results for type of collective agreement and composition of the labor force are frankly disappointing. In the case of the former argument, however, it might be argued that the raw variable is less well suited to capture actual differences in collective bargaining across establishments than the more conventional categories of *individual agreement/no collective agreement*, *firm-level agreement*, and *sectoral-level agreement*. These categories were unavailable to us, although we should note that experimentation with an alternative collective agreement variable left the results unaffected. We might also note that our findings continued to hold when we restricted the sample to establishments in the private sector, indicating their insensitivity to inclusion of the public sector.

Lacking exogenous change in our management practices index, the reported relationships in Table 1 for the two performance indicators are therefore conditional correlations. It can then be argued that the observed variation in management practices is all due to differences in economic environment. Lack of competition, for example, may

induce bad management practices because it either relaxes management effort or reduces the exit rate of badly managed firms. We sought to evaluate this possibility with a very simple exercise, in which we assigned OECD-based data on the layoff rate at ISIC rev 3 division level (OECD, Ch. 2, 2009) to the 2-digit ECS industry classification. Note that in this case, the layoff rate fully identifies sector affiliation and as a result the exercise serves only to examine whether there is any association between management practices and the layoff ranking across the selected ECS sectors. Running the overall indicator of management practices on the layoff rate dummy variables for Germany (the country for which we have layoff rate data), and controlling for the same set of regressors as in Table 1, we found that industries assigned a higher layoff rate have indeed a higher management practices score. In the absence of collinearity between the layoff rate and industry affiliation, we would proceed with an instrumental variables (IV) approach, under the additional presumption that the layoff rate, as an indicator of competition, would have an impact on firm performance through the adoption of the best management practices only. Unfortunately, since we cannot distinguish the competitive effect from the industry-specific effect, the IV implementation via this route is not viable.[7]

Table 2 addresses the role of workplace representation both autonomously and in interaction with management practices. With respect to the latter association, we find no evidence that an increase in the management score single index is associated with higher performance in works council establishments than establishments without formal representation. That is, the corresponding interaction term in the third row of the table fails to achieve statistical significance.[8] Nor did we find in column A that works councils are associated cet. par. with an improved financial situation. Indeed, in column B we report that the entity is negatively associated with labor productivity.

The coefficient estimates for the control variables are largely unchanged vis-à-vis Table 1. Observe also that in both Tables 1 and 2 the null of an ordinary ordered logistic model is rejected against the multilevel mixed effects ordered logistic model. Controlling therefore for country heterogeneity in our multilevel mixed effects framework reveals

[7] The alternative of finding a valid, establishment-based instrument is also unfeasible due to the fact that there is no information at all on firm-level competition in the ECS data.

[8] Interpretation of interaction effects in nonlinear models is not straightforward. We follow Buis (2010) and estimated the corresponding odds ratios and obtained, for the interaction term, 0.845 (s.e. = 0.135) in panel A and 1.036 (s.e. = 0.166) in panel B. This means that the effect of 1-unit change in the overall index of management practices for works council establishments is 0.845 and 1.036 times that for non-works council units in panels A and B, respectively. Given that the odds ratio is in neither case statistically significant, the interaction term is not included in the remaining tables.

that the country (random) intercepts are, as expected, statistically different across the four countries and their heterogeneity successfully taken into account within our estimation procedure.[9]

[Table 2 near here]

The failure of works councils to be positively associated either with establishment financial performance or labor productivity leads us to examine whether the type of works council has a role to play. To this end, we next exploit the notion of constructive (or otherwise) works councils, using raw variable er15a, and compare outcomes with an absence of workplace representation. The intention of this exercise is therefore to go beyond the simple works council presence argument to introduce some sense of works council heterogeneity/quality. As shown in column A of Table 3, there is now an indication that only non-constructive councils are correlated with an inferior financial situation compared with the default. That said, there is still the suggestion in column B that labor productivity growth is lower in establishments with councils, irrespective of their supposed quality (either constructive or non-constructive). For its part, the management practices term remains positive and highly statistically significant in both columns of the table.

[Table 3 near here]

These results are unchanged if we replace the raw variable er15a by er15b as the selected indicator of works council quality. It will be recalled that in this case councils are perceived by management as delaying important management decisions (or otherwise). In this experiment (available upon request) the estimated coefficients and statistical significance obtained in Table 3 are largely unchanged; that is, the coefficient estimate for delaying councils is negatively signed and significant, while the coefficient on non-delaying councils is negative and insignificant (other than in the case of labor productivity growth).

Alternatively, one may also seek the combination of the two raw variables er15a and er15b to devise a hybrid variable that flags a situation where workplace representation

[9] The results obtained in Table 2 continue to hold if we use the alternative indicator based on raw scores rather than *z*-scores. That is, management practices are both positive and highly significant throughout, while the coefficient on the works council dummy is negative and insignificant in column A and negative and highly significant in column B. Given that the overall management indicator is now contained in the 0-25 interval, we have the result that a 10-point increase in score from 10 to 20 is associated with a 7 (16) percentage point increase in the probability that the financial situation (labor productivity growth) is the highest. The results of this exercise are available upon request.

is viewed in particularly unfavorable light by management, being both non-constructive in finding ways to improve workplace performance and acting to considerably delay important management decisions. This construct has the potential to provide a more decisive or clear-cut works council category (albeit as perceived by management alone). As shown in column A of Table 4, it is apparent that both establishments without councils and establishments with councils that are constructive and/or do not delay decisions are associated with better financial performance than their counterparts that are both non-constructive and delay decisions (the reference group). What seems of interest in this case is the finding that the two coefficients are not statistically different (χ^2=0.76; p-value=0.3823). This result might suggest that as long as works councils are not perceived as too disruptive, the difference in performance across works councils and non-works council establishments is statistically negligible.

[Table 4 near here]

In the case of column B, we reject the null at the 0.05 level that the two workplace representation terms have equal coefficients. In this case, the coefficient on constructive and/or not decision-delaying councils is positive but not statistically significant, while the coefficient on non-works council establishments is positive and marginally significant. On net, therefore, it seems that contrary to the previous results, Table 4 provides no strong evidence that councils are negatively associated with lower labor productivity growth if the comparator is given by establishments in which the works council is both unconstructive and delaying.

We next introduce the views of employees, as provided by the works council respondent to the ER questionnaire. Note that our sample is now restricted to those establishments with formal workplace representation. The results of this exercise are given in Table 5, which implements model (6). For this subsample of works council establishments it can be seen that that financial performance is strongly associated with employee trust, with a marginal effect equal to 0.08 at the highest level of performance. Note that the coefficient estimate of the overall indicator of management practices is positive and of similar magnitude and statistical significance to that reported earlier in Table 2.

[Table 5 near here]

However, the findings in column B of the table fail to indicate any relationship between employee trust in management and labor productivity. This is a surprising result for which we have no explanation at this stage other than the limitations attaching to any

one-sided measure of the state of industrial relations, irrespective of its source. As a preliminary check, we tested whether the lack of statistical significance of the employee trust argument in the labor productivity performance equation was sensitive to the use of this particular measure. That is, we experimented with alternative employee representative views; specifically, as to the nature of the relationship between the two sides (hostile or otherwise) and of the quality of the general work climate at the establishment (based on raw variables q20_c and q44, respectively, which are described in Appendix Table 3). In both cases, the coefficient estimates of the substitute indicators for employee trust remained statistically insignificant, and those for management practices maintained their magnitude and strong significance. Full results are available from the authors upon request.

Nevertheless, there is the concern that unilateral qualitative measures, while instructive of the state of industrial relations, may not prove adequate to address the performance-worker representation nexus. Furthermore, given that both management and employee representative views are potentially endogenous, the empirical models in Tables 1 to 5 cannot of course establish any causal relationship. Thus, for example, a superior financial situation is likely to influence management's opinion as to whether workplace representation is constructive or not. Although reverse causation is less of a problem in the case of the employee representative view of management, one cannot exclude the possibility that a good establishment performance is also likely to favor employee representative opinion that management can be trusted.

By way of response, we sought an alternative implementation that exploits the notion of dissonance, namely a divergence between the views of management and the employee representative. Our strategy assumes that dissonance and non-dissonance cases are sufficiently distinct from one another to permit identification of a relevant parameter, so that the issue becomes one of whether dissonance between the two parties matters. This bilateral variable is intended to signal the extent to which there is evidence of a lack of mutual trust, the crucial point being that although non-dissonance may not be synonymous with genuine trust it is nonetheless likely to be sufficiently distinct from dissonance. The construct offers the advantage of potentially capturing a more fundamental notion of disaffection – or lack of mutual trust – and as such be expected to *imply* weaker performance.

As described in section 4, our principal measure of dissonance uses management and employee representative views on the general climate at the establishment. The

results of this experiment are given in Table 6, which therefore models establishment performance as a function of management practices and dissonance, while controlling for the same set establishment characteristics as before. It will be recalled that the model contains two dissonance variables – Dissonance_1 and Dissonance_2 – to differentiate the two possible types of misalignment between the parties against the reference category of no dissonance. Table 5 will provide the point of reference.

Firstly, we note that the management practices coefficient estimate remains positive, large, and statistically significant (at the 0.05 level) in column A of Table 6. The marginal effects for outcome-categories 1 through to 5 are also of similar magnitude. Secondly, both types of dissonance are negative, indicating that they are seemingly harmful to financial performance, with the Dissonance_2 term evincing a larger marginal effect. Based on the estimated coefficients, the measured deviation (or dissonance) of type 2 implies a substantially lower probability of achieving the highest performance category (outcome-category 5) of -19 percentage points. The marginal effect for the Dissonance_1 term is smaller in absolute magnitude at -11 percentage points. Both effects are sizable and are supportive of our priors.

[Table 6 near here]

In column B of Table 6, we also report a positive and significant coefficient estimate for management practices, while the corresponding marginal effects are again large in magnitude. Moreover, the Dissonance_2 term is now also statistically significant at the 0.05 level. The suggestion from column B of Table 5, that the growth in labor productivity does not seem sensitive to the employee representative view on the quality of industrial relations, is therefore not confirmed. It thus follows that, as anticipated, a one-sided view of work climate is an unsatisfactory measure.

Given the availability of (six) alternative measures of dissonance, however, are the results reported in Table 6 robust? From the perspective of the management respondent, it will be recalled that there is survey information on the general work climate in the establishment and whether management trusts the employee representation; and also that we have similar information from the employee respondent on the general work climate, as well as on whether management can be trusted and whether the relationship between management and the employee representation can be described as hostile. (The array of feasible dissonance measures is described in Appendix Table 3.) Space constraints are such that we can only offer a brief summary of the results of deploying these alternatives. In the case of financial performance, the management practices term is

always positive and of similar magnitude, while Dissonance_1 and Dissonance_2 are always negative and significant, except in two cases where Dissonance_1 is insignificant at conventional levels. For the labor productivity growth outcome, the management practices coefficient estimate is always positive and significant at the 0.01 level (except in one case in which is significant at the 0.05 level); and, as in Table 6, Dissonance_2 is significant (and negative) in two cases, while Dissonance_1 is never significant except in one case. On balance, there seems to be considerable stability in the results, and no real evidence to indicate that they are overly sensitive to the use of any particular dissonance construct. (Full results from these alternative dissonance scenarios are available upon request.)

6. Conclusions

This paper looks at two factors widely viewed as important determinants of establishment performance, namely advanced management practices and worker representation at the workplace. Yet despite their appeal as drivers of performance the two factors have to all intents and purposes not previously been juxtaposed. The present paper is among the first to consider the two factors alongside one another even if it does not formally explore their interplay other than via the use of interaction terms. Rather, its concern has been to examine the association between each argument and (two measures of) firm performance in the presence of the other Moreover, the cross section nature of our dataset necessitates that we avoid use of the word 'effect' but this limitation is shared with much of the highly influential management practices literature that long eschewed offering a causal analysis of its stark findings of a highly significant positive association between management practice scores and labor productivity growth, inter al. Causation issues have also loomed large in the separate workplace representation literature not least because of the lack of variation over time in the entity in question and the joint presence of both principal forms of worker representation, namely works councils and trade unions. In the present paper, we restrict our attention to countries with a unique form of workplace presentation – namely works councils in the 'Germanic cluster' of nations – but nonetheless seek to differentiate between types of works councils as well as the types of establishments in which they operate. The four countries in our sample have exemplary forms of workplace representation from a theoretical perspective, even if the empirical terrain is still contested. The management practices of the lead country with which they are identified, Germany, also has been shown to have superior management practices in the WMS

literature, practices that are associated almost without exception with improved performance.

Our study has used data from the two components of the 2013 European Company Survey. The Management Questionnaire (MM) is used to define our full sample of mixed establishments (that is, containing both works council establishments and those without any formal representation) and the Employee Representative Questionnaire (ER) to derive a smaller ER-MM merged sample of exclusively works council plants. Our findings will be recalled pertain to the correlates of subjective measures of financial performance and the growth in labor productivity.

For the full sample, we report that management practices are strongly positively related to both performance indicators, although there is no indication that the introduction of a simple work council variable – signified by works council presence versus its absence – influences the association between management practices and performance. Its own correlation with both outcome indicators is negative (and significantly so in the case of labor productivity growth). Moving beyond the simple presence of a works council (or otherwise), we first considered separate sets of works councils as either constructive in helping management to improve workplace performance (or otherwise) and alternately as leading to considerable delays in decision making (or otherwise). The reference category – establishments without a works council – was unchanged. The results for labor productivity were statistically significant negative coefficient estimates across the board, and on this occasion the financial situation was inferior only in circumstances where the works council was either unconstructive or delay inducing. We next combined both negatively perceived council characteristics to yield a uniquely unfavorable works council type (both unconstructive and delaying) as the reference category. This specification effectively rendered the coefficient estimate of the revised works council variable (i.e., constructive and/or nondelaying) coefficient estimate insignificant at conventional levels in the productivity growth equation and positive and statistically significant in the equation for the financial situation equation (and importantly not statistically different from the coefficient estimate for the no works council case). Accordingly, we obtain a more balanced and less challenging view of works council operations once we differentiate between works council type. No less important was the result that the association between management practice score and both performance indicators was effectively unchanged across all these iterations.

Analysis of the smaller sample, comprising works council establishments alone, confirmed the association between management practices and firm performance. On this occasion differentiation between works councils was on the basis of the views of the employee representative: either on the basis of the trust reposed in management or in terms of a favorable assessment of the general work climate. Both arguments were found to be associated with an improved financial situation. The association with labor productivity growth was negative but statistically insignificant throughout.

We then sought to take the views of management and labor into account in order to tackle a possible source of endogeneity; specifically, diametrically opposing views of the two sides as to the climate of industrial relations at the workplace (the reference category being mutual agreement as to there being a positive relationship). We found that 'dissonance' had a negative effect on the two performance indicators. Further experimentation with dissonance measures fashioned from other combinations of employer and employee perceptions of the functioning of their relationship provided support for the baseline result that dissonance was negatively related to establishment performance.

In sum, support for the predictions of the management as a technology argument is surprisingly strong, subject to the usual caveats on causality. By the same token, our results for works councils caution against any generalization of the worker representation (strictly, union) result reported in Bloom et al. (2019) for the U.S. (see subsection 2.3). In this sense, our results for works councils bear repeating. Firstly, there is no indication of a negative management practice-works council interaction term. Secondly, we were able to counter any suggestion of a uniformly negative direct association between the representation entity and the financial performance and labor productivity growth indicators once one abandons the assumption that works councils are a datum (just as we were able, in results not reported here but available on request, to dispel the notion that the union affiliations of works council members or of the workforce underpin negative results, where observed). Finally, and most importantly, we conclude that dissonance, or disagreement between the parties as to the climate of industrial relations, is negatively and significantly related with financial performance and labor productivity growth.

References

Addison, John T. 2009. *The Economics of Codetermination: Lessons from the German Experience*. New York: Palgrave Macmillan.

Addison, John T., Paulino Teixeira, Katalin Evers, and Lutz Bellmann. 2017. "Collective Bargaining and Innovation in Germany: A Case of Cooperative Industrial Relations?" *Industrial Relations* 56(1): 73-121.

Altmeyer, Werner. 2005. "Betriebsräte in Westeuropa. Zu den Strukturen der betrieblichen Interessenvertretungen." *Der Betriebsrat* 1(4): 19-25.

Arnold, Daniel., Tobias Brändle, and Laszlo Goerke. 2018. "Sickness Absence and Works Councils: Evidence from German Individual and Linked Employer-Employee Data." *Industrial Relations* 57(2): 260-295.

Black, Sandra E., and Lisa M. Lynch. 2011. "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity." *Review of Economics and Statistics* 83(3): 434-445.

Bloom, Nicholas, and John Van Reenen. 2007. "Measuring and Explaining Management Practices Across Firms and Countries." *Quarterly Journal of Economics* 122(94): 1351-1408.

Bloom, Nicholas, and John Van Reenen. 2010. "Why Do Management Practices Differ Across Firms and Countries?" *Journal of Economic Perspectives* 24(1): 203-224.

Bloom, Nicholas, and John Van Reenen. 2011. "Human Resource Management and Productivity." In *Handbook of Labor Economics*, Vol. 4B, edited by David Card and Orley Ashenfelter, pp. 1697-1797. Amsterdam: Elsevier.

Bloom, Nicholas, Erik Brynjolfsson, Lucia Foster, Ron Jarmin, Megha Patnaik, Itay Saporta-Ecksten, and John Van Reenen. 2019. "What Drives Differences in Management Practices?" *American Economic Review* 109(5): 1648-1683.

Bloom, Nicholas, Kalina Manova, John Van Reenen, Stephen Teng Sun, and Zhihong Yu. 2021. "Trade and Management." *Review of Economics and Statistics* 103(3): 443–460.

Broszeit, Sandra, Marie-Christine Laible, Holger Görg, and Ursula Fritsch. 2019. "Management Practices and Productivity in Germany." *German Economic Review* 20(4): e657-e705.

Buis, Martens, L. 2010. "Interpretation of Interactions in Nonlinear Models." *The Stata Journal* 10(2): 305-308.

Cappelli, Peter, and David Neumark, 2001. "Do 'High-Performance' Work Practices Improve Establishment-Level Outcomes?" *Industrial and Labor Relations Review* 54(4): 737-775.

Caroli, Eve, and John Van Reenen. 2001. "Skill-Biased Organizational Change? Evidence from Panel of British and French Establishments." *Quarterly Journal of Economics* 116(4): 1449-1492.

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.

Feng, Andy and Anna Valero. 2020. “Skill-Biased Management: Evidence from Manufacturing Firms.” *Economic Journal* 130(628): 1057-1080.

Freeman, Richard B., and James L. Medoff. 1984. *What Do Unions Do?* New York: Basic Books.

OECD. 2009. *Employment Outlook.* Paris: OECD Publishing.

Freeman, Richard B., and Edward P. Lazear. 1995. “An Economic Analysis of Works Councils.” In Joel Rogers and Wolfgang Streeck (eds.), *Works Councils, Consultation, Representation and Cooperation in Industrial Relations*. Chicago, IL: University of Chicago Press, pp. 27-52.

Frege, Carola. M. 2002. “A Critical Assessment of the Theoretical and Empirical Research on German Works Councils.” *British Journal of Industrial Relations* 40(2): 221-248.

Gosnell, Greer K., John A. List, and Robert D. Metcalfe .2020. “The Impact of Management Practices on Employee Productivity: A Field Experiment with Airline Captains.” *Journal of Political Economy* 128(4): 1195-1233.

Handel, Michael J., and David L. Levine. 2004. “Editors’ Introduction: The Effect of New Work Practices on Workers.” *Industrial Relations* 43(1): 302-318.

Harju, Jarrko, Simon Jäger, and Benjamin Schoeffer. 2021. “Voice at Work.” NBER Working Paper No. 28522 (revised November 2021). Cambridge, MA: National Bureau of Economic Research.

Hübler, Olaf, and Uwe Jirjahn. 2003. “Works Councils and Collective Bargaining in Germany: The Impact on Productivity and Wages*.” Scottish Journal of Political Economy* 50(1): 471-491.

Jirjahn, Uwe, and Stephen C. Smith. 2017. “Nonunion Employee Representation: Theory and the German Experience with Mandated Works Councils.” IZA Discussion Paper No. 11066. Bonn: Institute of Labor Economics.

Milgrom, Paul, and John Roberts, 1990. “The Economics of Modern Manufacturing: Technology, Strategy, and Organization.” *American Economic Review* 80(3): 511-528.

Mueller, Steffen. 2012. “Works Councils and Establishment Productivity.” *Industrial and Labor Relations Review* 65(4): 880-898.

Mueller, Steffen, and Jens Stegmaier. 2017. “The Dynamic Effects of Works Councils on Labor Productivity: First Evidence from Panel Data.” *British Journal of Industrial Relations* 55(2): 372-

Mueller, Steffen, and Georg Neuschaeffer. 2021. “Worker Participation in Decision-making, Worker Sorting, and Firm Performance.” *Industrial Relations* 60(4): 436-478.

Mueller, Steffen, and Jens Stegmaier. 2017. “The Dynamic Effects of Works Councils on Labor Productivity: First Evidence from Panel Data.” *British Journal of Industrial Relations* 55(2): 372-395.

Pfeifer, Christian. 2011. “The Heterogeneous Consequences of Works Council Relations.” *Schmollers Jahrbuch* 131(1): 59-71.

Wolf, Elke, and Thomas Zwick. 2002. “Reassessing the Impact of High Performance Work Practices.” ZEW Discussion Paper No. 02-07. Mannheim: Center for European Economic R

Zwick, Thomas. 2003. “Works Councils and the Productivity Impact of Direct Employee Participation.” ZEW Discussion Paper No. 03-47. Mannheim: Zentrum für Europäische Wirtschaftsforschung.

Van den Berg, Annette, Yolande Grift, and Arjen van Witteloostuijn. 2011. “The Role of Top Managers’ and Works Councils’ Attitudes in Bad Vis-à-vis Good Times.” *Journal of Labor Research* 32: 136-156.

Table 1: Establishment Performance and Management Practices (MPs) in the Germanic Cluster

Variable	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
Overall index of MPs	0.492***	-0.0018**	-0.0136***	-0.0675***	0.0089	0.0740***	0.669***	-0.0425***	-0.1182***	0.1607***
	(0.083)	(0.0007)	(0.0042)	(0.0139)	(0.0236)	(0.0172)	(0.083)	(0.0063)	(0.0143)	(0.0192)
With 50-249 employees	0.177**	-0.0006*	-0.0048*	-0.0241**	0.0025	0.0270**	0.171**	-0.0105**	-0.0306**	0.0411**
	(0.081)	(0.0004)	(0.0025)	(0.0114)	(0.0086)	(0.0132)	(0.082)	(0.0050)	(0.0147)	(0.0196)
With at least 250 employees	0.064	-0.0002	-0.0018	-0.0089	0.0016	0.0094	-0.016	0.0010	0.0027	-0.0038
	(0.098)	(0.0004)	(0.0028)	(0.0136)	(0.0038)	(0.0146)	(0.098)	(0.0065)	(0.0172)	(0.0237)
Private sector	0.444***	-0.0016**	-0.0123***	-0.0609***	0.0080	0.0667***	0.234*	-0.0149*	-0.0414*	0.0563*
	(0.121)	(0.0007)	(0.0046)	(0.0180)	(0.0214)	(0.0211)	(0.122)	(0.0078)	(0.0215)	(0.0292)
Single establishment	0.229***	-0.0008**	-0.0063**	-0.0314***	0.0041	0.0344***	-0.248***	0.0157***	0.0438***	-0.0595***
	(0.078)	(0.0004)	(0.0027)	(0.0114)	(0.0110)	(0.0130)	(0.080)	(0.0052)	(0.0140)	(0.0190)
Company level bargaining	-0.046	0.0002	0.0013	0.0063	-0.0008	-0.0069	0.057	-0.0036	-0.0102	0.0138
	(0.115)	(0.0004)	(0.0032)	(0.0158)	(0.0032)	(0.0172)	(0.115)	(0.0072)	(0.0205)	(0.0277)
Higher than company level	-0.060	0.0002	0.0017	0.0082	-0.0012	-0.0090	0.036	-0.0023	-0.0064	0.0088
	(0.096)	(0.0004)	(0.0027)	(0.0132)	(0.0034)	(0.0144)	(0.095)	(0.0061)	(0.0169)	(0.0229)
Mixed level	0.069	-0.0002	-0.0018	-0.0092	0.0005	0.0107	-0.043	0.0028	0.0075	-0.0103
	(0.107)	(0.0004)	(0.0028)	(0.0143)	(0.0034)	(0.0167)	(0.108)	(0.0071)	(0.0189)	(0.0260)
Workers with an OEC	-0.001	0.0000	0.0000	0.0001	-0.0000	-0.0001	0.001	-0.0000	-0.0001	0.0002
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0000)	(0.0002)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Female workers	-0.001	0.0000	0.0000	0.0001	-0.0000	-0.0001	0.002	-0.0001	-0.0003	0.0004
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0000)	(0.0003)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Workers with a university degree	0.002	-0.0000	-0.0000	-0.0002	0.0000	0.0002	0.004**	-0.0002**	-0.0006**	0.0008**
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Part-time workers	0.002	-0.0000	-0.0001	-0.0003	0.0000	0.0003	0.000	-0.0000	-0.0000	0.0000
	(0.002)	(0.0000)	(0.0001)	(0.0003)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0004)	(0.0005)
N	3,420						3,482			

Notes: The multilevel mixed-effects ordered logistic model is given in equation (3) in the text, and is estimated using the *meologit* command in Stata 15. Reference categories for establishment size and collective agreement dummies are given by the 10 to 49 employees and no collective agreement groups, respectively. Industry (five 2-digit NACE sectors) and establishment size (two groups) are also included in the regression. The table reports both the estimated coefficients and mean marginal effects. The included variables are described in the text and in Appendix Table 3. The log-likelihood ratio statistics, not reported in the table, are equal to 157.08 (p-value: 0.000) in column A; and 6.07 (p-value: 0.007) in column B; in all cases the null of an ordinary ordered logistic model is rejected against the multilevel mixed-effects ordered logistic model. ***, ** and * denote statistical significance at the 0.01. 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.

Source: 2013 ECS, Management Questionnaire.

Table 2: Establishment Performance, Management Practices (MPs), and Works Council Presence in the Germanic Cluster

Variable	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
Overall index of MPs	0.573***	-0.0020**	-0.0157***	-0.0784***	0.0098	0.0863***	0.680***	-0.0429***	-0.1200***	0.1629***
	(0.106)	(0.0008)	(0.0049)	(0.0172)	(0.0270)	(0.0210)	(0.108)	(0.0074)	(0.0186)	(0.0252)
Works council	-0.093	0.0003	0.0026	0.0127	-0.0016	-0.0140	-0.246***	0.0155***	0.0434***	-0.0589***
	(0.089)	(0.0003)	(0.0025)	(0.0123)	(0.0046)	(0.0137)	(0.089)	(0.0057)	(0.0157)	(0.0213)
Single index*Works council	-0.169	0.0006	0.0046	0.0231	-0.0029	-0.0254	0.036	-0.0022	-0.0063	0.0085
	(0.159)	(0.0006)	(0.0045)	(0.0220)	(0.0084)	(0.0243)	(0.160)	(0.0101)	(0.0283)	(0.0384)
With 50-249 employees	0.208**	-0.0015**	-0.0118***	-0.0585***	0.0074	0.0645***	0.250***	-0.0120	-0.0336	0.0456
	(0.086)	(0.0007)	(0.0045)	(0.0180)	(0.0203)	(0.0209)	(0.087)	(0.0078)	(0.0217)	(0.0294)
With at least 250 employees	0.127	-0.0007*	-0.0056**	-0.0283**	0.0031	0.0316**	0.106	-0.0153***	-0.0446***	0.0599***
	(0.108)	(0.0004)	(0.0027)	(0.0121)	(0.0099)	(0.0141)	(0.108)	(0.0053)	(0.0156)	(0.0208)
Private sector	0.428***	-0.0005	-0.0036	-0.0177	0.0028	0.0189	0.190	-0.0069	-0.0187	0.0257
	(0.122)	(0.0004)	(0.0031)	(0.0149)	(0.0063)	(0.0165)	(0.123)	(0.0069)	(0.0192)	(0.0261)
Single establishment	0.210***	-0.0007*	-0.0058**	-0.0287**	0.0036	0.0316**	-0.279***	0.0176***	0.0492***	-0.0667***
	(0.079)	(0.0004)	(0.0026)	(0.0113)	(0.0100)	(0.0129)	(0.081)	(0.0052)	(0.0141)	(0.0191)
Company level bargaining	-0.031	0.0001	0.0009	0.0043	-0.0006	-0.0047	0.076	-0.0048	-0.0133	0.0181
	(0.115)	(0.0004)	(0.0032)	(0.0158)	(0.0026)	(0.0173)	(0.116)	(0.0073)	(0.0204)	(0.0277)
Higher than company level	-0.050	0.0002	0.0014	0.0069	-0.0010	-0.0075	0.069	-0.0044	-0.0122	0.0166
	(0.096)	(0.0003)	(0.0027)	(0.0132)	(0.0029)	(0.0145)	(0.097)	(0.0062)	(0.0170)	(0.0231)
Mixed level	0.082	-0.0003	-0.0021	-0.0109	0.0006	0.0128	-0.000	0.0000	0.0001	-0.0001
	(0.108)	(0.0004)	(0.0029)	(0.0144)	(0.0040)	(0.0169)	(0.109)	(0.0071)	(0.0191)	(0.0262)
Workers with an OEC	-0.001	0.0000	0.0000	0.0001	-0.0000	-0.0001	0.001	-0.0000	-0.0001	0.0002
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0000)	(0.0002)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Female workers	-0.001	0.0000	0.0000	0.0001	-0.0000	-0.0001	0.001	-0.0001	-0.0002	0.0003
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0000)	(0.0003)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Workers with a university degree	0.001	-0.0000	-0.0000	-0.0002	0.0000	0.0002	0.004**	-0.0002**	-0.0006**	0.0009**
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Part-time workers	0.002	-0.0000	-0.0001	-0.0003	0.0000	0.0003	0.000	-0.0000	-0.0001	0.0001
	(0.002)	(0.0000)	(0.0001)	(0.0003)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0004)	(0.0005)
N	3,420						3,482			

Note: See notes to Table 1. The multilevel mixed-effects ordered logistic model is given in equation (4) in the text. The log-likelihood ratio statistics, not reported in the table, are equal to 151.06 (p-value: 0.000) in column A; and 2.72 (p-value: 0.049) in column B; in all cases the null of an ordinary ordered logistic model is rejected against the multilevel mixed-effects ordered logistic model. ***, ** and * denote statistical significance at the 0.01. 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.
Source: 2013 ECS, Management Questionnaire.

Table 3: Establishment Performance, Management Practices (MPs), and Works Council Type ('Constructive [or otherwise]'as Perceived by Management)

Variable	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
Overall index of MPs	0.493***	-0.0016**	-0.0137***	-0.0678***	0.0089	0.0742***	0.698***	-0.0440***	-0.1230***	0.1670***
	(0.084)	(0.0007)	(0.0042)	(0.0139)	(0.0232)	(0.0172)	(0.084)	(0.0061)	(0.0143)	(0.0193)
Works council is constructive	-0.069	0.0002	0.0019	0.0095	-0.0013	-0.0104	-0.224**	0.0141**	0.0394**	-0.0535**
	(0.092)	(0.0003)	(0.0026)	(0.0127)	(0.0036)	(0.0139)	(0.092)	(0.0059)	(0.0163)	(0.0220)
Works council is not constructive	-0.314**	0.0010*	0.0087**	0.0431**	-0.0057	-0.0472**	-0.275**	0.0174**	0.0485**	-0.0659**
	(0.137)	(0.0006)	(0.0044)	(0.0194)	(0.0149)	(0.0219)	(0.138)	(0.0088)	(0.0242)	(0.0329)
With 50-249 employees	0.227***	-0.0007*	-0.0062**	-0.0310**	0.0033	0.0346**	0.249***	-0.0152***	-0.0444***	0.0596***
	(0.086)	(0.0004)	(0.0028)	(0.0122)	(0.0108)	(0.0143)	(0.087)	(0.0053)	(0.0157)	(0.0209)
With at least 250 employees	0.124	-0.0004	-0.0036	-0.0174	0.0030	0.0183	0.092	-0.0060	-0.0161	0.0221
	(0.108)	(0.0004)	(0.0031)	(0.0150)	(0.0062)	(0.0164)	(0.109)	(0.0070)	(0.0192)	(0.0262)
Private sector	0.416***	-0.0014**	-0.0116***	-0.0571***	0.0075	0.0626***	0.193	-0.0122	-0.0341	0.0462
	(0.122)	(0.0007)	(0.0045)	(0.0180)	(0.0196)	(0.0208)	(0.123)	(0.0078)	(0.0217)	(0.0295)
Single establishment	0.222***	-0.0007*	-0.0062**	-0.0305***	0.0040	0.0334**	-0.280***	0.0177***	0.0493***	-0.0670***
	(0.079)	(0.0004)	(0.0027)	(0.0114)	(0.0105)	(0.0130)	(0.081)	(0.0053)	(0.0141)	(0.0192)
Company level bargaining	-0.041	0.0001	0.0012	0.0057	-0.0008	-0.0062	0.084	-0.0053	-0.0148	0.0200
	(0.116)	(0.0004)	(0.0032)	(0.0159)	(0.0030)	(0.0173)	(0.116)	(0.0073)	(0.0205)	(0.0278)
Higher than company level	-0.054	0.0002	0.0015	0.0074	-0.0011	-0.0080	0.072	-0.0045	-0.0126	0.0172
	(0.096)	(0.0003)	(0.0027)	(0.0133)	(0.0031)	(0.0145)	(0.097)	(0.0062)	(0.0171)	(0.0233)
Mixed level	0.073	-0.0002	-0.0019	-0.0097	0.0006	0.0113	-0.009	0.0006	0.0015	-0.0020
	(0.108)	(0.0004)	(0.0029)	(0.0146)	(0.0036)	(0.0169)	(0.110)	(0.0072)	(0.0191)	(0.0263)
Workers with an OEC	-0.000	0.0000	0.0000	0.0001	-0.0000	-0.0001	0.001	-0.0000	-0.0001	0.0002
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0000)	(0.0002)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Female workers	-0.001	0.0000	0.0000	0.0001	-0.0000	-0.0002	0.001	-0.0001	-0.0002	0.0003
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Workers with a university degree	0.001	-0.0000	-0.0000	-0.0002	0.0000	0.0002	0.004**	-0.0002**	-0.0006**	0.0009**
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Part-time workers	0.002	-0.0000	-0.0001	-0.0003	0.0000	0.0003	0.001	-0.0000	-0.0001	0.0001
	(0.002)	(0.0000)	(0.0001)	(0.0003)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0004)	(0.0005)
N	3,399						3,456			

Notes: See notes to Table 1. The multilevel mixed-effects ordered logistic model is given in equation (5) in the text. The works council type is based on the variable er15a and is described in Appendix Table 3. Establishments without a works council are the reference group. The interaction terms between management practices and works council type were never statistically significant and have been dropped from the specification. The log-likelihood ratio statistics, not reported in the table, are equal to 151.06 (p-value: 0.000) in column A; and 2.72 (p-value: 0.049) in column B; in all cases the null of an ordinary ordered logistic model is rejected against the multilevel mixed-effects ordered logistic model. ***, ** and * denote statistical significance at the 0.01. 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.
Source: 2013 ECS, Management Questionnaire.

Table 4: Establishment Performance, Management Practices (MPs), and Works Council Type ('Constructive and/or non-delaying' as Perceived by Management)

Variable	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
Overall index of MPs	0.497***	-0.0017**	-0.0136***	-0.0683***	0.0088	0.0748***	0.689***	-0.0433***	-0.1216***	0.1650***
	(0.084)	(0.0007)	(0.0041)	(0.0140)	(0.0233)	(0.0172)	(0.084)	(0.0061)	(0.0143)	(0.0193)
With a works council that is constructive and/or does not delay decision making	0.421**	-0.0014*	-0.0116**	-0.0579**	0.0075	0.0634**	0.151	-0.0095	-0.0266	0.0360
	(0.181)	(0.0008)	(0.0058)	(0.0258)	(0.0200)	(0.0290)	(0.182)	(0.0115)	(0.0321)	(0.0435)
Without a works council	0.499***	-0.0017*	-0.0137**	-0.0686**	0.0089	0.0751**	0.375*	-0.0236*	-0.0662*	0.0898*
	(0.190)	(0.0009)	(0.0063)	(0.0273)	(0.0236)	(0.0309)	(0.192)	(0.0122)	(0.0338)	(0.0458)
With 50-249 employees	0.221**	-0.0007*	-0.0060**	-0.0302**	0.0033	0.0336**	0.000	-0.0154***	-0.0450***	0.0604***
	(0.086)	(0.0004)	(0.0027)	(0.0122)	(0.0105)	(0.0142)	(0.000)	(0.0053)	(0.0157)	(0.0208)
With at least 250 employees	0.132	-0.0004	-0.0037	-0.0184	0.0030	0.0195	0.252***	-0.0069	-0.0187	0.0256
	(0.108)	(0.0004)	(0.0031)	(0.0150)	(0.0065)	(0.0165)	(0.087)	(0.0069)	(0.0193)	(0.0262)
Private sector	0.425***	-0.0014**	-0.0117***	-0.0584***	0.0075	0.0639***	0.106	-0.0125	-0.0351	0.0476
	(0.122)	(0.0007)	(0.0045)	(0.0180)	(0.0200)	(0.0209)	(0.109)	(0.0078)	(0.0217)	(0.0294)
Single establishment	0.219***	-0.0007*	-0.0060**	-0.0301***	0.0039	0.0330**	0.199	0.0171***	0.0481***	-0.0652***
	(0.079)	(0.0004)	(0.0027)	(0.0114)	(0.0104)	(0.0130)	(0.123)	(0.0052)	(0.0141)	(0.0192)
Company level bargaining	-0.030	0.0001	0.0008	0.0042	-0.0006	-0.0045	-0.272***	-0.0055	-0.0153	0.0208
	(0.115)	(0.0004)	(0.0032)	(0.0159)	(0.0027)	(0.0173)	(0.081)	(0.0073)	(0.0205)	(0.0278)
Higher than company level	-0.045	0.0001	0.0012	0.0062	-0.0009	-0.0066	0.087	-0.0048	-0.0135	0.0183
	(0.096)	(0.0003)	(0.0027)	(0.0133)	(0.0028)	(0.0145)	(0.116)	(0.0062)	(0.0171)	(0.0233)
Mixed level	0.080	-0.0003	-0.0021	-0.0108	0.0007	0.0125	0.076	0.0001	0.0002	-0.0003
	(0.108)	(0.0004)	(0.0029)	(0.0145)	(0.0039)	(0.0169)	(0.097)	(0.0072)	(0.0191)	(0.0263)
Workers with an OEC	-0.000	0.0000	0.0000	0.0001	-0.0000	-0.0001	-0.001	-0.0001	-0.0002	0.0002
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0000)	(0.0002)	(0.109)	(0.0001)	(0.0003)	(0.0004)
Female workers	-0.001	0.0000	0.0000	0.0001	-0.0000	-0.0001	0.001	-0.0001	-0.0002	0.0003
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0000)	(0.0003)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Workers with a university degree	0.001	-0.0000	-0.0000	-0.0002	0.0000	0.0002	0.001	-0.0002**	-0.0006**	0.0009**
	(0.002)	(0.0000)	(0.0000)	(0.0002)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0003)	(0.0004)
Part-time workers	0.002	-0.0000	-0.0001	-0.0003	0.0000	0.0003	0.004**	-0.0000	-0.0001	0.0001
	(0.002)	(0.0000)	(0.0001)	(0.0003)	(0.0001)	(0.0003)	(0.002)	(0.0001)	(0.0004)	(0.0005)
N	3,408						3,467			

Notes: See notes to Table 1. As described in the text, the works council type is based on the variables er15a and er15b. The reference group is made up of all establishments with a works council that is both non-constructive and implies delays in decisions. The multilevel mixed-effects ordered logistic model is similar to equation (5) in the text. The log-likelihood ratio statistics, not reported in the table, are equal to 148.93 (p-value: 0.000) in column A; and 2.20 (p-value: 0.068) in column B; in all cases the null of an ordinary ordered logistic model is rejected against the multilevel mixed-effects ordered logistic model. ***, ** and * denote statistical significance at the 0.01. 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.
Source: 2013 ECS, Management Questionnaire.

Table 5: Establishment Performance, Management Practices (MPs), and Trust ('Management can be trusted [or otherwise]' as Perceived by the Employee Representative)

Variable	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
Overall index of MPs	0.593***	-0.0058**	-0.0253**	-0.0769***	0.0179	0.0900***	0.612***	-0.0420***	-0.1030***	0.1450***
	(0.203)	(0.0029)	(0.0104)	(0.0266)	(0.0247)	(0.0333)	(0.206)	(0.0147)	(0.0344)	(0.0484)
Management can be trusted	0.543***	-0.0053**	-0.0231***	-0.0704***	0.0164	0.0824***	-0.201	0.0138	0.0337	-0.0475
	(0.158)	(0.0025)	(0.0086)	(0.0207)	(0.0224)	(0.0267)	(0.167)	(0.0116)	(0.0281)	(0.0396)
With 20-49 employees	-0.454	0.0044	0.0195	0.0594	-0.0151	-0.0682	0.203	-0.0180	-0.0307	0.0486
	(0.295)	(0.0031)	(0.0125)	(0.0376)	(0.0204)	(0.0486)	(0.298)	(0.0277)	(0.0436)	(0.0711)
With 50-249 employees	-0.216	0.0019	0.0084	0.0275	-0.0033	-0.0345	0.444	-0.0360	-0.0708*	0.1067
	(0.277)	(0.0023)	(0.0103)	(0.0346)	(0.0091)	(0.0466)	(0.282)	(0.0263)	(0.0414)	(0.0672)
With 250-499 employees	-0.031	0.0002	0.0011	0.0038	-0.0000	-0.0051	0.652**	-0.0488*	-0.1070**	0.1558**
	(0.293)	(0.0023)	(0.0105)	(0.0364)	(0.0014)	(0.0494)	(0.299)	(0.0267)	(0.0452)	(0.0710)
With at least 500 employees	-0.251	0.0022	0.0099	0.0322	-0.0045	-0.0399	0.472	-0.0378	-0.0756	0.1134
	(0.300)	(0.0026)	(0.0116)	(0.0378)	(0.0114)	(0.0497)	(0.309)	(0.0276)	(0.0468)	(0.0737)
Private sector	0.244	-0.0024	-0.0104	-0.0317	0.0074	0.0370	0.217	-0.0149	-0.0365	0.0514
	(0.170)	(0.0019)	(0.0076)	(0.0221)	(0.0111)	(0.0263)	(0.174)	(0.0120)	(0.0292)	(0.0411)
Single establishment	0.179	-0.0017	-0.0077	-0.0233	0.0054	0.0272	-0.157	0.0108	0.0265	-0.0373
	(0.117)	(0.0013)	(0.0053)	(0.0152)	(0.0081)	(0.0181)	(0.120)	(0.0083)	(0.0201)	(0.0283)
Company level bargaining	0.199	-0.0023	-0.0096	-0.0265	0.0107	0.0276	0.207	-0.0149	-0.0344	0.0493
	(0.214)	(0.0026)	(0.0106)	(0.0285)	(0.0142)	(0.0300)	(0.225)	(0.0163)	(0.0375)	(0.0537)
Higher than company level	0.313*	-0.0034	-0.0145	-0.0411*	0.0142	0.0448*	0.222	-0.0159	-0.0370	0.0530
	(0.177)	(0.0024)	(0.0094)	(0.0236)	(0.0161)	(0.0251)	(0.189)	(0.0143)	(0.0310)	(0.0452)
Mixed level	0.344*	-0.0037	-0.0158	-0.0452*	0.0148	0.0498*	0.077	-0.0059	-0.0126	0.0185
	(0.205)	(0.0026)	(0.0102)	(0.0269)	(0.0171)	(0.0302)	(0.214)	(0.0163)	(0.0349)	(0.0512)
Workers with an OEC	0.001	-0.00001	-0.0001	-0.0002	0.0000	0.0002	0.005*	-0.0003*	-0.0008*	0.0012*
	(0.003)	(0.00003)	(0.0001)	(0.0004)	(0.0001)	(0.0004)	(0.003)	(0.0002)	(0.0005)	(0.0006)
Female workers	-0.001	0.00001	0.0001	0.0002	-0.0000	-0.0002	0.005	-0.0003	-0.0008	0.0011
	(0.003)	(0.00003)	(0.0001)	(0.0004)	(0.0001)	(0.0005)	(0.003)	(0.0002)	(0.0006)	(0.0008)
Workers with a university degree	-0.000	0.000001	0.0000	0.0000	-0.0000	-0.0000	0.002	-0.0001	-0.0003	0.0005
	(0.003)	(0.00003)	(0.0001)	(0.0004)	(0.0001)	(0.0004)	(0.003)	(0.0002)	(0.0005)	(0.0007)
Part-time workers	0.002	-0.00002	-0.0001	-0.0002	0.0001	0.0003	0.001	-0.0001	-0.0002	0.0003
	(0.003)	(0.00003)	(0.0001)	(0.0005)	(0.0001)	(0.0005)	(0.003)	(0.0002)	(0.0006)	(0.0008)
N	1,204						1,212			

Notes: The multilevel mixed-effects ordered logistic model is given in equation (6) in the text. The estimation sample in this case is restricted to establishments with a works council and has a basis in the merged MM-ER dataset. The variable *Management can be trusted* is based on the variable q42a_c described in Appendix Table 3. Industry (seventeen, 2-digit NACE sectors) and establishment size (four groups) are also included in the regression. In column A, the log-likelihood ratio statistic is equal to 63.25 (p-value: 0.000). In column B, the null of an ordinary ordered

logistic model is not rejected against the multilevel mixed-effects ordered logistic model. In this case the results are obtained from an ordered logistic model. ***, ** and * denote statistical significance at the 0.01. 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.
Source: ECS2013 merged data file.

Table 6: Establishment Performance, Management Practices (MPs), and Management-Employee Dissonance

Variable	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
Overall index of MPs	0.530**	-0.0030*	-0.0202**	-0.0643**	0.0064	0.0811**	0.514**	-0.0330**	-0.0873**	0.1202**
	(0.212)	(0.0018)	(0.0096)	(0.0261)	(0.0232)	(0.0346)	(0.212)	(0.0140)	(0.0358)	(0.0492)
Dissonance_1	-0.713***	0.0041**	0.0271***	0.0864***	-0.0086	-0.1090***	-0.045	0.0029	0.0076	-0.0105
	(0.144)	(0.0020)	(0.0089)	(0.0186)	(0.0310)	(0.0274)	(0.144)	(0.0092)	(0.0244)	(0.0336
Dissonance_2	-1.260***	0.0072**	0.0479***	0.1527***	-0.0152	-0.1926***	-0.549**	0.0352**	0.0932**	-0.1285**
	(0.222)	(0.0035)	(0.0150)	(0.0293)	(0.0548)	(0.0446)	(0.230)	(0.0152)	(0.0388)	(0.0535)
Private sector	0.079	-0.0005	-0.0030	-0.0096	0.0010	0.0121	0.204	-0.0131	-0.0347	0.0478
	(0.177)	(0.0010)	(0.0068)	(0.0215)	(0.0041)	(0.0272)	(0.179)	(0.0116)	(0.0304)	(0.0418)
Single establishment	0.096	-0.0006	-0.0036	-0.0116	0.0012	0.0146	-0.177	0.0114	0.0302	-0.0416
	(0.123)	(0.0007)	(0.0048)	(0.0149)	(0.0044)	(0.0189)	(0.124)	(0.0081)	(0.0211)	(0.0290)
Company level bargaining	0.263	-0.0018	-0.0116	-0.0332	0.0103	0.0364	0.253	-0.0164	-0.0431	0.0595
	(0.224)	(0.0018)	(0.0104)	(0.0283)	(0.0147)	(0.0316)	(0.234)	(0.0152)	(0.0398)	(0.0549)
Higher than company level	0.380**	-0.0025	-0.0161*	-0.0472**	0.0117	0.0541**	0.193	-0.0128	-0.0328	0.0455
	(0.189)	(0.0018)	(0.0096)	(0.0240)	(0.0185)	(0.0269)	(0.189)	(0.0132)	(0.0317)	(0.0448)
Mixed level	0.445**	-0.0029	-0.0184*	-0.0548**	0.0116	0.0645**	-0.032	0.0023	0.0053	-0.0077
	(0.215)	(0.0020)	(0.0104)	(0.0269)	(0.0209)	(0.0324)	(0.222)	(0.0160)	(0.0366)	(0.0526)
Workers with an OEC	0.002	-0.0001	-0.0001	-0.0002	0.00002	0.0003	0.005	-0.0003	-0.0008	0.0011
	(0.003)	(0.00002)	(0.0001)	(0.0003)	(0.00008)	(0.0004)	(0.003)	(0.0002)	(0.0005)	(0.0007)
Female workers	-0.003	0.00002	0.0001	0.0004	-0.00004	-0.0005	0.003	-0.0002	-0.0006	0.0008
	(0.003)	(0.00002)	(0.0001)	(0.0004)	(0.00015)	(0.0005)	(0.003)	(0.0002)	(0.0006)	(0.0008)
Workers with a university degree	-0.004	0.00002	0.0001	0.0004	-0.00004	-0.0005	0.002	-0.0001	-0.0003	0.0004
	(0.003)	(0.00002)	(0.0001)	(0.0004)	(0.00016)	(0.0005)	(0.003)	(0.0002)	(0.0005)	(0.0007)
Part-time workers	0.002	0.00001	-0.0001	-0.0003	0.00003	0.0003	0.001	-0.0001	-0.0002	0.0002
	(0.004)	(0.00002)	(0.0001)	(0.0004)	(0.00010)	(0.0006)	(0.003)	(0.0002)	(0.0006)	(0.0008)
N	1,123						1,131			

Notes: See notes to Table 5. The multilevel mixed-effects ordered logistic model is given in equation (7) in the text. Dissonance_1 and Dissonance_2 are based on raw variables KCLIMATE and q44. They are described in Appendix Table 3. In column A, the log-likelihood ratio statistic is equal to 74.93 (p-value: 0.000). In column B, the null of an ordinary ordered logistic model is not rejected against the multilevel mixed-effects ordered logistic model. In this case the results are obtained from an ordered logistic model. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively; standard errors are given in parentheses.
Source: ECS2013 merged data file.

Appendix Table 1: Selected Management Practices and Domains

Domains	Items
1-Work organization practices and monitoring (3 items)	Use of information systems; monitoring of quality of production processes or service delivery; monitoring of external ideas or technological developments.
2-Team working (1 item)	Use of groups of people working together with a shared responsibility and varying degree of autonomy.
3-Performance appraisal (1 item)	Proportion of performance appraisal or evaluation interview.
4-Incentive/performance-based pay (5 items)	Use of payment by results; extra pay linked to the individual performance; extra pay linked to the performance of the team; extra pay linked to the results of the company (profit sharing); extra pay linked to ownership schemes.
5-Employee involvement (7 items)	Use of practices designed to involve employees in how work is organized: regular meetings, regular staff meetings; meetings of a temporary group/committee/ad-hoc group; dissemination of information through newsletters, website, notice boards, email; discussions with employees through social media or in online discussion; suggestion schemes, and employee surveys among employees.

Notes: A full description of each practice is given in Appendix Table 2A. Two extra domains, namely 6-Skill development/training and 7-Provision of information to employees and participation in decision making, were not included in our set of selected management practices. In the former case, the exclusion is due to the fact that the Management Questionnaire only provides information on the proportion of employees who receive on- and off-the-job training, not on the qualitative nature of the practice. In the latter case, the information is based on the set of establishments with a major organizational change, an extra restriction that implies a further reduction of approximately one-third in the size our estimation sample.

Appendix Table 2A: Description of the Selected Management Practices

Domain	Practice	Survey variable in the raw dataset	Description
1-Work organization practices and monitoring (3 items)	Use of information systems	EINFSYS	0-1 ordinal variable in ascending order: 0 if establishment does not use information systems to minimize supplies or work-in-process; 1 otherwise. (These practices are sometimes known as just-in-time or lean production systems or as working according to a zero-buffer principle.)
	Monitoring of production processes	EMONQUA	0-2 ordinal variable in ascending order: 0 if establishment does not monitor the quality of its production processes or service delivery; 1 if it does so intermittently; 2 if it does so on a continuous basis.
	Monitoring of external ideas	EEXTEMON	0-2 ordinal variable in ascending order: 0 if establishment does not monitor external ideas or technological developments for new or changed products, processes or services; 1 if it is a part of the responsibilities of general staff; 2 if it does so using staff assigned specifically to the task.
2-Team work (1 item)	Team work	FTEAMEX and FTAUTON	0-2 ordinal variable in ascending order: 0 if no team is present; 1 if tasks to be performed by the team are distributed by a superior; 2 if there is a team and team members decide among themselves. Note that a team is a group of people working together with a shared responsibility for the execution of allocated tasks, within or across units of the establishment.
3-Performance appraisal (1 item)	Performance appraisal	HAPRAIPC	0-6 ordinal variable in ascending order: 0 if the percentage of employees who have a performance appraisal or evaluation interview at least once a year is 0%; 1 if less than 20%; 2 if 20 to 39%; 3 if 40 to 59%; 4 if 60 to 79%; 5 if 80 t0 99%; 6 if 100%.
4-Incentives/performance-based pay (5 items)	Payment by results	HVBPRES	0-1 ordinal variable in ascending order: 1 if payment by results (for example, piece rates, provisions, brokerages or commissions); 0 otherwise.
	Extra pay linked to individual performance	HVPINPER	0-1 ordinal variable in ascending order: 1 if variable extra pay linked to the individual performance following management appraisal; 0 otherwise.
	Extra pay linked to team performance	HVPGRPE	0-1 ordinal variable in ascending order: 1 if extra pay linked to the performance of the team, working group or department; 0 otherwise.
	Profit sharing	HVPPRSH	0-1 ordinal variable in ascending order: 1 if variable extra pay linked to the results of the company or establishment (profit sharing scheme); 0 otherwise.
	Ownership scheme	HVPSHOW	0-1 ordinal variable in ascending order: 1 if variable extra pay in form of share ownership scheme offered by the company; 0 otherwise.
5-Employee involvement (7 items)	Regular meetings	E1_A	0-1 ordinal variable in ascending order: 1 if regular meetings between employees and immediate manager; 0 otherwise.
	Regular staff meetings	E1_B	0-1 ordinal variable in ascending order: 1 if regular staff meetings open to all employees at the establishment; 0 otherwise.
	Ad hoc groups	E1_C	0-1 ordinal variable in ascending order: 1 if meetings of a temporary group or committee or ad-hoc group; 0 otherwise.
	Newsletters, website and email	E1_D	0-1 ordinal variable in ascending order: 1 if dissemination of information through newsletters, website, notice boards, email, etc.; 0 otherwise.
	Social media	E1_E	0-1 ordinal variable in ascending order: 1 if discussions with employees through social media or in online discussion boards; 0 otherwise.
	Suggestion schemes	E1_F	0-1 ordinal variable in ascending order: 1 if suggestion schemes (the collection of ideas and suggestions from the employees, voluntary and at any time, traditionally by means of a 'suggestion box'); 0 otherwise.
	Employee surveys	E1_G	0-1 ordinal variable in ascending order: 1 if employee surveys among employees; 0 otherwise.

Appendix Table 2B: Distribution of Management Practices (MPs) by Works Council Type ('Constructive [or otherwise]' as Perceived by Management), in Percent

(a) Domains 1, 2, 4, and 5

	Establishments without a works council			Establishments with a works council					
				Works council is constructive			Works council is not constructive		
	0	1	2	0	1	2	0	1	2
1-Work organization practices and monitoring (3 items)									
Use of information systems (0-1 ordinal variable)	57	43		31	69		40	60	
Monitoring of production processes (0-2 ordinal variable)	4	15	81	2	13	85	4	11	85
Monitoring of external ideas (0-2 ordinal variable)	32	33	35	17	33	50	27	31	42
2-Team work (1 item; 0-2 ordinal variable)	22	50	28	13	60	27	15	63	22
4-Incentive/performance-based pay (5 items; 0-2 ordinal variable)									
Payment by results	62	38		51	49		59	41	
Extra pay linked to individual performance	54	46		37	63		39	61	
Extra pay linked to team performance	78	22		63	37		70	30	
Profit sharing	66	34		50	50		52	48	
Ownership scheme	96	4		87	13		92	8	
5-Employee involvement (7 items; 0-2 ordinal variable)									
Regular meetings	11	89		8	92		11	89	
Regular staff meetings	46	54		30	70		43	57	
Ad hoc groups	53	47		29	71		32	68	
Newsletters, website and email	30	70		9	91		7	93	
Social media	88	12		78	22		87	13	
Suggestion schemes	52	48		36	64		41	59	
Employee surveys	53	47		37	63		48	52	

(b) Domain 3

3-Performance appraisal (single item; 0-6 ordinal variable)	0	1	2	3	4	5	6
Establishments without a works council	17	6	9	9	4	6	50
Establishments with a constructive works council	5	7	8	10	6	9	55
Establishments with a non-constructive works council	8	9	9	7	5	13	50

Notes: The selected management practices are ordered variables on either 0-1, 0-2 or 0-6 scales (as described in Appendix Table 2A), with each column of the table reporting the share in the corresponding category. The works council type is based on the variable er15a, described in Appendix Table 3. Using the alternative variable, er15b, produces a largely similar distribution. In that case, the management respondent is asked whether the involvement of the employee representation leads to considerable delays in important management decisions. Both variables used to define works council type are described in Appendix Table 3.

Appendix Table 3: Definition of the Overall Management Practice (MP) Indexes, Establishment Performance, and the Control Variables

Variables	Survey variable in the raw dataset	Definition
Overall management practice:		
Overall management practice index (domains 1 through 5)		Given by the unweighted average over the z-scores on individual domains 1 through 5.
Overall management practice index (based on raw scores of domains 1 through 5)		Given be the sum over all raw scores in domains 1 through 5. The variable is contained in the 0-25 closed interval.
Performance:		
Financial situation	KFINAN	Ordered variable on a 1 to 5 scale: 1 is the lowest level.
Labor productivity growth	KLABPRCH	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.
Workplace representation:		
Works council		1/0 dummy: 1 if there is a works council at the workplace.
Type of works council: (based on question ER15A)		
Works council is constructive (management view)	er15a	1/0 dummy: 1 if management strongly agrees/agrees that the works council is constructive in finding ways to improve workplace performance.
Type of works council: (alternative based on question ER15B)		
Works council delays management decisions (management view)	er15b	1/0 dummy: 1 if management strongly agrees/agrees that the involvement of the works council often leads to considerable delays in important management decisions.
Employee (representative) trust:		
Management can be trusted	q42a_c	1/0 dummy: 1 if the employee representative strongly agrees/agrees that management can be trusted.
Collective agreement:	Er12	
No collective agreement		1/0 dummy: Individual agreement (i.e., no collective agreement).
Company level		1/0 dummy: Company-level agreement.
Higher than company level		1/0 dummy: Higher than company-level agreement.
Mixed level		1/0 dummy: Mixed-level agreement (i.e., company-level and higher than company-level).
Workforce composition:		
Workers with an OEC	q33perm	Percentage of employees who have an open-ended contract (OEC).
Female workers	q33wom	Percentage of employees who are female.
Workers with a university degree	q33univ	Percentage of employees who have a university degree.
Part-time workers	q33pt	Percentage of employees who work part-time (i.e., fewer hours than the usual full-time arrangement).
Single establishment	ASINGLE	1/0 dummy: 1 if single independent company or organization.

Private sector	APRIVATE	1/0 dummy: 1 if establishment belongs to the private sector.
Management-employee dissonance:		Management-employee dissonance is based on the separate views of management and employee representative. Management states the opinion on the general work climate at the establishment (raw variable KCLIMATE) and whether the employee representation can be trusted (er15e); in turn the employee representative states the opinion on the general work climate (q44), on whether management can be trusted (q42a_c), and whether the relationship between management and the employee representation can be described as hostile (q20_c). Their opinions are respectively coded as 1/0 dummies as follows: KCLIMATE_D: 1 if the general work climate in the establishment is very good or good; er15e_D: 1 if the management agrees or strongly agree that the employee representation can be trusted; q44_D: 1 if the general work climate in the establishment is very good or good; q42a_c_D: 1 if the employee representative agrees or strongly agrees that management can be trusted q20_c_D: 1 if the employee representative agrees or strongly agrees that relationship between management and the employee representation can be described as hostile. The definition of the Dissonance_1 and Dissonance_2 variables (together with the reference category) used in Table 6 are given in the last three rows of this table. The five supplementary alternative dissonance measures, based on KCLIMATE and q20_c, KCLIMATE and q42a_c, er15e and q42a_c, er15e and q44, and er15e and q20_c, respectively, are coded in an identical manner.
Dissonance_1		1/0 dummy: 1 if KCLIMATE_D = 1 and q44_D = 0
Dissonance_2		1/0 dummy: 1 if KCLIMATE_D = 0 and q44_D = 1
(Reference category)		1/0 dummy: 1 if KCLIMATE_D = 1 and q44_D = 1. All cases in which KCLIMATE_D = 0 and q44_D = 0 are discarded.

Notes: The dataset also comprises six distinct sectors and three establishment size groups (10 to 49, 50 to 249, and at least 250 employees), other than in Table 6 where the computations are based on the ECS2013 merged dataset and comprise eighteen distinct sectors and five establishment size groups (10 to 19, 20 to 49, 50 to 249, 250 to 499, and at least 500 employees).
Sources: 2013 ECS, Management and Employee Representative Questionnaires; and ECS2013 merged data file.