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Reconciling the opposing economic effects of works councils across databases

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Abstract:

Recent studies on the economic effects of works councils in Germany using the European Company Survey estimate a significant negative effect of works councils on establishment productivity and profitability. These results are in stark contrast to studies using the IAB Establishment Panel estimating a significant positive effect of works councils on establishment productivity and profitability. This article scrutinises these empirical approaches. While sample selection and control variables have a substantial impact on the magnitude of marginal effects, the definition of the dependent variable as an objective or subjective measure causes the opposing signs. Beyond that, similar measures in both datasets lead to comparable marginal effects highlighting the relevance of the definition of the dependent variable for inferences and interpretation of studies about the effectiveness of industrial relations institutions and raising questions about the validity of the performance measures.

JEL classifications: J53, M54

Keywords: works councils, codetermination, profitability

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Introduction

A valid and reliable measure of firm performance enables researchers in industrial relations to examine whether industrial relations institutions such as works council have an impact on the economic performance of firms. Such quantitative assessment allows researchers to understand the conditions under which industrial relations institutions improve firm performance and politicians and civil servants to develop a regulatory framework that enables beneficial societal outcomes. Particularly, the economic effects of works councils in Germany have been on the research agenda because works council rights limit managers right-to-manage with the promise of potential gains in profitability, wages and working conditions.

An extend literature estimates a positive effect of German works councils on productivity (among others: Addison et al. 2001; Hübler and Jirjahn 2003; Wagner et al. 2006; Müller 2011, Müller and Jirjahn, 2014; Brändle 2017; Müller and Neuschäffer 2020) and profitability (Mohrenweiser and Zwick 2009; Müller 2012; Müller and Neuschäffer 2020). The German experience with works councils was among the justifications of the European Union to incorporate Information and Consultation Rights for employees (ICE) in a European Directive in 2002 (Addison et al. 2020). The directive requires EU countries to implement works councils with mandatory information and consultation rights into national laws. Even if these rights fall short of the additional codetermination rights enjoyed by employees in Austria, Germany, or the Netherlands, the directive introduced statutory and robust information and consultation rights in EU employment law and represented a fundamental shift in power particularly in Southern European and Anglo-Saxon countries (Gollan and Wilkinson 2007; Hall et al. 2013).

In recent years, a couple of Pan-European studies analyse the economic effects of works councils in Europe based on the 2002 ICE directive (van den Berg et al. 2013; Addison and Teixeira 2020; Addison et al. 2020). These empirical studies, however, find consistently robust negative effects of works councils on productivity and profitability which contradict the findings in Germany. These studies use the European Company Survey (ECS), a repeated cross-section establishment survey covering establishments in European countries. More importantly, empirical studies using the ECS for the Germany subsample also find a negative effect of works councils on productivity and profitability (van den Berg et al. 2013; Addison et al. 2020). These results are in stark contrast to the German works council literature that is predominantly based on the IAB Establishment Panel. This calls the understanding of the economic effects of German works councils based on statutory information and consultation rights into question.

This article scrutinises the empirical approaches underpinning the diverging works council estimates between the IAB Establishment Panel and the ECS. The article shows that while sample differences and control variables have a substantial impact on the magnitude of the marginal effects, the measurement of establishment profitability drives the opposing signs. Using an objective profitability measure based on the reported total sales minus the total value of intermediate inputs, external costs, and labour costs, the article estimates a statistically and economically significant positive effect of works councils at about four percent in the preferred specification. In contrast, a subjective valuation of the establishment's profitability leads to a statistically and economically significant negative effect of about eight percentage points. In addition, the paper estimates comparable significant negative works council effects using a range of subjective profit evaluations available in both the IAB Establishment Panel and the ECS.

The nature of the subjective and objective measure of productivity and profitability for the estimated economic effects of works councils has also been reported and discussed in Müller (2011). His analysis warrants a more thorough reflection when interpreting the economic effects of works councils based on the ECS. This article extends Müller's (2011) discussion by identifying the definition of the dependent variable as the key factor among other potential sources such as sample and control variables that drives the opposing economic effects of works councils between both datasets. The article also discusses potential explanations for the opposing estimates and consequences for interpretation.

Institutional Background

German works councils are establishment-level employee representation bodies with statutory rights for information, consultation, and codetermination based on the Works Constitution Act (WCA). The law requires works councils and employers to work in a spirit of cooperation and mutual trust considering the interest of both the establishment and its employees. The WCA grants works councils the strongest codetermination rights, in which the employer needs the consent of works councils to change policies and practices, for example in working time regulations, technical devices designed to monitor employees, payment principles and health and safety. Hence, works councils have a pivotal role in the design and implementation of work practices and policies. However, works councils are not automatic but need to be established by the workforce of an establishment. Employees might not see the necessity for statutory codetermination and do not establish a works council. In fact, only about 1/3 of eligible firms have a works council (Oberfichtner and Schnabel, 2019). Eligible are establishments with 5 and more employees but the rights of employees increase with firm size and so

increases the proportion of firms with a works council. Finally, works councils do not have the right to bargain about wages and call for strike, these two areas are preserved for unions.

Background Discussion

The effect of works councils on the profitability of establishments is ambiguous because it is the consequence of two opposing effects: a productivity enhancing effect and a rent-redistribution effect (Smith 1991; Freeman and Lazear 1995; Hübler and Jirjahn 2013; Jirjahn 2017). Works councils can increase productivity via their collective voice function which provides employees with a platform to articulate grievances instead of leaving the firm. Works councils can summarise and effectively communicate employee preferences and concerns with working conditions. Furthermore, works councils also provide a safeguarding mechanism for employees because the codetermination rights can hold managers accountable and thereby monitor management actions. This can increase trust of employees in policies and procedures and can encourage employees to share information that can increase productivity. The codetermination rights give works councils a say and veto in the design of policies and procedures and prevent managers from using such shared information purely to intensify work or reduce employment. Moreover, because of reduced employee turnover, the tenure of employees increases making human capital investments more profitable from the view of employers and employees which also increase productivity.

However, the productivity enhancing role of works councils comes at a cost for firms because the statutory rights of works councils also increase the bargaining power of employees. Employees can use their codetermination rights to negotiate better working conditions that are not matched by a productivity increase or use their power as a leverage in areas where they have no codetermination rights. Even if works councils cannot bargain about wages directly, they might use the codetermination rights to classify employees into higher pay grades or negotiate more fringe benefits. Finally, discussing and negotiating with works councils require resources on the employer side and most of the resources come in form of time of employees which additionally affect the wage costs. The theoretical approaches and empirical pattern have been recently reviewed and summarised in more detail in Jirjahn and Smith (2018), Schnabel (2020) and Mohrenweiser (2021).

Hence, it remains an empirical question if and under which conditions the productivity-enhancing effect of works councils dominates the rent-redistribution effect or vice versa. The empirical evidence in Germany points towards a productivity increasing effect of works councils (Hübler and Jirjahn 2003; Addison et al. 2006; Wagner et al. 2006; Müller 2011; Müller and Jirjahn 2014; Müller 2015; Brändle 2017; Broszeit et al. 2019; Müller and Neuschäffer 2020) and to higher wage costs (Gürtzgen 2009;

Addison et al. 2010; Elguth et al. 2014a; Brändle 2017; Hirsch and Müller 2020; Müller and Neuschäffer 2020). However, the empirical pattern regarding the profitability of works councils is more mixed.

To assess the effect of German works councils on profitability, early studies use a subjective measure for profitability based on managers response to the question about the contemporary profit situation on a five-point Likert scale. First, Addison et al. (2001) use the five-point scale as an index variable but also a dummy variable with the value one if the establishment reports a good or very good profit situation. Utilising the Hannover Firm Panel 1994-1997, a panel dataset for manufacturing firms in the federal state Lower Saxony, Addison et al. (2001) estimate a negative effect of the works council on both subjective performance variables in all regression models. Second, Dilger (2002, 2006) uses the NIFA panel 1991-1998, a panel of mechanical engineering firms, and generates a dummy variable equalling 1 if the profit situation is at least satisfying. He finds a negative correlation for all types of works councils on the subjective performance evaluation. Finally, Müller (2011) uses the IAB Establishment Panel 2001-2007, an annual survey of establishments representative for the entire German economy, and the same definition for the subjective profit situation as Addison et al. (2001). He finds a negative but insignificant effect of works councils on the subjective profit situation.

Recent studies turned to a more objective measure of profits: the capital rent defined as the sales minus intermediate inputs minus external costs minus wage costs per employee. First, Mohrenweiser and Zwick (2009) use the LIAB 1997-2002, a dataset linking the IAB Establishment Panel with the social security records of all employees in the surveyed firms. They found that works council firms have an 8.5 percent higher log capital rent than firms without a works council in an OLS regression. Second, Müller (2011) uses the IAB Establishment Panel 2001-2007 and finds a positive effect of works councils on the level of capital rent. This effect was driven by firms covered by a collective bargaining agreement. Finally, Müller and Neuschäffer (2020) use the LIAB 1998-2017 and estimate that works councils are positively associated with log capital rent. The estimates range between 15 and 18 percent depending on the specification. In contrast to the first two studies, Müller and Neuschäffer (2020) control for employee quality and thereby for potential sorting of high ability employees into works council firms.

However, all three studies rely on OLS estimates owing to the stable nature of works councils and that establishing a works council is a rare event with works council being established in less than 0.8 per cent of eligible firms annually (Jirjahn and Mohrenweiser 2016). The OLS estimates can be biased but the empirical evidence points towards an underestimation because first, employee quality is similar between firms with and without a works council at the time employees establish a works council (Müller and Neuschäffer 2020) suggesting that employee sorting does not play a prominent role.

Second, works councils are more likely to be established as a defensive mechanism in firms in economic trouble and uncertainty (Jirjahn 2009; Mohrenweiser et al. 2012; Oberfichtner 2019) suggesting that weak rather than strong firms are sorted into the works council regime. On the contrary, the findings regarding the probability of establishment closure are mixed. Addison et al. (2004) estimate a higher and Jirjahn (2012) estimates insignificant to negative effects for works council firms on establishment closure compared with firms without a works council.

The striking difference in the empirical pattern for works councils on subjective compared to objective profit measures was first noted and investigated by Müller (2011). He compares the objective and subjective performance measures using the same sample definition and same covariates. He confirms that works councils are negatively (or insignificant negatively) associated with a subjective measure but positively with the objective measure of profitability. Müller (2011) argues that the objective measure is preferred to the subjective measure because the subjective profit question in the IAB Establishment Panel misses a reference point, and it remains unclear if a participant compares the profit situation with firms of similar size, region, or industry.

The European evidence for the effect of works councils on profitability is predominantly based on the European Company Survey (ECS), a survey covering companies with 10 and more employees in Europe which is representative on the country level (see Mohrenweiser 2021 for a more detailed review of these studies). The ECS includes several subjective assessments on firm's productivity and profitability on a five-point Likert scale.

The empirical pattern based on the ECS is similar to the German studies using a subjective performance measure. First, Addison et al. (2020) use a sample of companies from the Netherlands, Austria, Luxemburg, and Germany from the 2013 ECS. They find a negative but insignificant effect of works councils on firms' financial situation (five-point Likert scale) and a significant negative effect on labour productivity growth (three categories). Second, van den Berg et al. (2013) use the ECS 2009 for Austria, the Netherlands and Germany and find a significant negative effect of works councils on the economic situation (five-point Likert scale). The effect is stronger in larger firms. Finally, Addison and Teixeira (2020) use the ECS 2009 and 2013 for all available European countries and restrict the sample to establishments with employee representation such as workplace unions, shopfloor stewards, works councils and there like. They find that the effect of works councils on the financial and economic situation (five-point Likert scales) depends on the definition of the included trust variable between employee representatives and managers. The works council coefficient is insignificant if the trust of employee representatives in managers is included but significant negative if the trust of managers in employee representatives is used.

Hence, the empirical literature suggests that the impact of works councils on profitability depends on the definition of the dependent variable. Subjective measures are more likely to produce negative and objective measures positive estimates. However, the IAB Establishment Panel, the dataset used for the majority of the German evidence and the European Company Survey have a number of further differences which will be discussed and analysed in the following sections to understand the impact of works councils on profitability.

The datasets: IAB Establishment Panel and European Company Survey

This section will first describe the design, data collection and stratification of the IAB Establishment Panel and the European Company Survey and consequently the sample restrictions for both datasets to generate two comparable datasets. I will focus on the year 2013 which I will use for comparing both datasets.

The IAB Establishment Panel is an annual establishment survey which is representative for establishments with at least one employee subjected to social security contributions in Germany. The survey is administered by the Institute for Employment Research (IAB) and funded by the German Federal Employment Agency and the German federal states (see Fischer et al. 2009; Ellguth et al. 2014b for a detailed data description). The survey focusses on the demand side of the labour market: firm's employment structure, the organisation of production and work, HR polices, and work practices. The population of the sample is the Establishment File of the German Federal Employment Agency. The IAB Establishment Panel started in 1993 and comprises about 16,000 establishments annually since 2001. The survey is stratified regarding 10 establishment size classes, 19 sectors and the 16 federal states. The majority of the survey modules are annually identical questions amended with modules that are asked bi-annually or less frequent to respond to topical developments. The interviewers approach executives with personnel responsibility in the same firms every year but many participating firms forward parts of the questionnaire to other competent persons for example to respond to accounting related questions. The panel dimension with a low panel attrition is the distinctive feature of the IAB Establishment Panel with about 84 percent of firms continuing each year. The low attrition is achieved by face-to-face interviews with professional interviewers in each participating firm typically with the same interviewer each year[1]. Non-response and interviewer effects are low or insignificant (see Ellguth et al. (2014b) for a more in-depth discussion about field work and data editing processes).

[1] A minority of establishments is contacted via email but those have a higher attrition rate.

The European Company Survey is administered by EUROFOUND on behalf of the European Commission and was collected in 2004, 2009, 2013 and 2019 (see Eurofound 2021, for more details). The ECS is a repeated cross-section dataset without a panel dimension option in EU countries plus a varying set of further countries in Europe. The survey covers work organisation, workplace innovation, HR practices, employee participation and social dialogue. The questionnaire entails a number of repeated questions in each wave augmented with new and improved questions to capture topical themes and trends. The population of the survey are establishments with 10 and more employees in all sectors except those in the NACE categories A (agriculture, forestry, and fishing), T (Activities of the household) and U (Activities of extraterritorial organisation and bodies). The population for the 2013 German sample is the yearbook of the German statistical office. The 2013 sample is stratified for three establishment size categories, NACE 1-digit sectors and country. The sample size varies per country and is about 1650 establishments for Germany in 2013. In 2013, the data have been collected by Gallop, a professional data collection firm, via telephone interviews with senior managers in charge of personnel. The response rate is 35 percent, and a detailed analysis of response rates, item non-responses and interviewer bias can be found at Eurofound (data quality report).

The key differences between the IAB Establishment Panel and the ECS is the exclusion of firms with less than 10 employees and the sectors agriculture, forestry, and fishing, households, and extraterritorial organisations in the ECS. However, firms with these characteristics are routinely dropped in empirical analysis of the economic effect of works councils in Germany[2]. Moreover, the IAB Establishment Panel is much larger and thereby allows much more detailed analyses of sub-groups particularly investigating moderating factors that affect only a small proportion of firms. It has a panel dimension, is available annually and can be linked to several additional data sources.

Hence, I exclude establishments with less than 10 employees and the sectors agriculture, forestry, and fishing, households, and extraterritorial organisations from the IAB Establishment Panel 2013. In addition, I exclude observations with item non-response which is a step with severe consequences in this case. Item non-response occurs frequently in the sales, intermediate input, and investment variables in the IAB Establishment Panel. For example, finance firms report assets and public organisations report budgets, and consequently the sales variable is not filled. In addition, many participants refuse to answer these questions making these variables notorious for item non-response

[2] Most studies of the economic effects of works councils restricted the IAB Establishment Panel to firms with more than 20 employees because smaller firms rarely have a works council and works councils in these firms have fewer rights. Moreover, these studies routinely focus on commercial enterprises and exclude charities, religious or non-profit organisations, public administrations, and mutual corporations. However, this article leaves these firms in the sample because they cannot be identified in the ECS. Excluding these firms leads to slightly stronger marginal effects of the works council.

affecting about 37 percent of all firms in this analysis. Hence, I will provide estimates for the subjective performance measure for a *restricted sample*, that includes those observations that provide information to calculate the objective profit measure and an *extended sample* which additionally includes observations that do not provide the required information to calculate the objective measure but all other relevant variables. In contrast, I use all observations without missing values in the ECS 2013.

Variable definitions

The variable definitions follow the empirical studies reviewed in the background discussion and are summarised in Table 1 together with descriptive statistics. The objective profit measure is only available in the IAB Establishment Panel and is defined as the log of total sales minus intermediate inputs and external costs[3] minus total wage bill per employee. Hence, the variable is only available for businesses that report sales resulting in dropping public administration and many finance businesses because they report budgets or assets and not sales. Sales and intermediate input and external costs are measured in the 2014 wave of the IAB Establishment Panel as they refer to the previous year. The total wage bill is measured as the gross pay in June and is multiplied by the average social security contribution of employers and extrapolated to an annual wage bill. As an additional reference to the productivity estimations, I also provide the log value added per employee defined as the log of sales minus intermediate inputs and external costs per employee.

The subjective performance measure in the IAB Establishment Panel is based on the question "Please give your assessment of the profit situation of your business in the last fiscal year (2013)". The five answer categories are "very good", "good", "satisfactory", "sufficient", and "unsatisfactory". I use the variable either as an index variable with a higher value for a better profit assessment or as a dummy variable with the value 1 if an establishment reports the first two categories "very good" and "good" and zero for the other three. An alternative measure is generated from the three categories of the question: "Did you accomplish a positive or negative annual result (net profit or net loss) in the last fiscal year? Or did you realize an approximately balanced annual result? The annual result in this context is defined as profits less expenditures." This question has not been used in previous studies because the variable has been introduced in the questionnaire in 2007 and previous studies use waves that predates the introduction of the variable. I also use an index variable with a higher value for

[3] The questionnaire defines intermediate inputs and external costs as all raw materials and supplies purchased from other businesses or institutions, merchandise, contracted wage work, external services, rents, and other costs (e.g., advertising and agency expenses, travel costs, commissions, royalties, postal charges, insurance premiums, testing costs, consultancy fees, bank charges, contributions to chambers of trade and commerce and professional associations).

higher profits and a dummy variable with the value 1 if the establishment reports a net profit and zero for the two remaining categories.

Unfortunately, The ECS uses slightly different subjective profitability assessments. The variable is based on the question “How would you rate the financial situation of this establishment?” with the five answer categories “very good”, “good”, “neither good nor bad”, “bad” or “very bad”. The variable will be used as an index variable with higher values for a more promising financial situation or as a dummy variable with the value 1 if the establishment reports a “very good” or ”good” financial situation. In addition, the ECS provides three subjective assessments comparing the situation in 2013 with the situation at the beginning of 2010. The assessments comprise the financial situation, the labour productivity, and the amount of goods and services produced with the answer categories “increased”, “remained about the same” and “decreased”. I will use these variables as index variables in robustness checks with higher values for a more positive assessment.

The key independent variable is a dummy variable with the value 1 if the establishment has a works council and zero otherwise. The works council incidence is 35.8 per cent in the extended sample of the IAB Establishment Panel and 33.2 per cent in the ECS. Both samples are comparable regarding the data restriction. The works council incidence is 32.8 per cent in the restricted sample of the IAB Establishment Panel.

The estimations are based on two sets of control variables. First, the ECS controls are those variables that are available in both datasets with the same definition. The ECS controls include a dummy about collective bargaining to control for the wider industrial relation environment that moderates the efficacy of works councils on productivity and their impact on wages. Moreover, the proportion of women, part-time employees, employees with open-ended contracts and employees with a university degree capture the diversity in the qualification and structure of the workforce. Finally, a dummy describes if the firm is a part of a company, and several dummy variables capture the stratification regarding the firm size and sectors. Unfortunately, the ECS does not entail further variables that can be mimicked in the IAB Establishment Panel and that are not potentially influenced by the works council.

The second set of control variables, the IAB EP controls, include additional variables that have an effect on the existence of a works council and the profitability of the establishment. They comprise a measure for the capital stock of the establishment derived from the establishment’s replacement investments between 2001 and 2019 using the perpetual inventory method. In addition, three dummy variables capture the state of the technical equipment. The industrial relation environment is captured by a dummy for a collective bargaining agreement. The workforce composition is described with

variables for the shares of women, part-time employees, employees with a permanent contract, apprentices, employees with an apprenticeship degree and those with a university degree as well as the churning rate. The product market competition is captured by three dummy variables describing the competition situation that the establishment faces. Moreover, the ownership structure of the establishment is described by dummy variables single-site establishment, limited enterprise, and majority foreign-owned. Finally, the stratification dummy variables comprise the firm size categories, industries, and federal states.

Findings

I start with the IAB Establishment Panel and the objective performance measures before turning to the subjective measures. Then, I describe the findings based on the ECS.

Table 2 summarises the effect of works councils on the log capital rent for the full sample in models 1-4 and for firms with 50-249 employees in models 5-8. I use the 50-249 employee bracket instead of the standard 21-300 employee bracket because of the firm-size categories provided in the ECS. Firms with a works council have a significantly higher log capital rent than firms without a works council throughout all specifications. Relying on the control variables available in the ECS (model 2), the point estimate of the works council dummy is about 6.1 percent which decreases to a profitability premium for works council firms of about 4 percent in model 3, a model including additional control variables available in the IAB Establishment Panel. Finally, I estimate a profitability premium of 5.2 percent when restricting the control variables to the variables available in older waves of the IAB Establishment Panel (model 4) and used in the studies reviewed in the background discussion[4].

Restricting the sample to firms with 50 to 249 employees returns point estimates at about half the size of the full sample that turn insignificant (models 5-8). This finding resembles the works council on productivity data pattern. Addison at al. (2001), Addison et al. (2006) and Jirjahn and Müller (2014) report that the point estimates of the works council dummy on productivity shrinks by about 50 percent between the sample with all firms and the sample with firms of 21-100 employees. Addison et al. (2001) also use one wave (Hanover Firm Panel 1994) and estimate an insignificant effect of works council on productivity while the effect remains significant in Addison et al. (2006, IAB Establishment Panel 1997-2000) and Jirjahn and Müller (2014, IAB Establishment Panel 2001-2007). Empirical studies investigating the impact of works councils on profitability have not published the results for all and

[4] I have to note that the point estimates are much lower as in Müller and Neuschäffer (2020) who estimate a works council effect on profitability of 15 – 18 percent. I can only speculate about the cause in using the IAB Establishment Panel 2013 compared to the LIAB 1998-2017. Differences in point estimates between cross-section waves have also been reported by Addison et al. (2006). Moreover, sample restrictions because of the comparability with the ECS account for slightly lower point estimates in this article.

small- and medium sized firms separately. The lower impact of works councils in smaller firms can be attributed to the fact that the voice function of works councils and short-term managerialism is less pronounced in smaller firms and therefore the safeguarding function of works councils is less prevalent. Moreover, Broszeit et al. (2019) show that the impact of an index of management practices for monitoring, targets and incentives is halve the size in firms with 50-249 employees compared to the sample with all firm sizes. This might additionally indicate that the effectiveness of productivity-enhancing management practices increases in firm size. If works councils trigger the implementation and sustainability of performance enhancing work practices (Heywood and Jirjahn 2014; Mohrenweiser 2021), works councils will also be more effective in larger firms.

The estimations for the subjective profit measures are in Table 3. The top of table 3 present the estimates for the restricted sample which comprises the same observations as in Table 2. Because only 63 per cent of establishments in the extended sample report the variables necessary to calculate the capital rent, the bottom part of the table uses an extended sample that includes establishments that did not report all variables necessary to calculate the capital rent but all others. The extended sample is comparable with the ECS sample.

Works councils are negatively associated with a good or very good profit situation across all subsamples and models. In the restricted sample, the marginal effect is about six percentage points for all firms and about eleven percentage points for establishments between 50-249 employees. The models in the top of Table 3 (restricted sample) use the same sample and the control variables as the estimations of the objective profit measure displayed in Table 2, but the results cannot be more contradicting in statistical as well as economic terms.

Another interesting pattern emerges when comparing the estimates in the restricted (top of the table) and extended sample (bottom of table 3). While all point estimates are significant negative, the marginal effects of the works council dummy are smaller in the extended than in the restricted sample. The marginal effects in the extended sample are about 60-80 percent of the size of the restricted sample. This indicates possible sample selection effects even if the consequences for the objective profitability measure are not clear.

Moreover, Table 4 shows the same regression using a slightly different dependent variable: a dummy variable whether the company made net profits. While this variable asks a less subjective question about the profitability, Table 4 shows a very similar pattern as the previous table. The works council dummy is significantly negative in all models in the extended and the restricted sample. The point estimates in the restricted sample are again higher than in the extended sample. Interestingly, the marginal effects in Table 3 and Table 4 are similar in size despite the fact that the dependent variables

are different. The dependent variable in Table 3 asks about the assessment of the profit situation based on categories from “unsatisfactory” to “very good” without giving any reference point. In contrast, the dependent variable in Table 4 asks if a net profit was achieved which should be based on the firms balance sheet. The correlation between both variables is moderate at 0.409 (Table 8). Finally, Table 5 replaces the dummy about a good profit situation (Table 3) with the original five-point index variable. The estimation shows the same data pattern as Tables 3 and 4: a significant negative point estimate and across all models and both samples.

Turning to the ECS, Table 6 shows the estimates of the works council dummy on the subjective profit dummy, here the assessment of the financial situation. The works council dummy is significantly negatively associated with the subjective financial situation with a marginal effect of 6.3 percentage points for the sample including all firm sizes and 9.7 percentage points for firms with 50-249 employees. Hence, the estimates confirm the pattern of the empirical studies described in the background discussion. Moreover, the marginal effects are quite close to the marginal effects of the IAB Establishment Panel even if the question is a bit differently framed. Finally, Table 7 summaries estimations replacing the dummy variable used in Table 6 with the original index variable and using several alternative measures: the change in the financial situation, the growth in labour productivity and growth in sales between 2010 and 2013. All these estimations provide a qualitatively similar empirical pattern: works council firms are negatively associated with all of these outcome variables.

Evaluating the opposing effects

The estimations show that works councils are positively associated with objective profitability measures but negatively associated with subjective profitability evaluations. While the sample definitions and the included control variables have an impact on the magnitude of the works council effect on both objective and subjective profitability measures, the opposing sign is determined by the choice of using an objective or subjective measure. In contrast, differently framed subjective profitability measures produce similar marginal effects which are, remarkably, comparable in size between the IAB Establishment Panel and the ECS.

The results suggest a questionable validity of the profitability measures. Convergent and discriminant validity require that two corresponding measures are stronger correlated to each other than to dissimilar measures (Wall et al. 2004). In this case, a subjective and objective profitability measure should be stronger correlated to each other than an objective productivity to an objective profitability measure. The correlation between log capital rent and the two subjective profitability measures is 0.207 (net profit) and 0.193 (good profit situation – see Table 8). Both correlations are clearly smaller than the correlation between the objective measures log capital rent and the productivity measure

log value added which is 0.843 The acid test of validity, however, is construct validity meaning that the effects of the works council on a subjective and objective performance measure should lead to the same conclusion (Wall et al. 2004) which is also not the case.

Such questionable validity casts doubts whether both the objective and subjective profitability measure address the same profit dimension. Because all profitability constructs address a similar general profitability assessment, the findings are unlikely to be caused by a general vs. a context specific measure of profitability. In contrast, the measures might differ in two other dimensions: first in the before and after-tax evaluation and second in addressing an absolute value or a relative comparison.

First, the before and after-tax evaluation might drive the difference between objective, a before-tax measure, and a subjective profitability evaluation, an after-tax measure. Firms have leeway in accounting profits. Profits depend on assumptions made in accounting, for example, about depreciation rates and costs of stock options. Moreover, tax laws allow firms bringing forward planned expenditures in good years to offset taxes or charge costs in one year with benefits spread over several years. More importantly, tax laws include particularly opportunities to offset research and innovation activities. Works council firms might have more options to offset research and development costs against profits because they are more likely to be product and process innovators (Jirjahn and Kraft 2011). Such accounting of profits and costs are not covered by the objective profit measure, but participants will probably include them when assessing subjective performance indicators. Particularly the net profit question in the IAB Establishment Panel might indicate differences in accounting profits or tax optimisation between firms with and without a works council. This might create an omitted variable bias leading to lower after-tax profits of works council firms even if they have similar before tax profits compared with firms without a works council. Hence, different accounting traditions might be a potential explanation for the differences between objective and subjective performance indicators.

Second, the objective measure addresses an absolute dimension, but the subjective measures address a relative evaluation. Individuals assessing profitability on a Likert scale naturally use a reference point to assess if the profits are very good or only satisfactory. Unfortunately, the questions about the relative profitability assessment, which is the profit situation in the IAB Establishment Panel and financial situation in the ECS, ask participants to evaluate the profitability of their establishment without clarifying the reference point. Therefore, participants might compare the profit situation with firms of similar size, or in the same region or in the same industry or with the performance in the previous year or with an unknown internal target. Particularly comparing with an internal target can

lead to a severe bias. For example, if works councils facilitate implementing and sustaining a more sophisticated set of work practices, works council firms might, consequently, have more ambitious internal profit targets. If they just hit an ambitious target or slightly miss it, managers might assess that the contemporary profits are just satisfactory or sufficient, while a similar firm without a works council might assess a lower profit as good because it compares the contemporary with previous profits. Hence, the subjective profitability assessment might contain an omitted variable bias: because works councils trigger a more data driven management, as shown by Broszeit et al. (2019), leading to higher expectations and targets, managers are more likely to have a less favourable opinion about an establishment's profitability. Hence, differences in internal targets between works council firms and firms without a works council is another potential candidate to explain the difference between objective and subjective performance evaluations without a reference point.

However, the ECS also includes questions whether performance dimensions improved, stayed similar, or deteriorated between 2010 and 2013. While these questions provide a reference point, the initial level in 2010 remains unclear. For example, a highly profitable firm might have seen a slight decrease in profitability over three years while a low profitable firm witnessed a slight increase over the same time. Nevertheless, the high productivity firm might still be much more profitable than the low productivity firm.

The lack of a clear reference category in both datasets, the IAB Establishment Panel and the ECS, is in contrast to other widely used surveys that have been employed to understand the performance effects of involvement practices such as the British WERS and datasets in the high-performance-work-system literature (Wall et al. 2004; Bryson et al. 2005). For the WERS, Forth and McNabb (2008) have shown that a subjective performance evaluation that is bound to a reference category (here industry) produces qualitatively similar results for training, incentive pay, and union recognition compared with objective performance evaluations. In contrast, Peetz (2019) discusses that management delf-delusion or overconfidence can lead to severe distortion in subjective performance measures regardless of reference categories.

Conclusions

This article demonstrates that the sign of the estimated effect of works councils on firm profitability depends on the choice of the outcome variable as an objective or subjective profitability measure. The choice of control variables and sample definitions also affects the magnitude of the marginal effects but not the sign. This finding holds for a variety of definitions of objective and subjective performance evaluations.

The article discusses several potential causes of the poor validity of the performance measures and identifies differences in accounting profits before and after-taxes and the missing reference category in most of the subjective performance questions as likely drivers for the data pattern between the objective and subjective profitability measures. The objective measures are usually seen as the benchmark for subjective evaluations. Subjective evaluations are typically easier to collect and cover a wider set of firms than objective measures, as demonstrated in the two samples in the empirical analysis above. However, subjective profit assessments might also lead to biased inferences.

Hence, the estimations of economic effects of works councils using the ECS should be taken with a pinch of salt. Particularly the negative marginal effect of the works council dummy on the subjective productivity measure is hard to reconcile with evidence from other data sources and theoretical considerations. Hence, the policy conclusions based on profitability and performance measures in the ECS are unclear which is a shame given that the ECS has a number of variables describing the functioning of works councils that the IAB Establishment Panel does not entail. These problems might not only be present in the German sample of the ECS but also in other country samples or other datasets and thereby leading to potentially biased conclusions when assessing the economic effects of industrial relations bodies.

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Tables:

Table 1: Definitions of outcome variables

variable	Definition (mean, sd)
Objective measures: ***IAB Establishment Panel***	
Capital rent	Log of (sales minus intermediate inputs minus external costs minus wage costs per employee) (11.140; 0.418)
Log value added	Log(sales minus intermediate inputs and external costs per employee) (10.755; 0.729)
Subjective measures: ***IAB Establishment Panel***	
Good profit situation	Dummy variable equals 1 if the establishment reports a good or very good profit situation in 2013, 0 otherwise (0.500; 0.500)
Net profit	Dummy variable equals 1 if the establishment reports it accomplished a net profit in 2013, 0 otherwise (0.760; 0.427)
Profit situation index	Detailed index variable of the establishments' assessment of the profit situation in 2013: 1 = unsatisfactory; 2 = sufficient; 3 = satisfactory; 4 = good; 5 = very good (3.310; 1.024)
Net profit index	Detailed index whether the establishment has accomplished an annual net loss (1), an approximately balanced annual result (2) or an annual net profit (3) in 2013 (2.661; 0.669)
Subjective measures: ***European Company Survey***	
Good financial situation	Dummy variable equals 1 if the firm reports a good or very good financial situation in 2013, 0 otherwise. (0.749; 0.434)
Financial situation index	Detailed index variable of the establishments' assessment of the financial situation in 2013: 2 = very bad/ bad (two original categories pooled); 3 = satisfactory; 4 = good; 5 = very good (3.853; 0.669)
Financial growth	Index variable of the assessment of the establishment whether the financial situation has 3 = "Improved", 2 = "remained about the same" or 1 = "worsened" between 2010 and 2013. (2.181; 0.641)
Labour productivity growth	Index variable of the assessment of the establishment whether the labour productivity has 3 = "Increased", 2 = "remained about the same" or 1 = "Decreased" between 2010 and 2013. (2.451; 0.591)
Sales growth	Index variable of the assessment of the establishment whether the amount of goods and services produced has 3 = "Increased", 2 = "remained about the same" or 1 = "Decreased" between 2010 and 2013. (2.451; 0.635)

Number of observations: 3669 IAB EP and 1273 ECS.

Table 2: Profitability regression with objective profitability measure, IAB Establishment Panel

	Full sample				50-249 employees			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Works council	0.135*** (8.52)	0.061*** (3.14)	0.040** (2.04)	0.052*** (2.61)	0.084*** (3.44)	0.032 (1.29)	0.018 (0.71)	0.021 (0.81)
ECS controls	---	yes	---	---	---	yes	---	---
EP controls	---	---	yes	---	---	---	yes	---
Alternative controls	---	---	---	yes	---	---	---	yes
Observations	3669	3669	3669	3621	1185	1185	1185	1170
R square	0.023	0.109	0.167	0.165	0.01	0.108	0.204	0.197

Dependent variable: log capital rent, estimation method, OLS with robust standard errors, t-values in parentheses; control variables reported in Table A3; ECS controls: two firm size categories, categories for share of women, employees on permanent contracts, university degree, single-site firm and 6 sector dummies; EP controls: Log capital, state of technology, collective agreements, shares of women, part-time employees, permanent employees, apprentices, employees with apprenticeship degree, and university graduates on all employees; churning rate, competition, limited company, single-site company, foreign-owned company, firm-size dummies, industry and regional dummies; alternative controls as used in Müller and Neuschäffer (2020) Log capital, state of technology, exporting firm, single-site firm, shares of women, part-time employees, skilled employees churning rate, firm-size, industry and regional dummies; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table 3: Profitability regression with subjective profitability measure, IAB Establishment Panel

	Full sample			50-249 employees		
Restricted sample	(1)	(2)	(3)	(4)	(5)	(6)
Works council	-0.065	-0.152***	-0.158***	-0.282***	-0.264***	-0.305***
	[-0.026]	[-0.060]	[-0.059]	[-0.112]	[-0.104]	[-0.112]
	(1.48)	(2.60)	(2.58)	(3.86)	(3.21)	(3.41)
ECS controls	---	yes	---	---	yes	---
Full controls	---	---	yes	---	---	yes
Observations	3669	3669	3669	1185	1183	1183
Pseudo R sq.	<0.001	0.009	0.060	0.009	0.015	0.074
Extended sample	(1)	(2)	(3)	(4)	(5)	(6)
Works council	-0.052	-0.098**	-0.083*	-0.199***	-0.202***	-0.187***
	[-0.021]	[-0.039]	[-0.031]	[-0.079]	[-0.079]	[-0.070]
	(1.53)	(2.13)	(1.73)	(3.44)	(3.12)	(2.70)
ECS controls	---	yes	---	---	yes	---
Full controls	---	---	yes	---	---	yes
Observations	5820	5820	5820	1897	1897	1895
Pseudo R sq.	<0.001	0.008	0.056	0.005	0.011	0.061

Dependent variable: dummy good profit situation, estimation method, Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; control variables: see Table 2 notes. Full results displayed in appendix Tables A5 and A6; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table 4: Profitability regression with subjective profitability measure, IAB Establishment Panel

	Full sample			50-249 employees		
Restricted sample	(1)	(2)	(3)	(4)	(5)	(6)
Works council	-0.162***	-0.243***	-0.272***	-0.296***	-0.267***	-0.317***
	[-0.050]	[-0.075]	[-0.080]	[-0.091]	[-0.081]	[-0.090]
	(3.40)	(3.80)	(4.05)	(3.67)	(2.90)	(3.18)
ECS controls	---	yes	---	---	yes	---
Full controls	---	---	yes	---	---	yes
Observations	3669	3669	3669	1184	1184	1174
Pseudo R sq.	<0.001	0.009	0.060	<0.001	0.019	0.085
Extended sample	(1)	(2)	(3)	(4)	(5)	(6)
Works council	-0.116***	-0.187***	-0.209***	-0.216***	-0.228***	-0.265***
	[-0.036]	[-0.058]	[-0.062]	[-0.067]	[-0.070]	[-0.077]
	(3.12)	(3.73)	(4.01)	(3.40)	(3.18)	(3.48)
ECS controls	---	yes	---	---	yes	---
Full controls	---	---	yes	---	---	yes
Observations	5820	5820	5820	1897	1897	1895
Pseudo R sq.	<0.001	0.008	0.056	0.006	0.013	0.061

Dependent variable: dummy net profits, estimation method, Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; control variables: see Table 2 notes, detailed results in appendix Tables A5 and A6; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Tables 5: Ordinal subjective profitability index, IAB Establishment Panel

	Profit assessment			Net profit		
Restricted sample	(1)	(2)	(3)	(4)	(5)	(6)
Works council	-0.105***	-0.174***	-0.162***	-0.229***	-0.297***	-0.319***
	(2.76)	(3.41)	(3.07)	(4.81)	(4.64)	(4.81)
mfx (cut 1)	[0.014]	[0.023]	[0.020]	[0.043]	[0.055]	[0.057]
mfx (cut 2)	[0.015]	[0.026]	[0.022]	[0.026]	[0.033]	[0.034]
mfx (cut 3)	[0.012]	[0.021]	[0.018]	[-0.069]	[-0.088]	[-0.091]
mfx (cut 4)	[-0.026]	[-0.044]	[-0.038]			
mfx(cut 5)	[-0.015]	[-0.025]	[-0.023]			
ECS controls	---	Yes	---	---	Yes	---
BP controls	---	---	Yes	---	---	Yes
Observations	3669	3669	3669	3600	3600	3600
Pseudo R sq.	<0.001	0.005	0.035	0.005	0.011	0.042
Extended sample	(1)	(2)	(3)	(4)	(5)	(6)
Works council	-0.058***	-0.103***	-0.083***	-0.146***	-0.200***	-0.225***
	(1.98)	(2.57)	(2.02)	(3.86)	(3.94)	(4.32)
mfx (cut 1)	[0.007]	[0.013]	[0.010]	[0.026]	[0.035]	[0.038]
mfx (cut 2)	[0.008]	[0.015]	[0.011]	[0.017]	[0.024]	[0.026]
mfx (cut 3)	[0.008]	[0.013]	[0.010]	[-0.043]	[-0.059]	[-0.064]
mfx (cut 4)	[-0.015]	[-0.026]	[-0.020]			
mfx(cut 5)	[-0.008]	[-0.014]	[-0.011]			
ECS controls	---	yes	---	---	yes	---
BP controls	---	---	yes	---	---	yes
Observations	5820	5820	5820	5657	5657	5657
Pseudo R sq.	<0.001	0.005	0.034	0.002	0.007	0.037

Dependent variables displayed in first row, estimation method, ordered probit, z-values for robust standard errors in parentheses, marginal effect evaluated at variable mean in brackets; cut 1 is unsatisfactory/ net loss; cut 2 is sufficient/ balanced result, cut 3 is satisfactory/ net gain, cut 4 is good and cut 5 is very good; control variables: see Table 2 notes; *** significant on 1%; ** significant on 5% and * significant on 10% level; estimations based on IAB Establishment Panel 2013.

Table 6: Profitability regression with subjective profitability measure, European Company Survey

	Full sample			50-249 employees		
	(1)	(2)	(3)	(4)	(5)	(6)
Works council	-0.065 [-0.021] (0.81)	-0.203* [-0.063] (1.89)	-0.201* [-0.061] (1.71)	-0.362** [-0.104] (2.28)	-0.340** [-0.093] (1.98)	-0.405** [-0.108] (2.16)
ECS controls	--	yes	yes	--	yes	yes
additional controls	--	--	yes	--	--	yes
Observations	1273	1273	1224	322	322	306
R square	0.001	0.022	0.049	0.015	0.053	0.113

Dependent variable: dummy good financial situation, estimation method, Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; ECS control variables: two dummies for firm size, collective bargaining agreement; proportion of women, part-time employees, employees with open-ended contract and employees with university degree, single-site firm and sector dummies; detailed results displayed in appendix Table A7; *** significant on 1%; ** significant on 5% and * significant on 10% level, estimations based on European Company Survey 2013.

Tables 7: Further subjective profitability and productivity measures in the European Company Survey

	Full sample				50-249 employees			
	Financ. perform. index	Financ. perform. growth	Labour product. growth	Sales growth	Financ. perform index	Financ. perform growth	Labour product. growth	Sales growth
Works council	-0.170** (1.97)	-0.355*** (3.88)	-0.242** (2.43)	-0.248*** (2.57)	-0.322** (2.32)	-0.549*** (3.94)	-0.352** (2.36)	-0.358** (2.44)
mfx (cut 1)	0.011	0.075	0.025	0.035	0.021	0.117	0.032	0.056
mfx (cut 2)	0.042	0.050	0.070	0.061	0.068	0.072	0.100	0.078
mfx (cut 3)	-0.018	-0.124	-0.094	-0.097	-0.018	-0.189	-0.132	-0.138
mfx (cut 4)	-0.036	---	---	---	-0.071	---	---	---
ECS controls	yes	yes	yes	Yes	yes	yes	yes	yes
Observations	1273	1260	1247	1236	322	318	309	309
Pseudo R sq.	0.013	0.0137	0.021	0.012	0.047	0.064	0.045	0.034

Dependent variables displayed in second row, estimation method, ordered probit, z-values for robust standard errors in parentheses, marginal effect evaluated at variable mean; cut 1 is very bad/ bad financial situation, decrease in financial performance, sales and labour productivity compared to 2010, cut 2 is neither good nor bad financial situation and about the same financial performance, sales and labour productivity compared to 2010, cut 3 is good financial situation and increased financial performance, sales and labour productivity compared to 2010, cut 4 is very good financial situation; control variables displayed in appendix Table A8; *** significant on 1%; ** significant on 5% and * significant on 10% level; estimations based on European Company Survey 2013.

Tables 8: Correlation between the profitability and productivity measures in the IAB Establishment Panel

		1	2	3	4	5
1	log (capital rent)					
2	log (value added)	0.843				
3	Dummy: positive profit	0.207	0.173			
4	Dummy: good profit situation	0.142	0.134	0.419		
5	Index net profit	0.193	0.148	0.933	0.409	
6	Index profit situation	0.186	0.151	0.547	0.829	0.586

N = 3669, all correlations are significant at 1 percent level, IAB Establishment Panel

Appendix

Table A1: Definitions of IAB Establishment Panel control variables

variable	Definition (mean, sd in restricted sample)
Works council	Dummy equals 1 if the establishment has a works council (0.327, 0.469)
Collective bargaining	Dummy equals 1 if the establishment is covered by a collective bargaining agreement (0.432, 0.495)
logCapital	Log capital stock calculated with the perpetual inventory method based on annual replacement investments assuming an annual depreciation rate of 10% and an annual growth rate of 5% (11.453; 3.057)
Satisfactory technology	Dummy equals 1 if the establishment uses a satisfactory production technology, zero otherwise (0.299, 0.458)
Modern technology	Dummy equals 1 if the establishment uses a modern production technology, but not the latest one (0.502, 0.500)
Latest technology	Dummy equals 1 if the establishment uses the latest production technology (0.169, 0.375)
Women	Share of the workforce that is female (0.360, 0.276)
Part-time employees	Share of the workforce that is part-time (0.083, 0.137)
permanently employed	Share of employees with an open-ended employment contract (0.941; 0.122)
Apprentices	Apprentices as a share of the workforce (0.046, 0.066)
Skilled employees	Share of the workforce with completed apprenticeship training (0.646, 0.248)
University degree	Share of the workforce with a university degree (0.087, 0.153)
Churning rate	A churning rate based on the first half of 2012. H = number of hires and S = number of separations. The rate is equal to $1 - (H-S)^2/(H+S)^2$ if $H + S > 0$ and equal to 0 if $H+S = 0$ (0.439, 0.453)
Limited liability	Dummy equals 1 if the establishment is a private limited company or stock corporation (0.792, 0.406)
Single site	Dummy equals 1 if the establishment has no subsidiaries and is not itself a subsidiary (0.739, 0.439)
Foreign owner	Dummy equals 1 if the establishment has a dominant foreign owner (0.073, 0.261)
Weak competition	Dummy equals 1 if the establishment reports weak competition on product market (0.096; 0.295)
Some competition	Dummy equals 1 if the establishment reports some competition on product market (0.399; 0.489)
Strong competition	Dummy equals 1 if the establishment reports strong competition on product market (0.475; 0.499)
Firm-size dummies	Five dummy variables capturing the number of employees.
Industry dummies	Dummy variables capturing the industry classification; 19 in the IAB EP sample and 6 in the EXCS sample
Region dummies	15 federal state dummies are included.

Number of observations: 3669.

Table A2: Definitions of European Company Survey control variables

variable	Definition (mean, sd)
Works council	Dummy equals 1 if the establishment has a works council (0.332, 0.471)
50-249 employees	Dummy variable equals 1 if the establishment employs between 50 and 249 employees (headcount) (0.253; 0.435)
250+ employees	Dummy variable equals 1 if the establishment employs 250 or more employees (0.224; 0.417)
Collective bargaining	Dummy equals 1 if the establishment is covered by a collective bargaining agreement (0.685, 0.465)
Women	Categorical variable of the percentage of women among all employees: 1 = no women, 2 = <20%, 3 = 20-39%; 4 = 40-59%; 5 = 60-79%, 6 = 80-99%, 7 only women (3.234; 1.225)
Permanent	Categorical variable of the percentage of employees with an open-ended employment contract among all employees: 1 = no one, 2 = <20%, 3 = 20-39%; 4 = 40-59%; 5 = 60-79%, 6 = 80-99%, 7 everyone (5.964; 1.270)
Part-time	Categorical variable of the percentage of employees working part-time among all employees: 1 = no one, 2 = <20%, 3 = 20-39%; 4 = 40-59%; 5 = 60-79%, 6 = 80-99%, 7 everyone (2.277; 0.985)
University	Categorical variable of the percentage of employees with a university degree among all employees: 1 = no one, 2 = <20%, 3 = 20-39%; 4 = 40-59%; 5 = 60-79%, 6 = 80-99%, 7 everyone (2.415; 1.213)
Single-site	Dummy equals 1 if the establishment has no subsidiaries and is not itself a subsidiary (0.822, 0.0.383)
Sector	Six dummy variables describing the broad sectors: manufacturing, construction, commerce and hospitality, transport and communication, financial services and real estate, other services

N = 1273

Table A3a: Profit estimations for full sample

	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
Works Council	0.135***	(8.52)	0.061***	(3.14)	0.040**	(2.04)	0.052***	(2.61)
collective bargaining			0.014	(0.94)	0.005	(0.31)	0.008	(0.49)
Women			-0.027***	(4.88)	-0.090***	(2.89)	-0.098***	(3.20)
Permanent			0.021***	(2.78)	-0.224***	(4.56)		
Parttime			-0.041***	(5.33)	0.202***	(4.50)	-0.224***	(4.52)
Apprentices					-0.225***	(2.81)	-0.211***	(2.61)
Skilled					0.068**	(2.33)	0.093***	(3.29)
University			0.038***	(4.60)	0.223***	(4.18)		
Churning					-0.002	(0.15)	-0.011	(0.72)
Log(capital)					0.022***	(7.65)	0.021***	(7.48)
satisfactory equipment					0.120***	(3.73)	0.117***	(3.57)
modern equipment					0.141***	(4.52)	0.141***	(4.42)
latest equipment					0.148***	(4.35)	0.150***	(4.33)
Export							0.071***	(4.09)
Single site			-0.059***	(3.35)	-0.049***	(2.81)	-0.055***	(3.20)
Limited firm					0.028*	(1.68)		
foreign-owned firm					0.074**	(2.45)		
weak competition					-0.019	(0.40)		
some competition					-0.016	(0.37)		
high competition					-0.031	(0.71)		
ECS stratification	--		Yes		--		--	
EP stratification	--		--		Yes		Yes	
Observations	3669		3669		3669		3621	
R square	0.023		0.109		0.167		0.165	

Dependent variable: log capital rent, estimation method, OLS with robust standard errors, t-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; the IAB EP stratification variables include 18 industries, five firm-size categories and 15 federal states; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A3b: Profit estimations for establishments with 50-249 employees

	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
Works Council	0.084***	(3.44)	0.032	(1.29)	0.018	(0.71)	0.021	(0.81)
collective bargaining			0.019	(0.71)	0.017	(0.60)	0.018	(0.65)
Women			-0.012	(1.13)	-0.003	(0.05)	-0.011	(0.18)
Permanent			0.008	(0.54)	-0.464***	(3.81)	-0.528***	(4.29)
Parttime			-0.044**	(2.37)	0.163*	(1.86)	-0.204**	(2.04)
Apprentices					-0.238**	(2.38)		
Skilled					0.079	(1.46)	0.121**	(2.36)
University			0.055***	(3.55)	0.335***	(3.75)		
Churning					0.019	(0.67)	0.015	(0.53)
Log(capital)					0.031***	(5.13)	0.031***	(5.16)
satisfactory equipment					0.099	(1.54)	0.100	(1.54)
modern equipment					0.126**	(2.03)	0.129**	(2.05)
latest equipment					0.165**	(2.48)	0.166**	(2.48)
Export							0.071**	(2.16)
Single site			-0.048*	(1.70)	-0.036	(1.29)	-0.049*	(1.76)
Limited firm					0.062	(1.44)		
foreign-owned firm					0.057	(1.25)		
weak competition					0.135*	(1.70)		
some competition					0.145*	(1.90)		
high competition					0.149**	(1.96)		
ECS stratification	--		Yes		--		--	
EP stratification	--		--		Yes		Yes	
Observations	1185		1185		1185		1170	
R square	0.01		0.108		0.204		0.197	

Dependent variable: log capital rent, estimation method, OLS with robust standard errors, t-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; the IAB EP stratification variables include 18 industries, five firm-size categories and 15 federal states; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A4a: Productivity estimations for full sample

	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
Works Council	0.435***	(17.92)	0.187***	(6.46)	0.134***	(4.98)	0.163***	(5.94)
collective bargaining			0.027	(1.13)	0.005	(0.21)	0.004	(0.16)
Women			-0.101***	(11.10)	-0.343***	(6.97)	-0.387***	(7.93)
Permanent			0.069***	(4.56)	-1.340***	(12.47)		
Parttime			-0.196***	(11.55)	0.536***	(5.89)	-1.354***	(12.53)
Apprentices					-0.849***	(5.81)	-0.848***	(5.79)
Skilled					0.297***	(6.10)	0.397***	(8.12)
University			0.156***	(13.62)	0.951***	(13.43)		
Churning					-0.021	(0.93)	-0.041*	(1.76)
Log(capital)					0.044***	(10.15)	0.043***	(9.92)
satisfactory equipment					0.145***	(2.78)	0.135**	(2.53)
modern equipment					0.184***	(3.61)	0.193***	(3.69)
latest equipment					0.210***	(3.79)	0.218***	(3.87)
Export							0.212***	(8.87)
Single site			-0.106***	(4.21)	-0.082***	(3.48)	-0.102***	(4.36)
Limited firm					0.137***	(4.84)		
foreign-owned firm					0.116***	(3.20)		
weak competition					0.003	(0.04)		
some competition					-0.009	(0.13)		
high competition					-0.055	(0.83)		
ECS stratification	--		Yes		--		--	
EP stratification	--		--		Yes		Yes	
Observations	3669		3669		3669		3621	
R square	0.078		0.295		0.408		0.394	

Dependent variable: log value added, estimation method, OLS with robust standard errors, t-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; the IAB EP stratification variables include 18 industries, five firm-size categories and 15 federal states; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A4b: Productivity estimation for establishments with 50-249 employees.

	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
Works Council	0.290***	(7.47)	0.147***	(3.86)	0.094***	(2.65)	0.102***	(2.82)
collective bargaining			0.031	(0.79)	0.028	(0.76)	0.026	(0.67)
Women			-0.081***	(5.06)	-0.253***	(2.96)	-0.249***	(2.83)
Permanent			0.043*	(1.80)	-1.546***	(6.61)		
Parttime			-0.133***	(3.93)	0.387***	(2.71)	-1.674***	(7.22)
Apprentices					-1.004***	(5.76)	-0.956***	(5.55)
Skilled					0.296***	(3.75)	0.432***	(5.58)
University			0.179***	(8.57)	1.058***	(9.10)		
Churning					0.027	(0.71)	0.016	(0.42)
Log(capital)					0.060***	(7.02)	0.061***	(7.06)
satisfactory equipment					0.075	(0.84)	0.070	(0.77)
modern equipment					0.111	(1.29)	0.117	(1.33)
latest equipment					0.158*	(1.72)	0.163*	(1.74)
Export							0.181***	(4.22)
Single site			-0.062	(1.58)	-0.046	(1.24)	-0.070*	(1.90)
Limited firm					0.115*	(1.96)		
foreign-owned firm					0.114***	(2.19)		
weak competition					0.189	(1.61)		
some competition					0.195*	(1.77)		
high competition					0.176	(1.60)		
ECS stratification	--		Yes		--		--	
EP stratification	--		--		Yes		Yes	
Observations	1185		1185		1185		1170	
R square	0.045		0.283		0.454		0.437	

Dependent variable: log value added, estimation method, OLS with robust standard errors, t-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; the IAB EP stratification variables include 18 industries, five firm-size categories and 15 federal states; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A5a: Subjective profit assessment, restricted sample IAB Establishment.

	Coef.	mfx	z-value	Coef.	mfx	z-value	Coef.	mfx	z-value
Works Council	-0.065	[-0.026]	(1.48)	-0.152***	[-0.060]	(2.60)	-0.158***	[-0.059]	(2.58)
collective bargaining				-0.014	[-0.006]	(0.30)	0.015	[0.006]	(0.30)
Women				0.032*	[0.013]	(1.76)	0.125	[0.047]	(1.20)
Permanent				0.007	[0.003]	(0.26)	0.066	[0.025]	(0.37)
Parttime				-0.052*	[-0.020]	(1.87)	-0.290	[-0.108]	(1.54)
Apprentices							-0.167	[-0.062]	(0.50)
Skilled							0.223**	[0.083]	(2.10)
University				0.040	[0.016]	(1.57)	0.180	[0.067]	(1.04)
Churning							0.035	[0.013]	(0.67)
Log(capital)							0.031***	[0.012]	(3.55)
satisfactory equipment							0.310**	[0.111]	(2.30)
modern equipment							0.577***	[0.212]	(4.34)
latest equipment							0.730***	[0.270]	(5.20)
Single site				0.006	[0.002]	(0.12)	-0.049	[-0.018]	(0.90)
Limited firm							-0.175***	[-0.065]	(2.94)
foreign-owned firm							0.118	[0.044]	(1.35)
weak competition							-0.027	[-0.010]	(0.18)
some competition							-0.262**	[-0.097]	(1.98)
high competition							-0.567***	[-0.212]	(4.28)
ECS stratification	--			Yes			--		
EP stratification	--			--			Yes		
Observations	3669			3669			3669		
Pseudo R square	<0.001			0.009			0.060		

Dependent variable: dummy good profit situation, estimation method, Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; the EP stratification variables include 18 industries, five firm-size categories and 15 federal states; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A5b: Subjective profit assessment, extended sample IAB Establishment.

	Coef.	mfx	z-value	Coef.	mfx	z-value	Coef.	mfx	z-value
Works Council	-0.052	[-0.021]	(1.53)	-0.098**	[-0.039]	(2.13)	-0.083*	[-0.031]	(1.73)
collective bargaining				-0.044	[-0.018]	(1.18)	-0.011	[-0.004]	(0.28)
Women				0.047***	[0.018]	(3.41)	0.158**	[0.059]	(1.98)
Permanent				0.022	[0.009]	(1.03)	0.064	[0.024]	(0.46)
Parttime				-0.080***	[-0.038]	(3.76)	-0.311**	[-0.117]	(2.18)
Apprentices							-0.062	[-0.023]	(0.24)
Skilled							0.243***	[0.091]	(3.00)
University				0.025	[0.010]	(1.27)	0.089	[0.033]	(0.68)
Churning							0.005	[0.002]	(0.13)
Log(capital)							0.025***	[0.009]	(4.44)
satisfactory equipment							0.266**	[0.097]	(2.55)
modern equipment							0.543***	[0.202]	(5.30)
latest equipment							0.719***	[0.268]	(6.69)
Single site				-0.039	[-0.015]	(0.99)	-0.111***	[-0.042]	(2.71)
Limited firm							-0.189***	[-0.071]	(4.09)
foreign-owned firm							-0.001	[0.000]	(0.00)
weak competition							-0.072	[-0.026]	(0.64)
some competition							-0.226**	[-0.083]	(2.24)
high competition							-0.544***	[-0.204]	(5.41)
ECS stratification	--			Yes			--		
EP stratification	--			--			Yes		
Observations	5820			5820			5820		
Pseudo R square	<0.001			0.008			0.056		

Dependent variable: dummy good profit situation, estimation method, Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; the EP stratification variables include 18 industries, five firm-size categories and 15 federal states; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A6a: Subjective net profit dummy, restricted sample IAB Establishment.

	Coef.	mfx	z-value	Coef.	mfx	z-value	Coef.	mfx	z-value
Works Council	-0.162***	[-0.050]	(3.40)	-0.243***	[-0.075]	(3.80)	-0.272***	[-0.080]	(4.05)
collective bargaining				-0.011	[-0.003]	(0.22)	-0.006	[-0.002]	(0.12)
Women				-0.004	[-0.001]	(0.22)	0.000	[0.000]	(0.00)
Permanent				0.064**	[0.019]	(2.11)	0.440**	[0.129]	(2.30)
Parttime				-0.001	[0.000]	(0.03)	-0.084	[-0.025]	(0.42)
Apprentices							-0.307	[-0.090]	(0.86)
Skilled							0.015	[0.004]	(0.13)
University				-0.035	[-0.011]	(1.30)	-0.200	[-0.059]	(1.09)
Churning							0.064	[0.019]	(1.11)
Log(capital)							0.038***	[0.011]	(4.37)
satisfactory equipment							0.350***	[0.124]	(2.73)
modern equipment							0.600***	[0.201]	(4.73)
latest equipment							0.688***	[0.225]	(5.01)
Single site				0.017	[0.005]	(0.30)	-0.027	[-0.008]	(0.46)
Limited firm							-0.204***	[-0.060]	(3.03)
foreign-owned firm							-0.124	[-0.036]	(1.34)
weak competition							-0.167	[-0.045]	(1.06)
some competition							-0.141	[-0.038]	(0.98)
high competition							-0.25*	[-0.071]	(1.77)
ECS stratification	--			Yes			--		
EP stratification	--			--			Yes		
Observations	3659			3659			3659		
Pseudo R square	0.003			0.011			0.054		

Dependent variable: dummy net profit, estimation method, Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; the EP stratification variables include 18 industries, five firm-size categories and 15 federal states; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A6b: Subjective net profit dummy, extended sample IAB Establishment.

	Coef.	mfx	z-value	Coef.	mfx	z-value	Coef.	mfx	z-value
Works Council	-0.116***	[-0.036]	(3.12)	-0.187***	[-0.058]	(3.73)	-0.209***	[-0.062]	(4.01)
collective bargaining				0.008	[0.003]	(0.21)	0.006	[0.002]	(0.13)
Women				0.019	[0.006]	(1.26)	0.065	[0.019]	(0.75)
Permanent				0.058**	[0.018]	(2.56)	0.347**	[0.103]	(2.39)
Parttime				0.001	[0.000]	(0.01)	-0.038	[-0.011]	(0.25)
Apprentices							-0.561**	[-0.166]	(2.03)
Skilled							0.042	[0.013]	(0.48)
University				-0.013	[-0.004]	(0.63)	-0.143	[-0.042]	(1.03)
Churning							0.043	[0.013]	(0.95)
Log(capital)							0.030***	[0.009]	(5.36)
satisfactory equipment							0.362***	[0.130]	(3.60)
modern equipment							0.626***	[0.212]	(6.34)
latest equipment							0.717***	[0.237]	(6.78)
Single site				0.049	[0.015]	(1.14)	0.011	[0.003]	(0.25)
Limited firm							-0.236***	[-0.070]	(4.49)
foreign-owned firm							-0.118*	[-0.035]	(1.66)
weak competition							0.075	[0.022]	(0.62)
some competition							0.063	[0.018]	(0.58)
high competition							-0.06	[-0.019]	(0.57)
ECS stratification	--			Yes			--		
EP stratification	--			--			Yes		
Observations	5820			5820			5820		
Pseudo R square	0.002			0.008			0.050		

Dependent variable: dummy net profit archived, estimation method, Probit with robust standard errors, marginal effects evaluated at variable mean in brackets and z-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; the EP stratification variables include 18 industries, five firm-size categories and 15 federal states; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A7a: Subjective assessment financial situation, dummy, full sample, ECS.

	Coef.	mfx	z-value	Coef.	mfx	z-value	Coef.	mfx	z-value
Works Council	-0.065	[-0.021]	(0.81)	-0.203*	[-0.063]	(1.89)	-0.201*	[-0.061]	(1.71)
collective bargaining				0.046	[0.027]	(0.54)	0.052	[0.016]	(0.58)
Women				-0.015	[0.012]	(0.38)	0.008	[0.002]	(0.19)
Permanent				-0.014	[0.009]	(0.45)	-0.008	[-0.002]	(0.24)
Parttime				0.052	[0.014]	(1.13)	0.061	[0.018]	(1.30)
University				0.146***	[0.011]	(3.90)	0.145***	[0.044]	(3.60)
Single-site				-0.043	[0.033]	(0.40)	0.023	[0.007]	(0.20)
Employees above 50							-0.072	[-0.022]	(1.50)
Product innovation							0.051	[0.015]	(0.52)
Process innovation							-0.117	[-0.035]	(1.20)
Appraisal							0.002	[0.001]	(0.10)
Training							0.182	[0.055]	(1.42)
Majority privately owned							0.107	[0.032]	(0.66)
Flextime							-0.001	[0.000]	(0.07)
Overtime							-0.423**	[-0.128]	(2.41)
Individual bonus							0.231***	[0.070]	(2.67)
Team bonus							0.036	[0.011]	(0.35)
Profit sharing							0.243**	[0.074]	(2.55)
Employee ownership							0.375	[0.114]	(1.64)
ECS stratification	yes			yes			yes		
Observations	1273			1273			1224		
Pseudo R square	<0.001			0.023			0.051		

Dependent variable: dummy good financial situation, estimation method, Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A7b: Subjective assessment financial situation, dummy, 50-249 employees, ECS.

	Coef.	mfx	z-value	Coef.	mfx	z-value	Coef.	mfx	z-value
Works Council	-0.362**	[-0.104]	(2.28)	-0.340**	[-0.093]	(1.98)	-0.405**	[-0.108]	(2.16)
collective bargaining				-0.088	[-0.024]	(0.50)	-0.198	[-0.053]	(1.04)
Women				0.101	[0.028]	(1.22)	0.118	[0.032]	(1.34)
Permanent				0.088	[0.024]	(1.37)	0.087	[0.023]	(1.36)
Parttime				0.044	[0.012]	(0.45)	0.004	[0.001]	(0.04)
University				0.154*	[0.042]	(1.85)	0.141	[0.038]	(1.53)
Single-site				-0.038	[-0.010]	(0.20)	-0.025	[-0.007]	(0.12)
Employees above 50							0.109	[0.029]	(1.03)
Product innovation							-0.053	[-0.014]	(0.25)
Process innovation							-0.054	[-0.014]	(0.26)
Appraisal							-0.009	[-0.003]	(0.24)
Training							-0.052	[-0.014]	(0.15)
Majority privately owned							-0.312	[-0.083]	(1.06)
Flextime							-0.038	[-0.010]	(0.94)
Overtime							-1.161**	[-0.310]	(2.45)
Individual bonus							0.301	[0.080]	(1.64)
Team bonus							-0.078	[-0.021]	(0.39)
Profit sharing							0.324*	[0.086]	(1.69)
Employee ownership							0.293	[0.078]	(0.75)
ECS stratification	yes			yes			yes		
Observations	322			322			306		
Pseudo R square	0.016			0.056			0.096		

Dependent variable: dummy good financial situation, estimation method, Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A8a: Further subjective assessments variables, full sample, ECS.

	Financial performance index		Financial performance growth		Labour productivity		Sales	
	Coef.	z-value	Coef.	z-value	Coef.	z-value	Coef.	z-value
Works Council	-0.170**	(1.97)	-0.355***	(3.88)	-0.242**	(2.43)	-0.248***	(2.57)
collective bargaining	0.042	(0.62)	-0.067	(0.94)	-0.007	(0.09)	-0.093	(1.25)
Women	-0.007	(0.23)	-0.045	(1.44)	-0.030	(0.92)	-0.061*	(1.86)
Permanent	-0.002	(0.06)	-0.039	(1.61)	-0.012	(0.45)	0.001	(0.04)
Parttime	0.036	(0.92)	0.015	(0.43)	-0.005	(0.13)	-0.006	(0.17)
University	0.087***	(3.20)	0.014	(0.49)	0.126***	(4.22)	0.085***	(2.66)
Single-site	-0.102	(1.16)	-0.033	(0.35)	-0.327***	(3.38)	-0.157	(1.62)
ECS stratification	yes		yes		yes		yes	
Observations	1273		1260		1247		1236	
Pseudo R square	0.013		0.011		0.021		0.013	

Dependent variables in first row; estimation method: ordered Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.

Table A8b: Further subjective assessments variables, 50-249 employees, ECS.

	Financial performance index		Financial performance growth		Labour productivity		Sales	
	Coef.	z-value	Coef.	z-value	Coef.	z-value	Coef.	z-value
Works Council	-0.322**	(2.32)	-0.549***	(3.94)	-0.352**	(2.36)	-0.358**	(2.44)
collective bargaining	-0.156	(1.14)	-0.333**	(2.33)	-0.208	(1.35)	-0.329**	(2.07)
Women	-0.010	(0.16)	-0.050	(0.79)	0.064	(0.90)	-0.046	(0.67)
Permanent	0.044	(0.85)	-0.084*	(1.86)	-0.031	(0.49)	-0.024	(0.41)
Parttime	0.058	(0.73)	0.046	(0.67)	0.026	(0.34)	-0.035	(0.45)
University	0.139*	(1.92)	-0.064	(1.01)	0.064	(0.96)	0.059	(0.74)
Single-site	-0.051	(0.34)	0.094	(0.63)	-0.408**	(2.54)	-0.146	(0.89)
ECS stratification	yes		yes		yes		yes	
Observations	322		318		309		309	
Pseudo R square	0.047		0.064		0.046		0.034	

Dependent variables in first row; estimation method: ordered Probit with robust standard errors, marginal effect evaluated at variable mean in brackets and z-values in parentheses; ECS stratification variables are five broad industry classifications and two firm-size categories; *** significant on 1%; ** significant on 5% and * significant on 10% level, IAB Establishment Panel 2013.