

Gralla, Rafael; Kraft, Kornelius

Working Paper

Separating introduction effects from selectivity effects: The differences in employment patterns of co-determined firms

IZA Discussion Papers, No. 7022

Provided in Cooperation with:

IZA – Institute of Labor Economics

Suggested Citation: Gralla, Rafael; Kraft, Kornelius (2012) : Separating introduction effects from selectivity effects: The differences in employment patterns of co-determined firms, IZA Discussion Papers, No. 7022, Institute for the Study of Labor (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/69371>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

IZA DP No. 7022

**Separating Introduction Effects from Selectivity Effects:
The Differences in Employment Patterns of
Co-Determined Firms**

Rafael Gralla
Kornelius Kraft

November 2012

Separating Introduction Effects from Selectivity Effects: The Differences in Employment Patterns of Co-Determined Firms

Rafael Gralla

TU Dortmund

Kornelius Kraft

*TU Dortmund
and IZA*

Discussion Paper No. 7022
November 2012

IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0

Fax: +49-228-3894-180

E-mail: iza@iza.org

Any opinions expressed here are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The Institute for the Study of Labor (IZA) in Bonn is a local and virtual international research center and a place of communication between science, politics and business. IZA is an independent nonprofit organization supported by Deutsche Post Foundation. The center is associated with the University of Bonn and offers a stimulating research environment through its international network, workshops and conferences, data service, project support, research visits and doctoral program. IZA engages in (i) original and internationally competitive research in all fields of labor economics, (ii) development of policy concepts, and (iii) dissemination of research results and concepts to the interested public.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

Separating Introduction Effects from Selectivity Effects: The Differences in Employment Patterns of Co-Determined Firms*

This study examines differences in employment growth between firms with and without works councils by separating introduction effects from potential selectivity effects. Using a difference in differences framework, we show that firms with works councils have higher employment growth before establishing a works council. However, employment growth declines after introduction. We identify the reason for lower employment growth in reduced hiring rates but constant dismissal rates.

JEL Classification: J53, J63, C23, M54

Keywords: works councils, hires, dismissals, employment growth,
difference-in-differences

Corresponding author:

Rafael Gralla
TU Dortmund
Department of Economics, Business and Social Science
Vogelpothsweg 87
44221 Dortmund
Germany
E-mail: rafael.gralla@tu-dortmund.de

* The authors thank the Research Data Centre at the Institute for Employment Research, Nuremberg for the provided data access. The financial support of the Deutsche Forschungsgemeinschaft (SFB 823, "Statistical modelling of nonlinear dynamic processes") is gratefully acknowledged.

1 Introduction

The German Works Constitution Act defines the German method of co-determination on establishment level. This Act determines the information, consultation and codetermination rights of works councils which represent employees. Among other codetermination rights, works councils have the power to affect decisions regarding hires and dismissals. It is even possible for them to oppose hires as well as dismissals in some cases.

The effect of works councils on firms' behavior has been examined several times since the mid-1980s (FitzRoy and Kraft 1985, 1987, 1990, Kraft 1986). These and subsequent studies analyze to what extent firms with and without works councils differ with respect to profitability, R&D, productivity, quits and employment¹.

A common feature of studies on works councils is that they ignore potential selectivity effects. Differences between firms have so far been explained by the existence of works councils, although it might be the case that some of these differences are not in fact caused by works councils. Specific characteristics may exist before a works council has been introduced and also favor the introduction of works councils. These specific characteristics may also affect some other variables. Therefore, the existence or introduction of a works council as well as differences in employment, hires and dismissals may be caused by an unobserved third variable. If this variable is constant over time, selectivity may seriously affect the results of existing studies. Even if the heterogeneity that encourages the establishment of a works council disappears over time, the estimated effect of introducing a works council will be biased as long as no control for selectivity has been carried out. The estimation of adoption effects, given potential heterogeneity, is essentially the topic of this paper.

Not many studies until now have considered the effects of works councils on employment growth. However the results have been discussed quite

¹ See, for example, Addison and Teixeira (2006) as well as Jirjahn (2008a, 2008b, 2010) regarding employment growth. Frick and Sadowski (1995), Backes-Gellner, Frick and Sadowski (1997), Addison, Schnabel and Wagner (2001) as well as Dilger (2002) examine hires and dismissals.

controversially. Although we cannot solve all problems, we argue that the comparison of firms before and after the adoption of a works council avoids many problems associated with a cross-sectional comparison of firms with and without such an institution. This ensures that the permanent differences between firms which at some point in time adopt a works council are not mixed up with the actual effects of a works council, and the causal interpretation is much clearer.

The results of this study are probably of use beyond the German context, since works councils have interesting and exceptional codetermination rights on employment which are not matched by rights that unions in other countries possess. This study tries to document the effects of such codetermination on employment.

To analyze in more detail the ways in which employment adjustment is realized, we also look at hiring and dismissal rates. We find that firms which introduce a works council have higher employment growth rates before the introduction actually takes place. However, after introduction, firms with works councils have lower employment growth – which in turn is the result of lower hiring rates. However, we find that the introduction of works councils has no significant influence on dismissals. Instead, firms in which a works council is introduced already have lower dismissal rates.

This paper is organized as follows: firstly we summarize the theoretical background (section 2) and the results of previous empirical studies on the impact of works councils (section 3). In section 4, we describe our methodology and the dataset. Next, we discuss our results regarding employment growth (section 5), hires and dismissals (section 6). Finally, with section 6 we draw our conclusion.

2 Theoretical background

The German Works Constitution Act increases workers' power by conceding rights to co-determination when a company hires and dismisses staff, whereby their power depends on the number of employees in an establishment.

Irrespective of establishment size, works councils have to be informed in advance of a dismissal. A works council cannot oppose a dismissal without good reason. Possible reasons for intervention are when it appears that social issues have been neglected in the selection of employees for dismissal, or when further employment might in fact be feasible (perhaps after retraining or relocation within the establishment). If an establishment has more than 20 employees, the works council has extended codetermination rights. Among other things, works councils have to participate in decisions on large-scale redundancies, hires, and the classification of employees into particular wage brackets of collective bargaining agreements².

In the case of large-scale redundancies, managers negotiate a so-called social plan (Sozialplan) with works councils which determines redundancy payments, social selection criteria regarding who will be made redundant and the establishing of an interim employment company (Transfergesellschaft). If a works council exists, dismissed employees usually change from their previous establishment to such a company where they obtain a fixed-term contract. For the duration of this contract the company pays for and provides additional training to the employees in order to decrease the likelihood of their becoming unemployed. Even if dismissals cannot be avoided in the end, a delay is more probable and this clearly has effects on adjustment costs.

In the case of hires, works councils are able to refuse a hiring if, for example, it endangers the “peaceful atmosphere in an establishment” (Betriebsfrieden), threatens the jobs of permanent staff or causes other, unjustified disadvantages. For obvious reasons dismissals are much more frequently opposed than hires.

Theoretical discussion about possible employment effects of works councils is very controversial. The theories which are relevant within the given context are participation theory, the neoclassical approach (with the variants insider-outsider theory and rent-seeking theory) and the employment security view³. On

² See Pulte (2009) for a description of the link between codetermination rights and establishment size.

³ For a more detailed theoretical discussion from different perspectives, see inter alia, Addison, Schnabel *and* Wagner (2001), Dilger (2003) as well as Jirjahn (2010).

the one hand, participation theorists argue that works councils improve the relationship between employer and employee due to better communication. This is basically an application of the exit-voice theory of Freeman and Medoff (1984). Better communication helps to avoid misunderstandings and to solve problems at the workplace. This in turn has a positive influence on job satisfaction and productivity which also affects dismissals (Backes-Gellner, Frick and Sadowski 1997). Additionally, works councils improve communication with regard to work practices (Backes-Gellner, Jirjahn and Mohrenweiser 2011).

The basic idea is that information asymmetries between employees and the management exist. Employees are able to identify, for example, potential technical or organizational improvements. However, inadequate communication channels or anxiety about possible job losses following rationalization measures prevents workers from disclosing (private) information. The explicit task of works councils is (among other aims) the exchange of information with management and to protect employees from any negative implications of this information disclosure. If the introduction of a works council enhances efficiency and implied productivity advantages lead to price reductions, demand for the produced output will increase, the number of dismissals will probably fall and hires will increase.

On the other hand, based on a neoclassical point of view, it is maintained that bargaining power and codetermination rights of works councils constrain the profit-maximizing behavior of the management. According to Jensen and Meckling (1979), the standard argument goes as follows: if works councils are such a good thing, why does the legislator exclude the employer from the decision of whether to introduce a works council? Related to that argumentation is the observation that in no other country do workers' representatives have so much power as in Germany. If codetermination enhanced efficiency, other countries would have adopted such an institution too. The insider-outsider theory (Lindbeck and Snower 1988, 2001) argues that employed insiders have an advantage in bargaining compared with unemployed outsiders because of firm-specific advantages and the possibility of hampering cooperation with newly hired workers via harassment. Works councils could be interpreted as

institutionalized insider representation, as they are surely not responsible for the interests of outsiders⁴. Another strand of literature (c.f. for a recent example Beckman, Föhr and Kräkel 2010) emphasizes that the introduction of works councils aims at increasing bargaining power and therefore this institution is regarded as a rent-seeking entity. Information, consultation and codetermination rights of works councils are assumed to prevent or at least delay necessary decisions if these decisions are not in the workers' interest. One obvious example is the case of dismissals. The power of works councils to affect decisions on redundancy payments and the selection among the employees to be dismissed according to social criteria will increase employment (adjustment) costs. Therefore, profits may be negatively affected by the existence of works councils (Frege 2002), at least as long as no counteracting efficiency effects are connected with the introduction of works councils. If this theory is true, such firms experience lower employment growth rates in the long run, as they have cost disadvantages in comparison to otherwise identical organizations.

An alternative explanation for the parallel observation of the introduction of a works council and lower employment growth rate is the following: as stated above, works councils are of particular help for employees if redundancies take place. If - for exogenous reasons - economic conditions become worse, the workforce might decide to adopt a works council in order to be better prepared for possible negotiations about the conditions and extent of dismissals (Jirjahn 2009, Kraft and Lang 2008). Thus, works councils may be the result of pessimistic expectations about the future. If these concerns become real, we will simultaneously observe the adoption of a works council and, in an extreme case, an increase in dismissals. However, in this scenario the presence of a works council would not cause dismissals. The main motivation to introduce works councils is its expected effect of employment security. This theory is difficult to test empirically, since information on expectations is needed.

⁴ The insider-outsider theory predicts that insider power is used to increase wages. Establishments with a works council pay higher wages. See, e.g. Hübler and Jirjahn (2003) as well as Addison (2010). In addition works councils also affect wage dispersion (Jirjahn and Kraft 2010).

Implications are that the adoption of a works council is negatively correlated with performance.

In contrast, if expected profitability and adoption probability are uncorrelated or even show a positive relation, a works council is not introduced in times of worsening economic conditions. The reason then is probably rent seeking (Beckmann, Föhr and Kräkel 2010).

3 Related Literature

The effects of works councils on firm behavior and performance have been examined empirically in several studies. The main focus of this field of research is the impact of works councils on factors like productivity, innovations, profitability and labor turnover. Frege (2002) as well as Addison, Schnabel and Wagner (2004) survey previous studies. Furthermore, Jirjahn (2011) surveys studies of German codetermination rights on company- and establishment-level. Our study confines itself to employment growth, hires and dismissals. In an early work, Gold (1999) estimates the effect of works councils on employment using data from the production sector of Lower Saxony. He finds that works councils reduce changes in employment. He also finds that firms with works councils more frequently complain of high dismissal costs and are also grossly overstaffed. Gerlach and Jirjahn (1999), however, use the same data and find no significant influence of works councils on employment growth. Addison and Teixeira (2006) show that works councils reduce employment growth. Relating to these results, Jirjahn (2008a) argues that the estimated effects of works councils on employment growth strongly depend on the modeling of firm size. He claims that works councils do not influence employment growth. He proves his hypothesis by showing that the effects of works councils indeed vary if different methods of specifying firm size are used. Furthermore, Jirjahn (2010) finds a positive effect of the existence of a works council on employment growth for manufacturing establishments in Lower Saxony.

Compared with employment growth, results on the influence of works councils on hires and dismissals are less conflicting. In an early work, Frick and

Sadowski (1995) show that the existence of a works council reduces dismissals significantly. They also find a negative effect on hires, although not a significant one. Addison, Schnabel and Wagner (2001) find that works councils significantly reduce hires, separations and labor turnover in general, although this result does not apply to firms with 21 to 100 employees. Dilger (2002) shows that works councils reduce hires and separations. According to his results the extent of reduction depends on the characteristics of the works councils. Cooperative works councils induce the highest reductions. Works councils which do not intervene in day-to-day business do not have a significant effect at all. Backes-Gellner, Frick and Sadowski (1997) compare the dismissal rates of firms caused by the existence of works councils. They show that the dismissal rate in firms with works councils is 2.9 percentage points lower than in firms without such an institution. They also find some evidence that works councils neither prevent dismissals in bad economic situations nor inhibit hires in growing firms.

Ellguth (2006) uses a propensity-scores-matching approach to identify differences in labor fluctuation. Using cross-sectional data, he finds that works councils reduce labor turnover. Although lower turnover is explained by a reduction in hires and dismissals, fewer hires dominate his results. However, he does not estimate introduction effects. Furthermore, the strong correlation between establishment size and the existence of a works council reduces the general validity of his results as the majority of large establishments have a works council. So it is hardly possible to match these firms with other, similar firms without a works council. Guertzgen (2007) shows that works councils can be associated with lower accession and separation rates. Her definition of the dependent variables and the estimation procedure is quite similar to our study. However, she does not distinguish between quits and dismissals and the relation between works councils and hires/dismissals is not the main purpose of her study.

A common feature of the studies mentioned above is that they ignore the potential endogeneity of the introduction of a works council. Jirjahn (2009) as well as Kraft and Lang (2008) find that employees prefer to introduce works

councils to secure their rents. Additionally, Kraft and Lang (2008) show that employees prefer to introduce a works council if they are worried about potential job losses. The adoption of a works council in turn is associated with less anxiety about becoming unemployed. However, Beckmann, Föhr and Kräkel (2010) show that works councils are mainly adopted in order to seek rents instead of sustain jobs. These studies highlight that firms with certain characteristics are more likely to adopt a works council than others. The only studies that examine adoption effects are Addison et al. (2002) and Schultz (2006). These studies use a propensity-score-matching approach and find no significant effects on differences in quits, productivity, employment growth, profits (Addison et al., 2002) as well as productivity, profitability and qualification (Schultz 2006). However, their results might be inconclusive because the introduction of a works council is a rare event and therefore usually only a small number of observations is available.

4 Data & Method

Our data is taken from the IAB Establishment Panel, which is an annual survey of more than 15,000 German establishments with at least one employee covered by social insurance. This survey is collected by the Institute for Employment Research of the German Federal Employment Agency, Nuremberg. We use survey waves of the years 1998 to 2008. The advantage of this data is that it covers a long time period. Hence, our results should not be driven by cyclical up- or downturns but rather include whole business cycles. At first, we drop all observations with less than five employees as the introduction of a works council is only relevant for firms with more than four employees. We also drop observations from companies where a works council has been abandoned, and observations from the public service, non-profit organizations as well as households. Overall, our sample contains 54,515 observations of 16,151 establishments. In this sample, we observe 242 adoptions of a works council. We also generate a subsample which only includes establishments with more than 20 employees in order to control for the robustness of our results. As already mentioned above, works councils have stronger codetermination rights

if an establishment has more than 20 employees. This subsample contains 31,918 observations of 9,874 establishments and 187 adoptions of works councils.

4.1 Variables

Our estimates can be divided into two parts. We start by estimating the effect of introducing a works council on employment growth. The growth rate is defined as $d \ln EMP_{i,t+1} = \ln EMP_{i,t+1} - \ln EMP_{i,t}$. In the second part, we estimate the effect of the introduction of works councils on hires and dismissals. The idea of this approach is to find an explanation for changes in employment growth by identifying potential changes in hires and dismissals⁵.

We define our dependent variables as the ratio of hires (dismissals) in t+1 and overall employment in t. However, the exact recording of dismissals may be complicated. To repeat, the aim of this study is to define the effect of works councils on the decision of the management whether it wants to dismiss one or more employee(s) or not. This dismissal can be done in several ways. For example, aside of a classical firing, the firm can also renounce the extension of a fixed-term contract or reject further employment after an apprenticeship has been completed. Furthermore, management is also able to reduce employment within a firm by establishing interim employment companies. In this case employees usually terminate their employment contracts by mutual consent and get a new fixed-term contract in the interim employment company. Such a company can be seen as an independent organization within the same firm which has the purpose of financing and organizing application training courses or computer training courses, etc. to improve an individual's chances of finding alternative employment.

In order to define adequately what a dismissal is, we decide to specify our dismissal rate of firm i in year t+1 as

⁵ We also tried to estimate equations with quit rates as the dependent variable, but unfortunately the computations did not converge.

$$\text{Share of dismissals}_{\text{Jan-June},i,t+1} = \frac{100 \times \sum_{\text{Jan-June},i,t+1}}{\text{Employment}_{\text{June},i,t}} \quad (1)$$

where $\sum_{\text{Jan-June},i,t+1}$ is defined as the sum of changes in employment through dismissals, termination of employment contracts by mutual consent, leaving the firm after apprenticeship or after a fixed-term contract has expired. Similarly, we define the share of hires as

$$\text{Share of hires}_{\text{Jan-June},i,t+1} = \frac{100 \times \text{Hires}_{\text{Jan-June},i,t+1}}{\text{Employment}_{\text{June},i,t}} \quad (2)$$

We restrict the share of hires and dismissals, respectively, to the first half-year because the survey only requests the information for this period.

4.2 Explanatory Variables

An influence of unions on employment change can be expected, i.e. the existence of collective bargaining agreements. Therefore, we create a dummy to account for this influence. We add also a variable *qualification* to our model to measure labor qualification effects. This variable is defined as the number of employees with a vocational degree and the number of employees with a university degree divided by total employment. Of course, this is a broad definition of qualification. It covers 68 % of the employees in our sample. Unfortunately, we are unable to divide employees into more precise qualification groups because the respective question in the survey has been changed during our sample period.

Furthermore, we add variables to consider the effect of part-time working and to consider the effect of fixed-term contracts. Both variables may be associated with higher labor turnover in firms.

There is a strong correlation between firm size and the introduction of a works council. It may also be possible that large firms have different dismissal and hiring rates caused by internal manning procedures. Additionally, large firms might have different employment growth patterns. Therefore, we include several size dummies to avoid a potentially omitted variable bias.

Clearly, employment and employment changes are determined to a large extent by demand for the produced goods. Output is probably an endogenously determined variable and therefore we refrain from using it. We could use lagged values of output growth. However, this would lead to a substantial reduction in the number of observations. Less problematic seems to be the use of two innovation dummies (*Product improved* and *New product*) as alternative and exogenous variables describing growth potential. The variables in question have unit values if the firm improved an existing product or introduced a new product. Unfortunately, the IAB Establishment Panel does not include the respective questions regularly, but only in the years 1998, 2001, 2004, 2007 and 2008. Therefore, we impute the missing observations. As a proxy for capacity utilization, we also insert profits in our model⁶. Insufficient profits are (in the presence of fixed costs) usually the result of unsatisfying capacity utilization. Hence, employment reduction is probable. The IAB Establishment Panel contains assessments of the profit situation by the management of an establishment measured according to a Likert scale⁷. We use this information to generate a dummy *Profit situation* that has unit value if the management of the establishment assesses the profit situation as 4 or 5, i.e. if it rates the profit situation as bad or very bad. We also consider the influence of plant technology by using a dummy which has unit value if the management assesses the conditions of technical facilities as 1 or 2 on a scale of 1 (up to date) to 5

⁶ It could be argued that profits are the result of economic activity and not the cause. However several studies use profits a variable explaining employment growth. Excluding this variable does not alter our results. See, e.g., Gold (1999) and Dilger (2002) for a discussion on the effects of low profits on employment.

⁷ The Likert scale contains a subjective rating of profitability beginning 1 (very good) until 5 (very bad).

(obsolete). Moreover, we add a dummy for the age of a firm which has unit value if the firm was founded before 1990⁸.

Table 1: Descriptive statistics

Variable	Mean	Std. Dev.
Employment growth	-0.018	0.164
Share of hires	5.138	10.020
Share of dismissals	2.556	6.484
Works council (existence)	0.338	0.473
Works council (adopted)	0.010	0.097
Works council (treatment group)	0.019	0.136
Works council (pre-existent)	0.328	0.470
Product improved	0.459	0.498
New product	0.113	0.316
Profit situation	0.299	0.458
Technology	0.702	0.457
Collective agreement	0.536	0.499
Limited liability	0.655	0.475
Single establishment	0.743	0.437
Qualification	0.680	0.258
Part-time contracts	0.161	0.214
Fix-term contracts	0.042	0.105
Age of estab.	0.566	0.496
Size5-20	0.415	0.493
Size21-50	0.206	0.404
Size51-100	0.119	0.324
Size101-250	0.128	0.334
Size251-500	0.069	0.253
Size>500	0.063	0.243
No. of emp.	130.362	295.915
No. of estab.		16,151
No. of obs.		54,515

⁸ The IAB panel does not contain more detailed information on foundation date if an establishment was founded before 1990.

Older firms may have structures that reduce labor turnover and may also be active in more stable markets. We also take account of the legal form of firms by a dummy variable, which has unit value if the firm in question is managed with limited liability. Limited liability could motivate the management to invest in more risky but highly profitable projects so that employment growth might increase. Moreover, we add a dummy variable that controls for the effect of being a single-plant company. We also add industry and time dummies to control for industry- and time-specific effects. Clearly differences between East and West Germany may exist. We therefore include dummies for the German Bundesländer, which are comparable to states in other countries. Table 1 displays the descriptive statistics of our data.

4.3 Measuring the effect of works councils

In order to estimate the effect of works councils, we introduce in the first step a dummy variable for their existence. This is the common method that has been used in several studies. Of course, this method neither estimates the effect of the introduction of a works council nor does it account for potential endogeneity of the introduction of works councils. It simply shows the difference between firms which have a works council and firms without it. In the next step, in order to distinguish between potential heterogeneity among firms and the effect of works councils, we use a difference-in-differences (DiD) framework. This specification includes three dummies instead of one compared with the previous version. Hence, our estimation equation becomes

$$y_{i,t+1} = \beta_0 + \beta_1 \text{Works Council}_{i,t}^{\text{adopted}} + \beta_2 \text{Works Council}_{i,t}^{\text{treatment group}} + \beta_3 \text{Works Council}_{i,t}^{\text{pre-existent}} + \gamma_1 X_{i,t} + \gamma_2 T_{i,t} + \varepsilon_{i,t} \quad (3)$$

The second works council dummy identifies the treatment group and has unit value in every year if an establishment introduces a works council during the observation period, irrespective of whether it is actually introduced or not. The purpose of this dummy is to characterize the heterogeneity between our treatment group and firms without works councils. The first works council dummy has unit value if the observed establishment is a member of the treatment group and a works council actually exists. This dummy variable identifies the effect of the introduction of a works council. Finally, a group of firms exists that have a works council during the whole observation period. We account for this group by inserting the third dummy, which has unit value if the firm has introduced a works council at some point in time before the first period that we observe. This variable captures the impact of pre-existent works councils and its coefficient can be interpreted as the sum of heterogeneity, introduction and long-run effect. Hence, ignoring this variable would underestimate the effects of treatment group and adoption. Altogether, we have three groups of firms: firms without a works council (our control group), firms that introduced a works council (the treatment group) and firms that have a works council during all periods that we observe. This approach enables us to estimate different employment policies of firms with and without works councils and to check whether observed differences are caused by the actual introduction of a works council or are due to the heterogeneous characteristics of the firm.

An assumption of the difference in differences estimator is that the timing of adoption is approximately random. This might be crucial because, as already mentioned above, the introduction of a works council could be a result of a change in the employee's expectation about economic prospects.

In the first place we have some doubts with respect to the expectation hypothesis. The only study that examines the influence of expectations on the introduction of a works council is Kraft and Lang (2008). They, however, do not find any influence of expectations regarding, sales growth, short-run

employment growth, and long-run employment on the adoption of a works council⁹.

However, even if changes in expectations are the reason for adoption, our approach still provides interesting results for the discussion about codetermined establishments. Firstly, we still identify the economic performance of an establishment before adoption. Hence, our approach still provides inference regarding the heterogeneity in employment growth between establishments which adopt a works council and establishments that do not¹⁰. Secondly, we are able to identify how these establishments perform after adoption compared to other establishments, independent of the reason for adoption.

5 Works councils and employment growth

Table 2 shows the results of OLS estimates of employment growth. Standard errors are robust and clustered at establishment level. The first column contains the results of a regression, where we only control for the existence of a works council. In line with the results of Addison and Teixeira (2006) the existence of a works council reduces employment growth. Compared to establishments without works council, codetermined establishments have a 0.9 percentage points lower employment growth rate. Jirjahn (2008a) criticized that an inadequate modeling of firm size leads to biased estimates of effects of works councils on employment growth. Therefore, we use size dummies to measure size effects. Dummies have the advantage that they are able to detect nonlinearities as well as kinks in size effects. We also experimented with alternative measures of firm size¹¹. None of our results were affected. The

⁹ We also estimated models that include short run expectations of sales growth as independent variables. Although this does not change our results, we abstain from reporting these results because of the likely endogeneity of employment growth and expected sales growth. Instead, we prefer to model changes in sales by our innovation variables.

¹⁰ We could also estimate a model, where we include time dummies and firm dummies. However, we prefer the DiD approach without firm dummies because our main interest is the identification of the group effects. In particular we want to show the effects of an adoption of a works council by comparing the firms' performance before and after that event.

¹¹ That is, we used $\ln(\text{Employment})$, Employment and Employment^2 as well as solely Employment as a measurement of size.

coefficients of our size dummies indicate a negative relation between size and growth so that a size bias, as mentioned by Jirjahn (2008a), can be rejected.

The second column shows the results of the DiD approach. In this case firms which introduce a works council can be described by a specific pattern. These firms have a two percentage points higher employment growth rate before introduction. However, the introduction reduces employment growth by 2.8 percentage points so the initially higher rate disappears.

As already mentioned above, works councils obtain additional codetermination rights if an establishment has more than 20 employees. Hence, we repeat our estimates with a subsample that only contains establishments with more than 20 employees. The last two columns in table 2 show these results. The estimated coefficients in these columns are quite similar to the previous results.

In principle the sum of the effects of adoption and treatment group should be equal to the effect of pre-existing works councils, as the latter variable estimates both effects. A difference between both influences could also point to a difference between the short-run and the long-run effect. Backes-Gellner, Jirjahn and Mohrenweiser (2011) show that the influence of a works council increases over time, which they explain by a “learning effect”. Hence, the long-run effect of a works council is stronger than the short-run impact, and this is probably reflected by the difference between the effect of pre-existing works councils and the sum of adoption and treatment group. In principle we could expand our DiD model by including lagged variables of adoption in order to identify development over time.

However, unfortunately, our sample does not allow us to estimate meaningful long-run effects due to the relatively short time horizon that we observe. On average, we observe an establishment 2.1 years before and 2.2 years after a works council has been adopted. In addition, Backes-Gellner, Jirjahn and Mohrenweiser (2011) show that the aforementioned “learning effect” implies a very slow increase in power. For example, in their dataset works councils have the strongest impact after 30 years of existence.

Table 2: OLS with employment growth as dep. variable

Estab. size Variables	Pooled OLS N > 4		Pooled OLS N > 20	
	Coeff. (std. err.)	DiD OLS Coeff. (std. err.)	Coeff. (std. err.)	DiD OLS Coeff. (std. err.)
Works council (existence)	-0.009*** (0.002)		-0.010*** (0.002)	
Works council (adopted)		-0.028*** (0.010)		-0.025** (0.010)
Works council (treatment group)		0.020*** (0.008)		0.020** (0.009)
Works council (pre-existent)		-0.008*** (0.002)		-0.009*** (0.002)
Product improved	0.015*** (0.002)	0.015*** (0.002)	0.013*** (0.002)	0.013** (0.002)
New product	0.007*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.008** (0.002)
Profit situation	-0.059*** (0.002)	-0.059*** (0.002)	-0.054*** (0.002)	-0.054*** (0.002)
Technology	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)	0.010** (0.002)
Collective agreement	-0.001 (0.002)	-0.001 (0.002)	-0.003** (0.002)	-0.003 (0.002)
Limited liability	0.010*** (0.002)	0.010*** (0.002)	0.006*** (0.002)	0.006 (0.002)
Single establishment	0.004** (0.002)	0.005*** (0.002)	0.006*** (0.002)	0.006 (0.002)
Qualification	0.009*** (0.003)	0.009** (0.003)	0.007 (0.004)	0.007 (0.004)
Part-time contracts	-0.000 (0.004)	-0.000 (0.004)	0.000 (0.006)	0.000 (0.006)
Fix-term contracts	-0.004 (0.010)	-0.004 (0.010)	-0.011 (0.013)	-0.011 (0.013)
Age of estab.	-0.008*** (0.002)	-0.008*** (0.002)	-0.010*** (0.002)	-0.010*** (0.002)
Size21-50	0.008** (0.002)	0.008*** (0.002)	Ref.	Ref.
Size51-100	0.010** (0.003)	0.010*** (0.003)	0.003 (0.002)	0.003 (0.002)
Size101-250	0.003 (0.003)	0.003 (0.003)	-0.002 (0.003)	-0.002 (0.003)
Size251-500	0.001 (0.003)	0.001 (0.003)	-0.003 (0.003)	-0.003 (0.003)
Size>500	-0.008** (0.003)	-0.008*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)
No. of obs.	54,515		31,918	
R-squared	0.06	0.06	0.07	0.07

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. State, time and industry dummies are included but not reported. Standard errors in parentheses.

The coefficients of adoption and treatment group on the one hand and pre-existing works councils on the other hand are statistically insignificant from zero at common levels of significance¹². This result leads to two different conclusions. At first, we find no learning effect because the sum of adoption effect and treatment group effect does not differ from the estimated effect of pre-existing works councils. Secondly, our results cast some doubt on the employment security hypothesis after a temporal shock. If an expected negative shock in demand leads to the introduction of a works council and the sum of the effect of adoption and treatment group does not differ from the effect of pre-existent works councils, this implies that the firms introducing works councils never recover from the initial negative shock. This may be the case for some firms, but is rather unlikely for the average of our sample. Hence, these results are more plausibly explained by the neoclassical theory, where the management adjusts employment growth as a reaction to a new situation with higher labor (adjustment) costs.

Nor do the results support the participation theory, as the companies which introduce works councils do much worse than before.

6 What explains changes in employment growth?

In a last step, we try to find the link between changes in employment growth and the employer's decisions on hires and dismissals following the introduction of a works council. In doing so, we estimate the impact of the introduction of a works council within our DiD framework as explained above.

Of course, many firms do not hire or dismiss any employees at all during a period, i.e. a large share of our dependent variables is zero. Therefore, we apply a heteroscedasticity adjusted Tobit Model to take account of this censored data structure. For this purpose, we replace the variance σ^2 in the log likelihood function by the expression $\sigma_1^2 = \sigma^2 [\exp(w_i' \alpha)]^2$, where α denotes

¹² The p-values of the $H_0: \beta_{adopted} + \beta_{treatment\ group} = \beta_{pre-existent}$ are $p_1 = 0.930$ in the first and $p_2 = 0.604$ in the second sample.

estimated parameters of the heteroscedasticity term and w_i' is a vector of several size and industry dummies¹³.

Table 3: Heteroscedastic Tobit model with share of hires as dep. variable

Variables	Pooled Het. Tobit		DiD Het. Tobit	
	N > 4		N > 20	
	Coeff. (std. err.)	Coeff. (std. err.)	Coeff. (std. err.)	Coeff. (std. err.)
Works council (existence)	-2.180*** (0.211)		-2.041*** (0.206)	
Works council (adopted)		-1.743** (0.761)		-1.605** (0.745)
Works council (treatment group)		-0.359 (0.720)		-0.415 (0.708)
Works council (pre-existent)		-2.203*** (0.219)		-2.060*** (0.213)
Product improved	0.582*** (0.122)	0.582*** (0.122)	0.451*** (0.121)	0.450*** (0.121)
New product	0.578*** (0.121)	0.580*** (0.121)	0.523*** (0.120)	0.523*** (0.120)
Profit situation	-1.277*** (0.104)	-1.276*** (0.104)	-1.138*** (0.101)	-1.136*** (0.101)
Technology	0.098 (0.106)	0.096 (0.106)	0.104 (0.104)	0.102 (0.104)
Collective agreement	-1.388*** (0.149)	-1.384*** (0.149)	-1.411*** (0.151)	-1.409*** (0.151)
Limited liability	0.821*** (0.162)	0.823*** (0.161)	0.613*** (0.162)	0.615*** (0.162)
Single establishment	0.130 (0.099)	0.129 (0.099)	0.176* (0.097)	0.175* (0.097)
Qualification	-0.798*** (0.288)	-0.797*** (0.287)	-0.711** (0.289)	-0.710** (0.289)
Part-time contracts	1.056* (0.616)	1.054* (0.615)	0.838 (0.663)	0.835 (0.663)
Fix-term contracts	23.324*** (1.509)	23.327*** (1.505)	21.455*** (1.541)	21.461*** (1.537)
Age of estab.	-1.457*** (0.149)	-1.457*** (0.149)	-1.189*** (0.148)	-1.190*** (0.148)
No. of obs.	54,515		31,918	
Chi ² -Value [LR-Test] (p-value)	18,437.49 (0.000)	18,434.45 (0.000)	10,136.72 (0.000)	10,132.96 (0.000)

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Time, industry, size and state dummies are included but not reported. Standard errors in parentheses.

¹³ See, for example, Greene (2008) for a detailed discussion on heteroscedasticity in Tobit Models and methods to estimate unbiased coefficients.

Table 3 shows the estimated results of determinants of hires. The last row contains χ^2 - and p-values of LR tests on heteroscedasticity. These tests always reject the assumption of homoscedasticity and therefore the heteroscedasticity model is the relevant one. As the magnitude of coefficients of a Tobit Model cannot directly be interpreted, we also estimate semi-elasticities in order to identify the proportional effect of works councils. These semi-elasticities are shown in table 4.

Table 4: Semi-elasticities of share of hires

Estab. Size Variables	N > 4		N > 20	
	Pooled Het. Tobit Semielasticity (std. err.)	DiD Het. Tobit Semielasticity (std. err.)	Pooled Het. Tobit Semielasticity (std. err.)	DiD Het. Tobit Semielasticity (std. err.)
Works council (existence)	-0.237*** (0.023)		-0.293*** (0.029)	
Works council (adopted)		-0.189** (0.083)		-0.231** (0.107)
Works council (treatment group)		-0.039 (0.078)		-0.060 (0.102)
Works council (pre-existent)		-0.239*** (0.023)		-0.296*** (0.030)

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Standard errors in parentheses are calculated by the delta method.

The conventional approach leads to the by now well-known result: firms with works councils hire fewer employees. We find a semi-elasticity of -0.237 in this approach¹⁴. Clearly, this effect is dominated by establishments with experienced works councils and does not identify introduction effects. The DiD approach, however, shows that the actual introduction of a works council reduces hires. The semi-elasticity of the adoption effect is -0.189 and is still significant at 5%-level. Hence, the introduction of a works council reduces the

¹⁴ Here and throughout we evaluate average semi-elasticities of our works council dummies given that the dependent variable is positive. Semi-elasticities are defined as $E(\ln(y)|d=1) - E(\ln(y)|d=0)$.

share of hires by 18.9% in the large sample (Employment > 4) and we also find a reduction of 23.0% in the small sample (Employment > 20). Using the DiD approach, we also find no significant differences in hires between treatment group establishments before introduction and establishments which do not adopt a works council. That is, we find no heterogeneity in hires between firms that will introduce a works council in later periods and firms that never adopt a works council. Additionally, the null hypothesis that the summarized effect of adoption and treatment group equals the influence of pre-existent works councils cannot be rejected¹⁵. Hence, the short-run impact of works councils on hires is quite similar to the long run effect.

Table 5 illustrates the results of the estimations on dismissals. The LR Test again rejects the hypothesis of homoscedasticity. Furthermore, table 6 contains the corresponding semi-elasticities. The estimates of pooled Tobit show a reduced share of dismissals in firms with works councils. However, using the DiD approach, it turns out that the introduction of a works council does not affect dismissals. In this case, firms which introduce a works council during the sample period generally have lower dismissal rates before adoption. Now, the impact treatment group variable explains the difference between firms with and without works councils. The estimated average semi-elasticities of dismissals are -0.217 in the large and -0.254 in the small sample. That is, shares of dismissals in firms which introduce a works council are 21.7% and 25.4% lower than dismissal rates in firms without works councils. Both average marginal effects are also significantly different from zero at 5%-level.

¹⁵ The p-values of this test are 0.882 in the large and 0.948 in the small sample.

Table 5: Heteroscedastic Tobit model with share of dismissals as dependent variable

	Pooled Het. Tobit	DiD Het. Tobit	Pooled Het. Tobit	DiD Het. Tobit
Estab. Size	N > 4	N > 4	N > 20	N > 20
Variables	Coeff. (std. err.)	Coeff. (std. err.)	Coeff. (std. err.)	Coeff. (std. err.)
Works council (existence)	-0.932*** (0.167)		-0.786*** (0.163)	
Works council (adopted)		-0.357 (0.575)		-0.455 (0.548)
Works council (treatment group)		-1.487*** (0.576)		-1.258** (0.568)
Works council (pre-existent)		-0.973*** (0.173)		-0.817*** (0.169)
Product improved	-0.121 (0.100)	-0.128 (0.100)	-0.145 (0.098)	-0.153 (0.099)
New product	-0.027 (0.094)	0.029 (0.094)	0.021 (0.093)	0.023 (0.093)
Profit situation	1.447*** (0.101)	1.453 (0.101)	1.296*** (0.094)	1.301*** (0.094)
Technology	-0.593*** (0.097)	-0.595*** (0.097)	-0.544*** (0.094)	-0.545*** (0.094)
Collective agreement	-0.298*** (0.112)	-0.307*** (0.111)	-0.362*** (0.110)	-0.374*** (0.110)
Limited liability	0.335*** (0.125)	0.340*** (0.125)	0.247** (0.122)	0.252** (0.121)
Single establishment	-0.093 (0.078)	-0.098 (0.078)	-0.098 (0.076)	-0.102 (0.076)
Qualification	-1.407*** (0.219)	-1.413*** (0.219)	-1.245*** (0.216)	-1.254*** (0.216)
Part-time contracts	0.109 (0.431)	0.080 (0.430)	0.232 (0.429)	0.199 (0.426)
Fix-term contracts	14.352*** (0.431)	14.433*** (1.311)	12.958*** (1.246)	13.046*** (1.232)
Age of estab.	-0.341*** (0.111)	-0.350*** (0.111)	-0.213** (0.109)	-0.222** (0.109)
No. of obs.	54,515		31,918	
Chi ² -Value [LR-Test] (p-value)	17,741.49 (0.000)	17,747.69 (0.000)	8,872.28 (0.000)	8,876.78 (0.000)

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Time, industry, size and state dummies are included but not reported. Standard errors in parentheses.

Table 6: Semi-elasticities of share of dismissals

Estab. Size Variables	N > 4		N > 20	
	Pooled Het. Tobit Semielasticity (std. err.)	DiD Het. Tobit Semielasticity (std. err.)	Pooled Het. Tobit Semielasticity (std. err.)	DiD Het. Tobit Semielasticity (std. err.)
Works council (existence)	-0.138*** (0.024)		-0.159*** (0.032)	
Works council (adopted)		-0.052 (0.084)		-0.092 (0.111)
Works council (treatment group)		-0.217*** (0.084)		-0.254** (0.114)
Works council (pre-existent)		-0.142*** (0.025)		0.165*** (0.034)

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Standard errors in parentheses are calculated by the delta method.

Based on the DiD estimation we conclude: before adoption, firms do not differ with regard to the hiring rate but have a lower dismissal rate compared with establishments without works councils. The introduction itself does not change dismissals but has a negative impact on hiring behavior¹⁶. To sum up, the impact of works councils takes place by affecting hires and not, as perhaps expected, by reducing dismissals. How can our findings be explained? In our view, these results are in accordance with two rival explanations, but one of the two is more likely. Of course, a works council has the legal power to inhibit hires, but apparently they oppose hires rather rarely in practice. More plausible is an intervention if dismissals are planned. Generally, works councils are able to increase dismissal costs by claiming high redundancy payments or simply by avoiding or at least delaying dismissals. One possible explanation for the observed effect on hires is the anticipation of increased dismissal costs if a works council exists and the termination of contracts is economically necessary.

¹⁶ It could be argued that a part of the reduction in hires is a result of lower quit rates. If works councils were to reduce quits, the management would diminish hires because the number of vacancies is reduced. However, our results regarding employment growth point out that the hiring effect has to overcompensate a potential quit effect. Otherwise, a reduction in employment growth should not be observed.

The co-determination rights of works councils might lead employers to reduce hiring rates because of the extended dismissal protection rights and a shift of bargaining power to the employees. This explanation is also consistent with the insider-outsider theory. Insiders raise dismissal costs by introducing works councils. Hence, employers react to the existence of works councils by not filling vacancies.

However, we already discussed the alternative possibility that the workforce introduces a works council if it is worried about the economic perspectives of the firm. If these concerns become true, fewer hires will take place in the next period. The similar magnitude of the short- and long-run effect of a works council casts doubt on the relevance of this theory. The employment security models would only be valid if the shock leading to the introduction of a works council continues for all periods we observe.

The results do not, however, support the hypothesis of participation theory that efficiency is improved by the introduction of a works council. We estimate lower employment growth after the adoption of a works council, which is inconsistent with improvements to efficiency, at least if labor costs do not rise more than productivity.

7 Conclusion

We show that differences between firms with and without works councils regarding their employment growth, hiring and dismissal behavior are not only caused by the existence of works councils. In general, firms with works councils hire and dismiss less and also have a lower employment growth than firms without works councils. Taking account of the potential heterogeneity of firms and estimating the effect of an introduction of works councils by a difference-in-differences approach, we show that the adoption of a works council is associated with fewer hires. However, works councils do not affect the share of dismissals. Consistently, we also find a reduced employment growth after introduction.

We discuss three possible explanations for the reported empirical results. The neoclassical view with its variants insider maximization and rent seeking, employment security modeling and participation theory are relevant with respect to the analysis of the effects of works councils. In our view, the neoclassical approach explains the observed results more convincingly than the other theories. However, although we use a vast dataset with more than 50,000 observations, the fact is that even more information is needed. Consideration of the introduction of works councils and the lags of these values would unfortunately greatly reduce the number of usable observations with positive values for the introduction of works councils in former years. However such variables are needed to infer the long-run effects of newly adopted works councils.

References

- Addison, John T., Lutz Bellmann, Claus Schnabel, and Joachim Wagner. 2002. The Long Awaited Reform of the German Works Constitution Act. IZA Discussion Paper No. 422, Institute for the Study of Labor, Bonn.
- Addison, John T., Claus Schnabel, and Joachim Wagner. 2001. Works councils in Germany: their effects on establishment performance. *Oxford Economic Papers* 53:659-694.
- Addison, John T., Claus Schnabel, and Joachim Wagner. 2004. The Course of Research into the Economic Consequences of German Works Councils. *British Journal of Industrial Relations* 42:255-281.
- Addison, John T., and Paulino Teixeira. 2006. The Effect of Works Councils on Employment Change. *Industrial Relations* 45: 1-25.
- Addison, John T., Paulino Teixeira, and Thorsten Zwick 2010. Works Councils and the Anatomy of Wages, *Industrial and Labor Relations Review* 63: 250-274.
- Backes-Gellner, Uschi, Bernd Frick, and Dieter Sadowski. 1997. Co-determination and personnel policies of German firms: The influence of works councils on turnover and further training. *International Journal of Human Resource Management* 8:328-347.

- Backes-Gellner, Uschi, Uwe Jirjahn, and Jens Mohrenweiser. 2011. Works Councils and Learning: On the Dynamic Dimension of Codetermination. *Kyklos* 64:427-447.
- Beckmann, Michael, Silvia Föhr, and Matthias Kräkel. 2010. Rent Seeking, Employment Security, and Works Councils: Theory and Evidence for Germany. *Schmalenbach Business Review* 62: 2-40.
- Dilger, Alexander. 2002. *Ökonomik betrieblicher Mitbestimmung*. Munich and Mering: Rainer Hampp Verlag.
- Dilger, Alexander. 2003. Economic Effects of Co-Determination. In: *The Changing Contours of German Industrial Relations*, ed. Walther Müller-Jentsch, and Hansjörg Weitbrecht, Munich and Mering: Rainer Hampp Verlag.
- Ellguth, Peter. 2006. Betriebsräte und betriebliche Personalfuktuation. In: *Institutionen und Arbeitsmarkt: Messkonzepte, Wirkungszusammenhänge und internationaler Vergleich*, ed. Herbert S. Buscher, Christian Dreger, and Ulrich Walwei, Nürnberg: IAB.
- FitzRoy, Felix, and Kornelius Kraft. 1985. Unionization, Wages, and Efficiency: Theories and Evidence from the U.S. and West Germany. *Kyklos* 38:537-554.
- FitzRoy, Felix, and Kornelius Kraft. 1987. Efficiency and Internal Organization: Works Councils in West German Firms. *Economica* 54:493-504.
- FitzRoy, Felix, and Kornelius Kraft. 1990. Innovation, Rent-Sharing and the Organization of Labor in the Federal Republic of Germany. *Small Business Economics* 2:95-103.
- Freeman, Richard B., and Edward P. Lazear. 1995. An Economic Analysis of Works Councils. In: *Consultation, Representation, and Cooperation in Industrial Relations*, ed. Joel Rogers, and Wolfgang Streek, Chicago and London: The University of Chicago Press.
- Freeman, Richard B., and James I. Medoff. 1984. *What Do Unions Do?*. New York: Basic Books.
- Frege, Carola M. 2002. A Critical Assessment of the Theoretical and Empirical Research on German Works Councils. *British Journal of Industrial Relations* 40:221-248.
- Frick, Bernd, and Dieter Sadowski. 1995. Works Councils, Unions, and Firm Performance: The Impact of Workers' Participation in Germany. In: *Institutional Frameworks and Labor Market Performance*, ed. Friedrich Buttler, Wolfgang Franz, Ronald Schettkat, and David Soskice, London and New York: Routledge.
- Gerlach, Knut and Uwe Jirjahn. 1999. Längerfristige Beschäftigung, personalpolitische Konzepte und Beschäftigungsdynamik. In: *Ökonomie und Gesellschaft 15*, ed. Peter de Gijssel, Knut Gerlach, Jörg Glombowski, Franz

Haslinger, Peter Kalmbach, Hans G. Nutzinger, Hajo Riese, Kurt W. Rothschild, Thomas Schmid-Schönbein, Johannes Schneider, Winfried Vogt, Hans-Jürgen Wagener, Peter Weise, and Ulrich Wittmann, Frankfurt and New York: Campus Verlag.

Gold, Michael. 1999. Innerbetriebliche Einflüsse auf die Beschäftigungsanpassung. In: *Zur Entwicklung von Lohn und Beschäftigung auf der Basis von Betriebs- und Unternehmensdaten*, ed. Lutz Bellmann, Susanne Kohaut, and Manfred Lahner, Nürnberg: IAB.

Greene, William H. 2008. *Econometric Analysis*. Upper Saddle River: Pearson Prentice Hall.

Guertzgen, Nicole. 2007. Job and Worker Reallocation in German Establishments: The Role of Employers' Wage Policies and Labour Market Institutions. Discussion Paper no. 07-084, Centre for European Economic Research/ZEW, Mannheim.

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

Jensen, Michael C., and William H. Meckling. 1979. Rights and Production Functions: An Application to Labor-managed Firms and Codetermination. *Journal of Business* 52:569-506.

Jirjahn, Uwe. 2008a. Betriebsräte und Beschäftigungswachstum: Spielt die Spezifikation der Betriebsgröße eine Rolle für den geschätzten Zusammenhang?. *Industrielle Beziehungen* 15: 279-291.

Jirjahn, Uwe. 2008b. Works Councils and Employment Growth: A Reply to Addison and Teixeira. *Industrielle Beziehungen* 15:436-448.

Jirjahn, Uwe. 2009. The Introduction of Works Councils in German Establishments – Rent Seeking or Rent Protection?. *British Journal of Industrial Relations*, 47:521-545.

Jirjahn, Uwe. 2010. Works councils and employment growth in German establishments. *Cambridge Journal of Economics* 34:475-500.

Jirjahn, Uwe. 2011. Ökonomische Wirkung der Mitbestimmung in Deutschland: Ein Update. *Schmollers Jahrbuch* 131:3-57.

Jirjahn, Uwe, and Kornelius Kraft. 2010. Teamwork and Intra-Firm Wage Dispersion Among Blue-Collar Workers, *Scottish Journal of Political Economy* 57: 404-429.

Kraft, Kornelius. 1986. Exit and Voice in the Labor Market: An Empirical Study of Quits. *Journal of Institutional and Theoretical Economics* 142:697-715.

Kraft, Kornelius, and Julia Lang. 2008. The Causes and Consequences of Adopting a Works Council. *Jahrbücher für Nationalökonomie und Statistik* 228:512-532.

Lindbeck, Assar, and Denis J. Snower. 1988. *The Insider-Outsider Theory of Employment and Unemployment*. Cambridge, Cambridge and London: The MIT Press.

Lindbeck, Assar, and Denis J. Snower. 2001. Insiders versus Outsiders. *Journal of Economic Perspectives* 15:165-188.

Pulte, Peter. 2009. *Betriebsgröße und Arbeitsrecht*. Birmingham: Verlag Personal, Recht, Management.

Schultz, Birgit. 2006. Mikroökonomische Evaluation der ökonomischen Wirkung betrieblicher Mitbestimmung – Möglichkeiten und Grenzen des Matching-Ansatzes. *Jahrbücher für Nationalökonomie und Statistik* 226:519-536.