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One-third Co-determination in German Supervisory Boards and its Economic Consequences. New Evidence for Employment

By Franziska Boneberg*

Abstract

The economic consequences of workers' participation rights in Germany are still uncertain. Because employee representation at the board level is mandatory based on the legal form and size of the company, a direct comparison of firms that apply co-determination and those that do not does not appear to be possible. However, a new kind of data set used in this paper allows such a direct comparison. The present study analyzes the potential impact of co-determined supervisory boards on employment. Whereas several studies have looked at the possible effects of works councils on employment growth, the effects of co-determination at the enterprise level have been the object of investigation only once. The present paper contributes to this lack of empirical evidence in showing that there is no significant correlation between supervisory board existence and employment growth.

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1. Introduction

Since their first introduction in the 1950s, co-determination rights at the enterprise level (on a company's supervisory board) have been highly controversial. In terms of theory, there are two primary lines of argument: The advocates of co-determination legislation emphasize the motivating effect, the increase in

* The access to the services statistics panel was provided via remote data access at the Research Data Centre of the Statistical Office of Lower Saxony. For more details about the data access, see Zühlke / Zwick / Scharnhorst / Wende (2004). All calculations were performed using Stata 10. All do-files are available from the author on request. Many thanks go to Nils Braakmann, Christian Pfeifer, Mario Richter, Joachim Wagner for helpful comments and to Rita Hoffmeister for running the do-files in the Research Data Centre.

trust and cooperation and the from that resulting augmentation in productivity, while the opponents fear delayed decisions and loss of efficiency when workers have participation rights.

Empirical evidence about the economic consequences of co-determination is much needed, but proof is not as easy to find as it might seem. Since at least co-determination rights at the enterprise level are compulsory, all companies of certain legal forms and sizes must establish a co-determined supervisory board. So comparisons between companies with and without co-determined supervisory boards can be drawn only by contrasting big firms to small ones (for smaller firms, depending on their size, either a different co-determination act or no co-determination act at all applies). The majority of the existing studies in this field follows this approach, and consequently suffers from irregularities.

Boneberg (2009a) shows that some limited liability companies (GmbHs) in the western German service sector, according to the law, must establish a supervisory board but that some do not do so (Boneberg, 2009a and 2009b). The fact that many companies, contrary to the law, do not create supervisory boards makes it possible to compare companies of the same legal form, size and industry that differ in terms of whether they are co-determined at enterprise level. Wagner (2011) and Boneberg (2010) take advantage of this opportunity: Analyzing the potential economic influence of workers' participation rights on two core performance indicators, productivity and profitability, Wagner (2011) finds no significant effects for the industrial sector. Boneberg (2010) concludes that, in the western German service sector, companies with co-determined supervisory boards are, on average, more productive than those without them. For profitability, however, she does not find a significant effect.

The present study analyzes the potential impact of co-determination at the enterprise level on employment. Whereas several studies consider the possible effects of works councils on employment, co-determined supervisory boards have been the object of investigation only once. The present paper contributes to this lack of empirical evidence using a data base drawn from two sources: initial information was collected from the Hoppenstedt Database, a commercial database that provides information on the size, age, legal form and ownership structure of all German companies that employ more than 200 people and / or that have more than 20 m Euro in sales volume per year. Since information concerning whether the companies have supervisory boards was not available for all companies from this data source, missing data were collected via telephone calls. In order to analyze the economic consequences of the 2004 Co-determination Act on employment, details about variables such as productivity, profitability or labor costs of the firms observed are also needed, and these were obtained from official German statistics. Merging the information of the Hoppenstedt Database and the official statistics makes it possible to compare the economic consequences of companies that have a supervisory board with those that do not.

The rest of the paper is organized as follows: Sections two and three introduce the legal and theoretical framework, and section four provides an overview of the extant empirical studies on the relation between co-determination and employment. The data description and methodology follow in section five, the empirical investigation is presented in section six. The paper finishes with a conclusion in section seven.

2. Legal Background

In Germany employee representation is provided not only at the establishment level but also at the enterprise level in a company's supervisory board. Worker participation at establishment level refers to decision-making processes important in operational matters (e.g., layoffs) that are performed by the works council (Betriebsrat). It is the task of the works council to represent the employees' interests to management. In contrast, co-determination at the enterprise level involves worker participation in corporate planning and decision-making processes relevant to the company as a whole (see Junker, 2006, 442 f.). Co-determination at the enterprise level is implemented in the board, where employees receive a certain number of seats and votes based on the legal structure and size of the company. The mission of the supervisory board is primarily to oversee and control the management; whereas in corporations the executive is appointed by the supervisory board, this is not the case in limited liability companies. Because of the weak position of supervisory boards in limited liability companies, Fuchs / Köstler (2005, 35 f.) denote such boards solely as information organs.

Since the introduction of the Co-determination Act in 1976, there have been three laws regulating workers' participation on supervisory boards: The Montan Co-determination Act, the 1976 Co-determination Act (Mitbestimmungsgesetz (MitbestG)), and the 2004 Third Part Act (Drittelbeteiligungsgesetz (DrittelbG)). All companies examined in the present analysis fall into the scope of the 2004 Third Part Act, which applies to corporations (AGs), partnerships limited by shares (KGaA), limited liability companies (GmbHs), mutual insurance associations (VVaG), and cooperative, industrial and provident societies that, generally, employ 500 to 2000 people (§ 1 DrittelbG. The working time stipulated by contract is of no relevance in determining company size). The law assigns one-third of the seats on the board of a company to the employees (§ 4 I DrittelbG). In contrast to the other co-determination laws, the 2004 Third Part Act does not dictate an exact number of board members, so the provisions of the stock corporation law, which prescribe a board size of any number of members that is a multiple of three, are used (§ 95 S. 1, 3 Aktien-Gesetz (AktG)). The 2004 Third Part Act is applied when no statutory regulation initiates the opening of the scope of another co-determination law being more

favorable to workers (§ 1 II 1 No. 1 DrittelbG). The provisions of the 2004 Third Part Act are mandatory and cannot be changed by statutes or collective and bargaining agreements (see Oetker, 2007, 1836).

Co-determination at the enterprise level is also governed by the Montan Co-determination Act and the 1976 Co-determination Act. The Montan Co-determination Act, which applies to companies in the coal and steel industry that have more than 1,000 employees, provides for equal representation on the company's supervisory board. Supplementarily, a representative of the employee's side can operate as a worker director in the board (see Junker, 2006, 452 f. See also Niedenhoff, 2005, 382 ff; Fuchs / Koestler, 2005, 20). Companies that regularly engage at least 2000 employees, fall into the scope of the 1976 Co-determination Act. This law also provides equal representation in the supervisory board, but because of the casting vote of the chairman (who generally sides with the shareholders), talk is of "quasi-parity" (see Donges et al., 2007, 15 f.).

Only one of the three laws applies to any one company. The provisions of the Montan Co-determination Act have priority (§ 1 II MitbestG), and the 1976 Co-determination Act takes precedence over the 2004 Third Part Act (§ 1 III MitbestG).

3. Theoretical Framework

The following section outlines the theoretical background concerning the economic consequences of workers' participation. Among economists different views on the potential effects of such participation are advanced that presume positive as well as negative consequences for a company.

In the context of the Property Rights approach it is expected that legal co-determination regulations have primarily negative effects on the organizational structures of a company. It is argued that participation rights reduce the residual decision rights of the owners and result in less efficient–or at least delayed – decisions, as well as in delays in the planning and innovation process. It is criticized that shareholders must be able to influence managerial decisions and to achieve residual income or their willingness to invest capital in the enterprise will decrease (Furubotn, 1985; 1988; Pejovich, 1978; 1990).

According to Pejovich (1990, 69), participation rights influence the relationship between employers, shareholders and employees but also alter the roles between risk-carrier and benefactor. This influence often leads to conflicts of interest between these groups, which impedes efficient solutions. The division of the position of risk-carrier and that of decision-maker has negative impacts on the efficiency of a company (see Kraft / Stank, 2004, 428). Pejovich (1990, 69) argues in this context: "Co-determination shifts the responsibility for deci-

sions to a group of people who are not at all affected by the consequences of the decisions." Pejovich contends that, when investments are successful, shareholders and employees benefit, but owners must bear the consequences of unfortunate investments alone. Consequently, the owners experience lower productivity and lower incomes, partly because the employees use their increasing influence to participate in the business profits (Renaud, 2007, 691). Pejovich (1976, 18 ff.) claims that the planning horizons and risk tolerances of equity holders, employers, and workers vary, which results in a strong potential for conflict. As a result, because of the participation regulations, shareholders can rarely decide in their own interest while the workers can maximize their own utility.

However, in the context of the Participation Theory it is argued that the benefits of co-determination rights exceed the expenses. Since the potential conflict that generally determines the relationship between employer and employee is eased by employee participation, satisfaction on both sides increases (Kraft / Stank, 2004, 430). Thus, an augmentation in productivity and in the acceptance of innovations can be achieved.

The exit-voice approach proposed by Hirshman (1970, 77 ff.) also indicates positive consequences of co-determination: Hirshman explains that the collective pooling of interests, such as that in trade unions or works councils (voice), helps prevent employees from leaving the company or from reducing performance and motivation as a result of dissatisfaction (exit). Thus, Hirshman (1970), Freeman / Medoff (1984, 94) as well as Pfeifer (2010) state that participation rights reduce the labor turnover rate; workers' participation rights help to retain employees because employees generally prefer dialogue to quitting (Freeman / Medoff, 1984: 8). This preference is an advantage to the employer since the exit option is a significant expense in terms of finding replacements and paying unemployment compensation (Dilger, 2002, 68 ff.).

Levine / Tyson (1990, 185 ff.) show that there are two primary effects of workers' participation: increased operational readiness and motivation, and better use of knowledge and improved flow of information, all of which have a positive impact on productivity and profitability. The two researchers also show that workers' participation enhances the confidence not only of employees, but also of the management, leading to a stronger identification with the corporate objectives (Levine / Tyson, 1990, 187 f.).

Another reason for expecting positive consequences is the fact that even the most detailed contracts cannot be exhaustively explicit (Hart, 1995, 23 ff.), so opportunistic behaviour or the internal prisoners' dilemma may occur. Both employers and employees have incentives to deviate from their contractual obligations, so even if a cooperative seems the best solution for both sides, a situation of mistrust emerges. In such a case, participation rights can lead to long-ranging employment-employee contracts and support cooperative interaction within the company (Dilger, 2002, 55 f.).

Turning to the potential influence of workers' participation on employment growth, theory delivers indications about possible relations between the granting of participation rights and employment growth in a company, too. For co-determination at the establishment level, it is argued that a works council leads to a rise in productivity, in the acceptance of innovations, and a more trusting relationship between employer and employees. Therefore, a works council could be expected to have a positive impact on labor demand. On the other hand, it is possible that works councils use their power to assert the rights of people already employed and for redistributive activities, rather than to care for new appointments. According to Lindenthal and Sliwka (2003, 105), employees want the works council to avert lay-offs, making lay-offs in co-determined companies more expensive. An employer who anticipates this effect may hire fewer people from the outset. Thus, works councils that use their power to increase labor costs will have negative consequences for employment growth (Jirjahn, 2010, 476, 478 ff. For an overview concerning potential employment effects see Jirjahn, 2005 and 2006, and Frick, 2008). Clearly, from a theoretical point of view, it is critical to determine the relationship that exists between works councils and employment growth.

In the context of co-determination at the enterprise level, the establishment of a supervisory board does not depend on the initiative of the workforce but is regulated by law. The implementation of a supervisory board and, for bigger companies, the extent of co-determination depends on firm size. Therefore, companies may hesitate to grow if they fear they will be moving toward falling into the scope of the more strenuous co-determination act. Instead, these firms may choose to pass up economic advantages like economies of scale rather than to increase the workforce. Furthermore, as is the case with workers' participation rights at the establishment level, employees' representatives at the enterprise level may also prefer to enforce their claims than to pursue the needs of the company. This effect may be even stronger when some of the employee advocates on the supervisory board are represented by union officials who are primarily interested in implementing the political ideas of their unions. Depending on the power and goals of the workers' representatives, negative effects on the future recruitment behavior of a company may result since the owners or managers will avoid too much worker influence and because they fear that lay-offs in critical times will not be enforceable. Even in economically prospering times employment is not raised. Taken together, these factors indicate that a co-determined supervisory board would be expected to be rather negatively related to employment growth.

4. Empirical Evidence

Many empirical studies deal with the effects of co-determination at the enterprise level, particularly with changes in productivity. More recently, some papers examine the potential effects of co-determination on shareholder value and profitability. One study analyzes a possible impact on innovation activity, one deals with potential consequences for a firm's occupational level. Renaud (2007, 693) points to the fact that no long-term studies on the effects of co-determination have yet been done. Generally, in the investigations, either co-determined and non-codetermined firms, or companies that fall into the scope of various co-determination acts are compared in terms of their business metrics. Thus, in all studies the existence of a supervisory board is taken for granted.[1] A detailed overview on all studies can be found in Addison / Schnabel (2009).

The present study analyzes the potential impact of co-determination on employment growth. Few extant studies deal with this subject of investigation. Most of them consider the potential influences of participation rights at the establishment level (which is accomplished by the works council) on employment growth. As it is the case with productivity and profitability, the results of these studies considerably differ. Gold (1999) and Addison / Teixeira (2006) find negative consequences, while Gerlach / Jirjahn (1999), Schank / Schnabel / Wagner (2004), Addison et al. (2004) and Meyer / Pfeifer (2005) find no significant relationship between works councils and employment growth. Jirjahn (2010) shows a positive effect of works councils on growth and concludes that the performance-enhancing voice role of works councils dominates their monopoly role. The author provides evidence in support of the hypothesis that workers are more interested in a works council when their companies are facing an economic crisis because they hope the works council will protect their quasi-rents. Only one study considers the influence of co-determination at the enterprise level on employment growth; in a study using a similar sample size to the one used here, Werner / Zimmermann (2005) find a negative relationship between union officials on supervisory boards and employment growth.

In the context of the relation between works council existence and employment growth, Jirjahn (2008a, 2008b) claims that the varying results can be explained with the distinct definitions used for the explanatory variable for employment. The scientist refers to the fact that works councils are strongly correlated to firm size. As larger companies generally show less growth in employment, a misspecification of firm size can lead to a negative coefficient for the presence of works councils, which rather bases upon the negative relation-

[1] Only one study, conducted by Wagner (2011), differs in its approach when analyzing potential economic effects of co-determination at enterprise level. It follows the same idea the present study does, though for the industrial sector.

ship between firm size and employment growth. Therefore, Jirjahn prefers to apply the logarithm of firm size instead of its linear form. In the present investigation all companies examined are similar in size as they all fall into the scope of the DrittelbG. In the empirical part of the paper it will be shown, whether the definition of employment also is as crucial as it apparently is in the works council literature.

Another problem in determining the impact of co-determination on employment growth lies in the matter of endogeneity. Concerning workers' participation at the establishment level, it is possible that other, non-observable factors affect employment growth and whether a company has a works council. For example, Jirjahn (2010) argues that employees in a company facing economic difficulties that are likely to result in lay-offs will be more interested in a works council. Therefore, if the economic situation of a company is not controlled for in the estimations, the coefficient indicating whether the company has a works council will be downward biased because of the economic crisis. Jirjahn (2010, 481) also points to the fact that works councils that get involved primarily with rent-seeking activities tend to be implemented in companies that are prospering and where there is potential for further employment growth. In companies that are facing financial distress, works councils are more likely to help the employees protect their quasi-rents. The problem of endogeneity may also influence the results of the present study. Although co-determination at the enterprise level is regulated by law, the own investigations have demonstrated that many companies do not observe the regulations. Therefore, in this context also the question raises, whether there are unobservable factors that influence supervisory board existence as well as employment growth. The discussion will be continued in section six.

5. Data and Methodological Remarks

Initial information for the present study was collected from the Hoppenstedt Database, a commercial database that provides information on the size, age, legal form and ownership structure of all German companies that employ more than 200 people and / or have more than 20 m Euro in sales volume per year. Information about whether the company has a supervisory board and the allocation of staff to it is also usually available in this database. However, the latter cannot be found for every company, so any missing data was collected via telephone calls. (For detailed data specification and further information regarding data collection, see Boneberg, 2009a.) The service sector was chosen because of its increasing relevance in the German economy. Limited liability companies were selected because the limited liability company law (GmbHG) requires the establishment of a co-determined supervisory board only for companies that employ 500 or more workers. Therefore, the employment level is the decisive factor for the supervisory board existence.

Boneberg (2009a) shows that among limited liability companies in the western German service sector are many companies that do not establish a supervisory board although the law requires them to do so. The present investigation compares companies with co-determination at the enterprise level to those without in order to determine the effects of workers' participation on changes in the number of employees. Therefore, information on whether the firm had a co-determined supervisory board is needed for at least two periods. Which companies had a supervisory board in 2005 as well as in 2007 was obtained from the initial information collected in the year 2007 and from data originating from Hoppenstedt archives for the year 2005. 82 per cent of the companies observed in 2007 were "stable" in terms of their supervisory boards, meaning that no indication was found suggesting that the status of their supervisory boards – whether they had one or not – changed. Unstable, on the other hand, means that either their co-determination status (whether they had a supervisory board or not) changed or the number of employees fell below 500 so the company no longer came under the rules of any co-determination act.

In order to include as many relevant explanatory variables in the model as possible, the information from the Hoppenstedt database were matched with the official business services statistics (Strukturerhebung im Dienstleistungsbereich), which is set up by the German Federal Statistical Office and the statistical offices of the Federal States (Länder). It contains, among other data, information on the economic sector of a company, along with its number of employees (not including temporary workers), total turnover, subsidies, and salaries and wages. The statistics were first collected for this database in 2000 on the initiative of the European Union. The data covers the enterprises and professions (Freie Berufe) of companies in the NACE divisions I (transport, storage and communication) and K (real estate, renting and business activities) with an annual turnover of at least € 17,500. A stratified random sample based on the federal states, 4-digit industries, and 12 size ranges (in terms of turnover or employees) is used to assign the enterprises. The data is, for the most part, confidential, but researchers can use it on a contractual basis via controlled remote data access inside the research data centers of the German Statistical Offices. For details see Zühlke et al. (2004). Further information about the German business services statistics panel can be found in Vogel (2009).

Merging the information from the Hoppenstedt Database and the official statistics makes it possible to compare companies with and without a co-determined supervisory board in terms of employment growth. Merging was done using information about each enterprise's register number and register court of the trade register (Handelsregisternummer und Handelsregistergericht). This information is available in both the Hoppenstedt data base and in the official register of enterprises (Unternehmensregister) that was linked to the business services statistics data. The initial data set used in previous investigations contained 500 companies (see Boneberg, 2009a), but only 174 companies were

included in the present study because only 174 firms were found in both the Hoppenstedt Database and the official statistics. The official business services statistics includes only companies active in sectors I (transport, storage and communication) and K (real estate, renting and business activities), while the Hoppenstedt data collection also contains firms from other sectors.

6. Empirical Investigation

This section explains the growth rates used in the estimated model, followed by a description of potential determinants of employment growth. Finally, the results of different OLS-regressions are presented.

Growth Rates

Most of the existing studies that determine effects on employment are based on two cross-sections of establishment data. The most common employment-growth equation found in the literature is

$$g = \alpha + \beta_{i2005}\, Board + \delta_{i2005} + \mathrm{e}_i, \tag{1}$$

where *Board* is a dichotomous variable indicating whether a company has a supervisory board ($Board = 1$) or not ($Board = 0$). β expresses the supervisory board employment growth differential over the 2-year interval. X_{i2005} is a vector expressing other establishment characteristics in the beginning period, δ is a vector of coefficients, α a constant and e_i the error term. In the present case the supervisory board status is observed in 2005 and assumed to be fixed over time.

Changes in employment are expressed in two ways, both of which are estimated: Equation (2) refers to a model developed by Davis / Haltiwanger (1992). Changes in employment in the years 2007 and 2005 are divided by the average employment to reduce the influence of outliers.

$$g_1 = (\mathrm{Empl}_{2007} - \mathrm{Empl}_{2005}) \;/\; 0.5\; (\mathrm{Empl}_{2007} + \mathrm{Empl}_{2005} \tag{2}$$

Evans (1987) uses another definition of the employment change rate: the differential of the logarithmic employment level in the two years under observation (equation (3)).

$$g_2 = (\ln \mathrm{Empl}_{2007} - \ln \mathrm{Empl}_{2005}) \tag{3}$$

Determinants of employment growth

The present study uses the firm characteristics from the year 2005 to study the effects of workers' participation on supervisory boards on changes in em-

ployment levels in the years 2005 to 2007. The following variables are included in the model to control for workforce and establishment characteristics: First, a dichotomous variable indicates whether a company has a supervisory board or not. Second, a variable controls for ownership structure, which is thought to have a decisive influence on employment growth: For example, the owners of GmbHs are thought to accept more risky projects with high returns because of the protection of limited liability. Therefore, greater employment growth could be expected in these companies (Stiglitz / Weiss, 1981). This assumption is supported by Harhoff et al. (1998), who state that GmbHs in Germany tend to have higher employment growth rates. Another argument the distinction of the owners by their activity level may deliver. Considering agency theory it is thinkable that in companies without active owners the managers miss the opportunity to expand the company's market share which leads to negative effects in employment growth. Unfortunately, in the present case the impact only of family-owned firms can be investigated because the other variables indicating ownership structure were dropped by the FDZ for reasons of confidentiality. However, studying the relationship of family-owned firms to employment growth makes sense insofar as these firms tend to have supervisory boards less often.

Two variables indicating company size are also integrated in the model; the number of employees and its squared value. For co-determination at the establishment level, whether a company has a works council or not is strongly correlated to firm size. Concerning co-determination at the enterprise level, firm size also seems to influence whether the firm has a supervisory board (see Boneberg, 2009a) and the descriptive statistics in table 3) and may also influence employment growth. The model controls for whether a firm is a single establishment entity or not; companies that are part of a larger organization may experience more job turnover than single establishments do because larger firms may reallocate employees among the firms' branches. By contrast, managers of single establishments may want to avoid employment growth even in prosperous times to retain flexibility in case of economic contraction.

The productivity and profitability variables are used to capture the economic performance of a firm but, because of missing information, the two terms can be determined only as proxies. The data set does not include information on a company's capital stock or the sum of its assets or equity, so it is not possible to compose profit indicators like return on assets or return on equity. Consequently, profitability is measured as turnover profitability, defined as the rate of return (gross firm surplus[2] divided by total sales minus net change of inventories). It is expected that employment growth is higher in companies with higher

[2] The definition applied here is in line with the denotation of the European Commission (1998) as gross value added at factor costs minus gross wages and salaries minus costs for social insurance paid by the firm.

profitability. Productivity is measured as value added per employee. Higher employment growth is expected in companies with greater productivity.

A variable reporting subsidies per employee received by an enterprise is also contained in the estimation. In the official business services statistics, subsidies per employee are defined as any payments received from local, regional, federal or European authorities without consideration with the purpose of lowering production costs or prices of the goods produced and / or to guarantee sufficient payments for factors of production. Therefore, it is expected that subsidies are higher in firms with lower productivity and profitability and less employment growth.

It is reasonable to control for wages per capita because employment growth can be expected to be lower in companies with higher levels of remuneration. This effect is captured by integrating the share of labor costs in the company's turnover. If labor costs already account for a large share of a firm's turnover, the company will avoid increasing these costs through increasing employment. Therefore, another variable is also included in the estimation to reflect whether labor costs in *t* rise compared to *t-j*. Since it is also expected that the heterogeneity of the workforce influences employment growth, the estimations also contain variables that reflect the proportion of part-time and female employees because these groups are expected to have a lower average tenure. Including these two workforce characteristics controls also for lower skill compositions and, thus, workers who are more vulnerable to job loss. The official business services statistics does not provide information on short-time work, overtime, shift-work or the level of technology, which factors are often used as proxies for the situation a company is facing in the market.

Finally, the regressions are augmented by 1-digit industry dummies[3], which indicate the sector in which a company is active. These variables test for industry-specific structural differences and shocks (e.g., the extent of competition, technology of production, and fluctuations in demand and production costs).

Empirical Results

Table 1 shows that, in 2005, 46 of the 174 companies in the dataset had supervisory boards and 128 did not. At the end of section five it was described that the initial data set used in previous investigations contained 500 companies (see Boneberg, 2009a). Only 174 companies were included in the present study because only 174 firms were found in both the Hoppenstedt Database and the

[3] The official business services statistics is comprised only of companies acting in branches I and K. Five-digit industry identifiers are usually reported; however, because of the small sample size and, as a result, the insufficient number of enterprises in single sectors, only 1-digit dummies could be generated for the present study if confidentiality was to be preserved.

official statistics. As can be seen from table 1 the main part of the companies found had no supervisory board. This means that in the present investigation compared to former own studies there are on average more companies without supervisory board (in former studies they amounted to about 50%). This is unfortunate, but must be accepted.

Table 1

Frequencies of firms with / without supervisory boards in 2005

Supervisory Board	Frequencies	Percent
0	128	73.56
1	46	26.44
Total	174	100.00

Tables 2 and 3 demonstrate the correlation between supervisory board existence and employment growth. As Jirjahn (2010) demonstrates, the right specification of employment is extremely important when analyzing the outcomes of workers' participation on employment growth. This is why in the study at hand, both growth rates are estimated first with firm size measured in linear and squared form and then in logarithmic form. For both growth rates the results of eight regression models are reported. Models one and five include the number of employees, models two and six additionally contain the squared value of the number of employees. Models three and seven apply the logarithmic firm size as explanatory variable, in models four and eight the squared logarithmic firm size is added.

In model one the coefficient reflecting supervisory board existence suggests that employment growth and supervisory board existence significantly correlate at the 10-percent level. The results of the models two through eight in tables 2 and 3, however, indicate no correlation between supervisory board existence and the firm's employment growth. The coefficients in either estimation are not statistically significant at any conventional error level. Estimating a regression model containing only linear firm size, a significant correlation between employment growth and value added per employee, the sector K (real estate, renting and other business activities) and an increase in labor costs is pointed out. Including firm size and its squared value in the estimation, a significant positive correlation between the growth rate of a company and the squared firm size, the logarithmized value added per employee, the share of female workers and an increase in labor costs can be observed. Model six additionally indicates a negative relation between profitability and employment growth, and a positive relation between the share of labor costs and employment growth.

Table 2

Regression results for the employment growth of codetermined and not-codetermined firms on board level

	Endogenous Variable $(Empl_{2007} - Empl_{2005})/0.5(Empl_{2007} + Empl_{2005})$			
Exogenous Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Board^{+}	-0.09* (0.093)	-0.07 (0.174)	-0.07 (0.173)	-0.07 (0.192)
Number of employees	7.35 e-06 (0.811)	-0.9 e-04 (0.144)		
Number of employees squared		8.75 e-09* (0.072)		
Number of employees (log)			-0.03 (0.280)	0.05 (0.766)
Number of employees (log) squared				-0.7 e-02 (0.606)
Value added per employee (log)	0.07* (0.068)	0.07* (0.062)	0.06 (0.109)	0.06 (0.123)
Profitability (%)	-0.3 e-02 (0.405)	-0.3 e-02 (0.308)	-0.3 e-02 (0.334)	-0.4 e-02 (0.334)
Share of part-time workers (%)	-0.08 (0.438)	-0.07 (0.522)	-0.09 (0.403)	-0.09 (0.431)
Share of female workers (%)	0.19 (0.101)	0.19* (0.094)	0.18 (0.118)	0.18 (0.123)
Number of entities	0.2 e-04 (0.983)	-0.4 e-03 (0.729)	0.6 e-03 (0.491)	0.9 e-03 (0.394)
Share of labor costs (%)	0.2 (0.185)	0.22 (0.146)	0.22 (0.150)	0.22 (0.153)
Labor cost increase (dummy-variable: 1 = increase, 0 = decrase)	0.3*** (0.000)	0.28*** (0.000)	0.29*** (0.000)	0.29*** (0.000)
Subsidies per employee (€)	-2.21 e-07 (0.884)	-1.19 e-07 (0.937)	-1.99 e-07 (0.895)	-1.39 e-07 (0.927)
Family-owned^{+}	0.05 (0.426)	0.04 (0.562)	0.05 (0.468)	0.04 (0.527)
Sector I (transport, storage and communication)$^{+}$	-0.05 (0.462)	-0.04 (0.566)	-0.04 (0.568)	-0.04 (0.581)
Sector K (real estate, renting and other business activities)$^{+}$	-0.14* (0.061)	-0.12 (0.117)	-0.13 (0.102)	-0.13 (0.104)
Constant	-0.97 (0.039)	-0.92 (0.049)	-0.65 (0.219)	-0.86 (0.198)
R-squared	0.284	0.300	0.290	0.291
Number of Enterprises	166	166	166	166

Terms in brackets report the p-value.
$^{+}$Dummy-variable: 1 = yes, 0 = no. Reference category for industry dummies = K 74.
*/**/*** denotes significance at the 10-/5-/1 percent level.

Table 3

Regression results for the employment growth of codetermined and not-codetermined firms on board level

	Endogenous Variable ($\ln Empl_{2007} - Empl_{2005}$)			
Exogenous Variable	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Board^{+}	-0.1 (0.125)	-0.08 (0.219)	-0.08 (0.218)	-0.08 (0.244)
Number of employees	-3.43 e-06 (0.928)	-0.1 e-03 (0.125)		
Number of employees squared		1.02 e-08* (0.089)		
Number of employees (log)			-0.05 (0.206)	0.08 (0.683)
Number of employees (log) squared				-0.01 (0.505)
Value added per employee (log)	0.12** (0.011)	0.12*** (0.010)	0.11** (0.018)	0.11** (0.021)
Profitability (%)	-0.6 e-02 (0.141)	-0.7 e-02* (0.099)	-0.7 e-02 (0.108)	-0.7 e-02 (0.108)
Share of part-time workers (%)	-0.09 (0.488)	-0.08 (0.573)	-0.1 (0.455)	-0.09 (0.492)
Share of female workers (%)	0.29** (0.038)	0.3** (0.035)	0.28** (0.044)	0.28** (0.047)
Number of entities	0.5 e-03 (0.752)	-0.5 e-04 (0.971)	0.09 e-03 (0.410)	0.01 e-02 (0.296)
Share of labor costs (%)	0.38** (0.049)	0.4** (0.036)	0.4** (0.037)	0.4** (0.038)
Labor cost increase (dummy-variable: 1 = increase, 0 = decrase)	0.32*** (0.000)	0.30*** (0.000)	0.31*** (0.000)	0.31*** (0.000)
Subsidies per employee (€)	-8.10 e-07 (0.663)	-6.91 e-07 (0.708)	-8.10 e-07 (0.661)	-7.14 e-07 (0.700)
Family-owned^{+}	0.05 (0.540)	0.03 (0.684)	0.04 (0.577)	0.04 (0.659)
Sector I (transport, storage and communication)$^{+}$	-0.04 (0.623)	-0.03 (0.737)	-0.03 (0.751)	-0.02 (0.768)
Sector K (real estate, renting and other business activities)$^{+}$	-0.17** (0.064)	-0.15 (0.118)	-0.15 (0.110)	-0.15 (0.112)
Constant	-1.62 (0.006)	-1.56 (0.007)	-1.20 (0.065)	-1.53 (0.062)
R-squared	0.264	0.278	0.271	0.273
Number of Enterprises	166	166	166	166

Terms in brackets report the p-value.
$^{+}$Dummy-variable: 1 = yes, 0 = no. Reference category for industry dummies = K 74.
* / ** / *** denotes significance at the 10- / 5- / 1 percent level

As mentioned in section four, the literature that addresses the economic effects of co-determination on employment reveals that the "right" specification of firm size strongly influences the outcome. In the present case, running the regressions with the logarithmized firm size and its squared value, the results do not seemingly differ from those models applying the linear and squared form. Using the logarithmic firm size instead of the linear and squared firm size the results of models three, four, seven and eight suggest that an increase in labor costs positively correlates with employment growth. Models seven and eight furthermore find a significant relation between employment growth and the value added per employee, the share of female workers, the share of labor costs and an increase in labor costs. However, a correlation between supervisory board existence and employment also in these models cannot be assumed.

The results of models one through eight demonstrate that depending on the specification of firm size a relation between employment growth and supervisory board existence is suggested or not. However, in the works council literature a difference in the results regularly occurs when using the logarithmic compared to the linear and squared form. In the present case the results change, if the employment variable is included only in linear, but not in the squared form. Though, as only model one suggests a correlation, but not model five, it seems that in the present case the specification does not influence the results as significantly as it does in the works council literature. That might be due to the fact (as pointed out in section 3) that in the present investigation all companies observed are similar in size class.

Apart from the results of model one all other results indicate that there is no correlation between supervisory board existence and employment growth. Nevertheless, it is thinkable that there is an indirect influence of co-determined supervisory boards on employment to that effect that the institution has impact on a company's value added per employee, its profitability or an increase in labor costs. In order to control for any indirect mechanisms further regressions are run, which a) do not contain any of the three variables mentioned, b) contain only one of the three variables and c) contain two of the three variables. The results can be found in tables 4 and 5. Looking only at a potential correlation between supervisory board existence and employment growth, again no such relation can be found.

Table 4

Regression results for the employment growth of codetermined and not-codetermined firms on board level

	Endogenous Variable $(Empl_{2007} - Empl_{2005})/0.5(Empl_{2007} + Empl_{2005})$						
Exogenous Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Board[+]	-0.05 (0.431)	-0.05 (0.373)	-0.06 (0.264)	-0.07 (0.168)	-0.05 (0.365)	-0.04 (0.476)	-0.06 (0.253)
Number of employees	-0.1 e-03** (0.031)	-0.1 e-03** (0.031)	-0.1 e-03* (0.099)	-0.8 e-04 (0.177)	-0.1 e-03** (0.044)	-0.1 e-03** (0.017)	-0.1 e-03* (0.098)
Number of employees squared	1.34 e-08** (0.012)	1.37 e-08** (0.011)	8.60 e-09* (0.078)	8.24 e-09* (0.088)	1.3 e-08** (0.015)	1.37 e-08** (0.011)	8.52 e-09* (0.078)
Value added per employee (log)		0.08* (0.056)		0.05 (0.115)	0.05 (0.163)		
Profitability (%)		-0.5 e-02 (0.149)	-0.5 e-03 (0.875)			-0.2 e-02 (0.509)	
Share of labor costs (%)	0.02 (0.802)	0.26 (0.124)	0.08 (0.560)	0.08 (0.182)	0.04 (0.592)	0.1 (0.482)	0.06 (0.313)
Labor cost increase (dummy-variable: 1 = increase, 0 = decrase)			0.29*** (0.000)	0.29*** (0.000)			0.29*** (0.000)
Constant	0.24 (0.005)	-0.77 (0.138)	-0.07 (0.138)	-0.65 (0.091)	-0.34 (0.426)	0.2 (0.078)	-0.06 (0.491)
R-squared	0.109	0.132	0.286	0.295	0.12	0.111	0.285
Number of Enterprises[+]	167	166	167	166	166	167	167

Terms in brackets report the p-value.

*/**/*** denotes significance at the 10-/5-/1 percent level.

[+] The number of enterprises differs as there is one company with a negative value added per employee. This company therefore is excluded from the estimations when the logarithm of the VAE is applied.

Table 5

Regression results for the employment growth of codetermined and not-codetermined firms on board level

	Endogenous Variable ($Empl_{2007} - Empl_{2005}$)						
Exogenous Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Board+	-0.05 (0.525)	-0.06 (0.404)	-0.06 (0.386)	-0.08 (0.21)	-0.06 (0.394)	-0.04 (0.591)	-0.06 (0.354)
Number of employees	-0.2 e-03** (0.02)	-0.2 e-03** (0.03)	-0.1 e-03* (0.076)	-0.1 e-03 (0.179)	-0.2 e-03* (0.051)	-0.2 e-03** (0.014)	-0.1 e-03* (0.085)
Number of employees squared	1.49 e-08** (0.022)	1.55 e-08** (0.016)	9.92 e-09 (0.102)	9.17 e-09 (0.125)	1.43 e-08** (0.026)	1.54 e-08** (0.018)	9.62 e-09* (0.11)
Value added per employee (log)		0.13*** (0.01)		0.09** (0.041)	0.08* (0.063)		
Profitability (%)		-0.01** (0.047)	-0.1 e-02 (0.632)			-0.4 e-02 (0.365)	
Share of labor costs (%)	0.03 (0.702)	0.44** (0.033)	0.15 (0.372)	0.11 (0.137)	0.06 (0.438)	0.18 (0.326)	0.08 (0.292)
Labor cost increase (dummy-variable: 1 = increase, 0 = decrase)			0.31*** (0.000)	0.31*** (0.000)			0.31*** (0.000)
Constant	0.27 (0.011)	-1.39 (0.026)	-0.1 (0.449)	-1.01 (0.034)	-0.67 (0.19)	0.19 (0.163)	-0.07 (0.553)
R-squared	0.102	0.146	0.247	0.264	0.123	0.107	0.246
Number of Enterprises+	167	166	167	166	166	167	167

Terms in brackets report the p-value.

*/**/*** denotes significance at the 10-/5-/1 percent level.

+ The number of enterprises differs as there is one company with a negative value added per employee. This company therefore is excluded from the estimations when the logarithm of the VAE is applied.

Table 6

Descriptive statistics for variables included in the regressions of table 2 and 3

Variable	All companies		Codetermined Companies		Not-codetermined companies	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
g1 = $(\mathrm{Empl}_{2007} - \mathrm{Empl}_{2005}) / 0.5(\mathrm{Empl}_{2007} + \mathrm{Empl}_{2005})$	0.06	0.3	-0.01	0.21	0.09	0.33
g2 = $(\ln \mathrm{Empl}_{2007} - \ln \mathrm{Empl}_{2005})$	0.07	0.37	-0.01	0.23	0.1	0.4
Board^{+}	0.27	0.45	1	0	0	0
Number of employees	896.28	1056.61	998.78	389.12	858.47	1212.93
Number of employees squared	1,930,040	1.37 e+07	1,145,604	884,271	2,196,111	1.6 e+07
Value added per employee	62,576	92,362	86,636.84	126,620	53,701	74,690
Profitability (%)	1.37	16.36	4.84	31.5	0.09	0.17
Share of part-time workers (%)	0.27	0.3	0.15	0.14	0.32	0.33
Share of female workers (%)	0.38	0.26	0.28	0.22	0.42	0.26
Number of entities	8.56	25	6.29	10.8	9.41	28.5
Share of labor costs (%)	0.46	0.44	0.48	0.77	0.45	0.22
Labor cost increase (dummy-variable: 1 = increase, 0 = decrase)	0.69	0.46	0.71	0.46	0.69	0.47
Subsidies per employee (€)	2583.97	17,482.15	9,198.25	33,008.57	144.27	900.44
Family-owned^{+}	0.14	0.35	0	0	0.2	0.4
Sector I (transport, storage and communication)$^{+}$	0.32	0.47	0.44	0.5	0.27	0.45
Sector K (real estate, renting and other business activities)$^{+}$	0.16	0.37	0.29	0.46	0.11	>0.32
Number of enterprises^{++}	167		45		122	

$^{+}$Dummy-variable: 1 = yes, 0 = no. Reference category for industry dummies = K 74.

$^{++}$In the regression models the log value added per employee and in the descriptive statistics the value added per employee are entailed. For reasons of confidentiality, this inaccuracy could not be changed in retrospect, so the total number of enterprises differs.

7. Discussion

In the present paper potential economic consequences of co-determined supervisory boards on employment growth have been determined. Because of the small sample size, it is not the aim of this study to provide comprehensive explanations, but only to compare percentage differentials concerning several control variables. According to the results of different regressions only one model suggests a negative relation between supervisory board existence and employment growth. All other models indicate no significant correlation between the two variables. It is demonstrated that (depending on the particular model) the logarithmized value added per employee, the share of female workers, the share of labor costs, the sector K (real estate, renting and other business activities) and the dummy reflecting labor cost increase are significantly related to employment growth. It is shown that the specification of the independent employment variable obviously does not impact the results to that extent as it is the case in the works council literature.

The main part of the results, therefore, does not support the hypotheses proposed in section three. The section that introduced the theoretical framework explained companies with co-determined supervisory boards were expected to grow less than companies without them, a supposition substantiated by the fact that the establishment of a supervisory board does not depend on the initiative of the workforce but is regulated by law. Therefore, since the implementation of a supervisory board and, for larger companies, the extent of co-determination depends on firm size, some companies may hesitate to grow for fear of falling into the scope of a broader co-determination act. The management of these firms may prefer passing up economic advantages like economies of scale to increasing the workforce. However, for the companies at hand apparently this expectation does not proof true.

As is the case with workers' participation rights at the establishment level, at the enterprise level workforce advocates have two ways to represent the employees' interests: they can invest in rent-seeking activities or in the creation of joint establishment surplus. Depending on their power and goals, the employees' representatives could prefer to pursue their own claims rather than the needs of the company, in which case negative effects on the future recruitment behavior of a company can be expected; the owners or managers will avoid too much worker influence and will fear that lay-offs in critical times will not be enforceable. In the study at hand no correlation of this kind is indicated.

While due to a lack of essays studying potential impact of supervisory boards on employment the present paper refers regularly to the works council literature, one important difference between the works council and the supervisory board at least partly accounts for the varying results obtained: Whereas works councils are optional, supervisory boards are required by law. In the context of works council establishment the problem of endogeneity plays an important

role. Kraft / Lang (2008) and Jirjahn (2009) demonstrate that works councils tend to be introduced in economically difficult times in order to protect the workers' quasi-rents. So the works council effect may be biased. Furthermore, the literature on works councils shows that the right definition of company size is also essential when analyzing any relation between works council existence and employment growth: Since smaller companies less often have a works council than do larger firms, and since works councils in larger companies are, by law, assigned more participation rights than their counterparts in smaller firms, the correct assessment of the size of the company is extremely important in the works council literature.

The situation is different with supervisory boards; their establishment and the accompanying influence of the workers are regulated by law based on the firm's size and legal form. However, the results by Boneberg (2009a) and Wagner (2011) suggest that also in the case of supervisory boards, the outcome might be biased; that may only have different roots than is the case in the works council literature. In the present study whether a firm has a supervisory board or not is assumed as a given. However, the owners or managers of a company may decide to implement a co-determined supervisory board because they anticipate positive effects on firm performance. To determine whether this is the case, a variable is needed that reflects the decision in favor of or against a supervisory board and that is not related to productivity or profitability. Because no such variable is available, an investigation of this kind is not practicable.

In the present investigation companies with supervisory board are compared with those firms that do not have a supervisory board relating to their employment growth. The regressions show that apparently there is no significant correlation between supervisory board existence and a firm's employment growth. However, the results can also imply that supervisory boards generally are weak and ineffective institutions, even if they are co-determined. One possibility to escape this problem could be the division of the sample into three groups: companies with supervisory board, companies with co-determined supervisory board and companies without supervisory board. In that case it could be seen whether there is a difference in performance between companies with co-determined and not co-determined supervisory board. From that it could be followed whether co-determination in a firm's supervisory board positively or negatively influences the institution's performance. Unfortunately, the data does not allow such an investigation as only for the year 2007 the information exists, whether the supervisory board is co-determined or not. For the year 2005, this information unfortunately is missing. The „Board" variable only tells whether there is a supervisory board, but does not differentiate whether it is co-determined or not.

Although the study has limitations, the paper provides new information on the economic consequences of co-determination. The data used appears to be

more reliable because it facilitates a direct comparison of firms with and without co-determination at the enterprise level. The brief literature survey demonstrated that empirical evidence is needed concerning workers' participation at the enterprise level. The present study is the second to analyze the economic consequences of employment growth. When studying the 2004 Third Part Act it shows that employment growth does not significantly correlate with supervisory board existence.

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