Mandatory Codetermination in Germany: Five Essays on Employment and Productivity

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1 Introduction

Almost every introductory industrial organization book explains the classical theory of firms through an entrepreneur who burdens financial risk of bankruptcy in the hope for profits. In order to generate some output, workers are hired and their wage is determined on a spot market. Since the entrepreneur provides capital and also carries full responsibility, he or she has the whole decision-making power in the firm. In a perfectly competitive world, such organization of markets leads to a maximization of society's welfare. In Reality, however, many ifs and buts prevent efficient allocations through market forces. In many cases dysfunctions are caused by market failures. Another reason for market inefficiency is a political intervention that prevents efficient yet socially undesired market equilibria. A political intervention into markets however has not to be harmful per se. It can also be used to increase market performance by avoiding market dysfunctions. Market failures and political interventions ensure that unregulated welfare maximizing markets are rather the exception than the rule.

Labor markets belong to the strongest regulated markets in industrial countries and, especially in continental Europe, they are far away from unregulated spot markets. The analysis of effects of a very particular political intervention into the German labor market is the topic of this thesis. I analyze how mandatory codetermination affects different issues of company's performance. In principle, mandatory codetermination means that the legislator constrains the firm owner's decision rights by giving codetermination and veto rights regarding the owner's decisions or even by shifting some decision power from the owner to the employees.

The German system of codetermination consists of two pillars. On the one hand, employees are allowed to adopt works councils. A works councilor represents the interests of employees at establishment level. The source of these codetermination rights is the Works Constitution Act. It grants extensive information, consultation and codetermination rights with respect to social and work place-related aspects. On the other hand, the Codetermination Act enables codetermination in supervisory boards of large companies. It defines that in companies with at least 2000 employees, half of the seats of the supervisory

board has to be allocated to labor representatives. In the event that a vote results in a standoff, the chairman of the supervisory board has two votes. As the chairman is a representative of the capital side, this structure results in almost parity distribution of votes in the supervisory board[1]. Although the effects of codetermination by works councils in establishments and almost parity codetermination in supervisory boards are examined in this thesis, an emphasis is devoted to impacts of works councils.

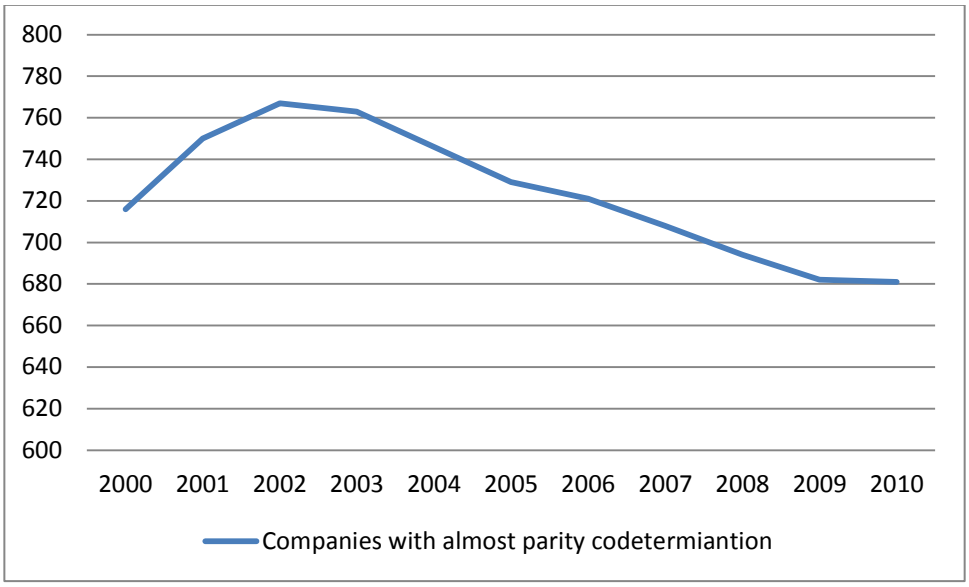
If the relevance of the German model of codetermination and its development in the last years are considered, a reduction of importance over several years followed by slightly recovery during the financial crisis can be observed. At the beginning of the present century, codetermination seemed to be a relic of the industrial society with no place in a modern information society. Michael Rogowski, the president of the Bundesverband der deutschen Industrie, for example, characterized in a STERN interview in 2004 codetermination as a mistake of history[2]. This image, however, changed in the financial crisis where the society seemed to rediscover the advantages of codetermination with respect to a rapid response capability in which employer and employee are pulling together. In a FAZ article in 2010, for instance, employers praise the role of German codetermination during the financial crisis and even highlight how fast a works council helped to find a way through the crisis that was, under the given circumstances, satisfactory for employees and employer[3]. Even the journal THE ECONOMIST highlighted the role of German works councils during the crisis in an article in 2010 called “Inside the Miracle”[4].

Regarding the development of codetermination in Germany in the last years, a decline in the number of almost parity codetermined supervisory boards and in the share of codetermined establishments is observed. The latter seems to

[1] Beside almost parity codetermination, other forms of codetermination, namely one third codetermination and the Act on Codetermination in the Coal, Iron and Steel Industry, exist in German supervisory boards. With respect to codetermination in the supervisory board, these kinds of codetermination are not discussed in his thesis.
[2] See Anonymous (2004).
[3] See Paul and Rossbach (2010).
[4] See Anonymous (2010).

stabilize at a lower level. Figure 1.1 shows the development of the number of almost parity codetermined supervisory boards.

Figure 1.1: Number of companies with almost parity codetermination

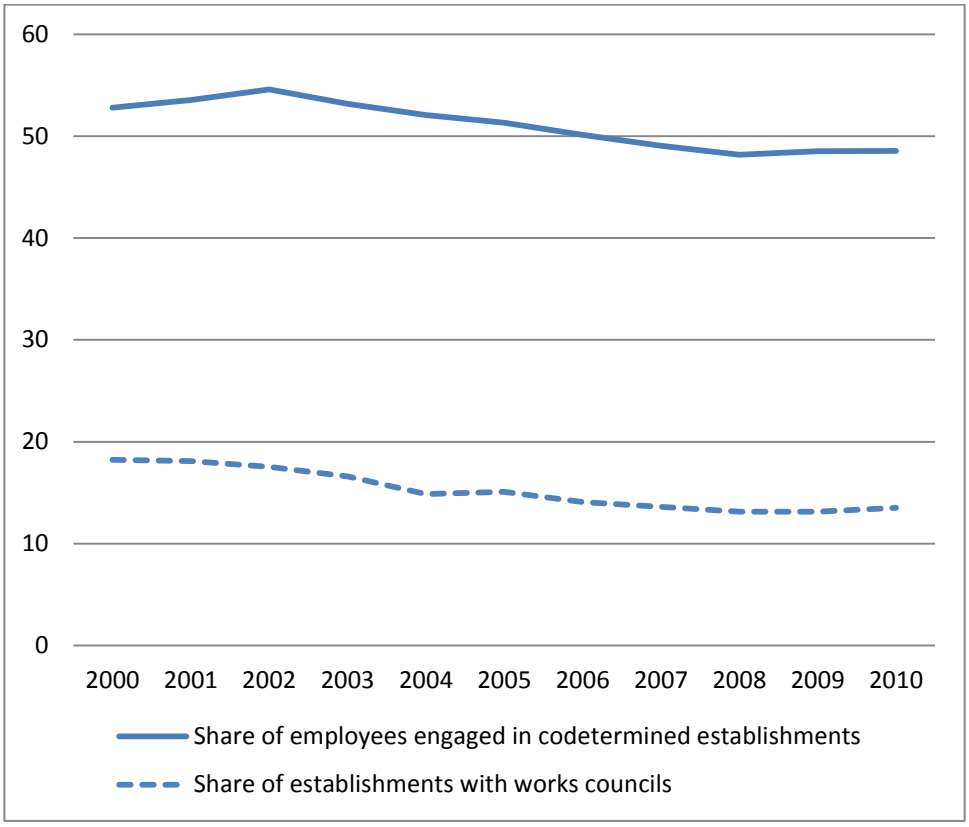


Source: WSI-Datenkarte 2005 and WSI-Datenkarte 2010.

After an increase between 2000 and 2002, the number of almost parity codetermined supervisory boards has continuously declined. This reduction however might be caused by the possibility to transform an almost parity codetermined company into a Societas Europaea (SE). Such SEs are not covered by the German Codetermination Act. The extent of codetermination in such companies is negotiated between employees and the management before transformation into a SE. Only if such negotiations fail, the German Codetermination Act applies as a subsidiary regulation.

Regarding the development of establishment level codetermination, also a decline is observed. Figure 1.2 shows the development of the coverage of codetermination at establishment level in the private sector.

Figure 1.2: Development of establishment level codetermination



Source: Own calculations based on IAB-Establishment Panel, waves 2000-2010.

If the share of covered establishment is considered, a decline beginning at almost 19 percent in 2000 to 13 percent in 2008 is observed. Since 2008 however this trend seems to be stopped and a slight increase is indicated. With respect to the share of covered employees, almost the same pattern can be observed. Since 2002 the share of covered employees declined and even excessed the 50 percent boundary in 2007. Since 2008 after all a slightly increase can be observed.

A better insight and an international comparison of establishment level codetermination between European countries provides the European Company survey 2009[5]. This survey contains interviews of more than 27,000 HR managers and employee representatives from the EU-27 and 3 candidate countries. It shows that, compared to the other countries, the incidence of works councils in German

[5] A descriptive evaluation of this survey contains Bechmann et al. (2010).

establishments is below average (21st place). Clearly, this does not allow assessing the work of work councilors. The survey also includes further qualitative information about German work councils. Overall, this survey contains a subjective assessment of the influence of German works councils by HR managers. They characterize works councils as a powerful institution that on the one side has a strong influence on decisions in establishments. Germany reaches the second place in a ranking regarding the influence of employee representatives on organizational policies. In the case of involvement of employee representatives in decisions concerning flexibility practices, Germany even reaches the first place. On the other side, codetermination seems to be very frowned upon by managers. Regarding management's agreeing that employee representation is constructive in improving work place performance and management's preference for direct consultation of employees, Germany realizes ranks in the bottom quarter of all examined countries. In a nutshell, the first impression arises that the incidence of institutional establishment level employee representation is less prevalent than in other European countries. These representatives are however deeply involved into operational decisions. Additionally, to put it more strongly, managers neither value nor desire such intuition compared to other European countries.

From a theoretical perspective, different predictions of the effects of codetermination on firm performance exist. The neoclassical view predicts that mandatory codetermination is an inefficient market constraint that is only used to shift rents from the employer to the employee. Referring to this, Jensen and Meckling (1979) highlight that if codetermination increases efficiency, firms would introduce it voluntarily. By contrast, Levine and Tyson (1990) oppose that the lack of voluntary codetermination results from a welfare decreasing market failure that has to be eliminated by the government. Finally, Freeman and Lazear (1995) argue that codetermination indeed increases welfare. It is however only the employee who profits from participation so that the employer is not willing to adopt codetermination rights voluntarily. In consideration of these predictions, the aim of this thesis is to contribute new insights into the discussion of effects of

mandatory codetermination whereas the main issue is to derive which consequences on firms and their behavior arise.

The structure of this thesis is as follows: in the next chapter I discuss how works councils affect overtime work. Beside the classical comparison of mean effects, this chapter contains an analysis of effects of works councils in different quantiles of the distribution of overtime hours and effects conditional on the agreed working hours. Works councils are encouraged by law to support the reconciliation of family and working life. Hence, in the third chapter, I examine how works councils affect working hours mismatches, i.e. mismatches between hours worked and the desired amount of working hours of employees, especially of parents. In Chapter 4, I consider how works councils affect the likelihood of overemployment and too high wage costs. In contrast to other studies, I use subjective assessments of managers if their establishments suffer from such problems and also control for heterogeneity of works councils. In the fifth chapter, I examine how the adoption of a works council affects employment growth in an establishment. Therefore, I control for potential heterogeneity between non-codetermined establishments and establishments that adopt a works council. Furthermore, I also identify the source of changes in employment growth. Chapter 6 analyzes productivity effects of almost parity codetermination in supervisory boards. In doing so, I especially analyze how ownership structures of companies interact with employee representatives. That is, I examine if the effect of codetermination depends on the existence of dominant owners and their role in the supervisory board. Chapter 7 contains final remarks.

2 The effects of works councils on overtime hours - a censored quantile regression approach

This chapter is based on the SFB 823 Discussion Paper No. 45/12. It is co-authored with Kornelius Kraft and Stanislav Volgushev.

2.1 Introduction

In the last two decades the topic of overtime work has frequently been investigated, with a substantial number of studies analyzing how labor market institutions affect overtime work. In our approach, we investigate how codetermination at establishment level influences the extent of overtime hours. The German system of industrial relations is characterized by two pillars: unions generally bargain over wages at industry level. Workers are additionally entitled – but not obligated – to elect a works council as an institution of employee representation at establishment level which acts as the workers' voice in negotiations with the management.

Works councils have explicit codetermination and even veto rights regarding overtime. Workers and management preferences frequently differ widely, particularly with respect to the extent of overtime, and in such cases a works council with its legally prescribed codetermination rights might well have an influence on the number of overtime hours supplied. Although our study is restricted to the German system of codetermination, our results provide evidence of general interest in the question of how the amount of overtime worked is affected by the existence of a body of worker representatives, i.e. a representation of the preferences of the supply side, which possesses bargaining power concerning determination of working time. In this sense it is strongly related to the general discussion on the effects of unions on overtime hours[6].

Compared to previous studies, we analyze the determinants of the impact of works councils in a very detailed way. In our study, we identify the effects of works councils on overtime hours based on two factors that strongly influence the employee's decision whether to work *additional* overtime or not. The first factor is the amount of standard working time. The effect of a works council might depend on the standard working hours if works councils intend to prevent

[6] Previous studies of this topic mainly focus on the USA and UK. While in the US union coverage seems to reduce the likelihood and amount of overtime hours (Trejo 1993), in the UK Bell and Hart (1999) find positive effects of a collective bargaining agreement on the incidence of overtime. Kalwij and Gregory (2005) however conclude that unions are of minor importance with respect to overtime.

excessively long working days. The second factor is the extent of overtime hours itself. The decision of a works council to agree to or to oppose the scheduling of additional overtime hours might strongly depend on the number of overtime hours that are done already. Therefore, in addition to analyzing the effects of works council effects given different levels of standard working hours, we additionally use censored quantile regression in order to identify differences in the values of overtime work across the quantiles of its distribution[7].

With respect to German codetermination rights, only few studies on overtime work exist and these show conflicting results. Kölling (1997), Gold (2004) as well as Schank and Schnabel (2004) use the IAB Establishment Panel, a German panel that contains establishments from all industries, and find positive effects of work councils on the amount of overtime hours. However, in the last study, the results are not robust. Gold (2004) additionally uses the Hannover Panel and finds no effects of works councils. In contrast to the IAB data, this panel only contains data from manufacturing establishments. Hübler and Meyer (1997) also use the Hannover Panel and find similar results as Gold (2004). Jirjahn (2008) additionally controls for the attitude of the management towards employee involvement. Irrespective of the view of the management, he finds no effects of works councils on the incidence of overtime work. All the mentioned studies use establishment data. In contrast we use the German Socio-economic Panel, i.e. personal data[8]. The only study that analyzes the effects of works councils on overtime with personal data is Kraft and Lang (2008). Using a difference-in-differences approach, they investigate how the introduction of a works council affects overtime hours and find no adoption effects. The same study demonstrates that in cases where only the presence of a works council is considered (instead of introduction within a difference-in-differences framework) the amount of overtime work is reduced.

[7] Although quantile regressions enables much more detailed inference on works councils' effects, other studies mainly apply conditional mean estimators. To our knowledge only Wagner et al. (2006) and Addison, Teixeira and Zwick (2010) apply quantile regressions. The first study analyzes productivity effects and the latter one analyzes wage effects of works councils.

[8] Several studies use this data in order to analyze determinants of overtime work. See e.g. Hunt (1999), Bell et al. (2000), Bauer and Zimmermann (2000). None of these studies, however, control for the effects of a works council.

Using the waves 2001 and 2006 of the German Socio-economic Panel we find strong heterogeneity in the effects of works councils on overtime work: if 35 hours per week are the standard working time, works councils increase the number of overtime hours. However, this effect decreases if higher quantiles are considered. If an employee has a 40 hours-per-week contract, works councils always significantly reduce the amount of overtime hours. This effect becomes even more pronounced if higher quantiles are analyzed.

This chapter is organized as follows: in the next section, we discuss the legal background of German codetermination rights and some theoretical background that might explain different effects of works councils on overtime work. Section 2.3 describes our data and contains a descriptive analysis of overtime hours. Section 2.4 contains a description of our econometric approach and a discussion of our results. Finally, we conclude in Section 2.5.

2.2 Legal and Theoretical Background

According to Golden (1998) as well as Clarkberg and Moen (2001) actual working time, i.e. the sum of standard working time and overtime work, is determined by the interaction of a) workers' preferences b) employers' demands and c) the institutional environment. In the standard labor supply theory where leisure is a normal good, employees dislike working and marginal disutility rises with the number of working hours so that, given a particular number of standard working hours, (too much) overtime work in particular generates high disutility.

Standard working time varies in Germany between industries and companies[9]. This is relevant in the given context as, with a low number of standard working hours, overtime will pose less of a problem for workers. In contrast, employees will tend to dislike doing overtime in addition to a high number of standard working hours. In accordance with this theory, surveys show that the majority of

[9] In Germany, standard working time is usually determined by collective bargaining agreements or, if such an agreement does not exist, individually between employee and employer. Works councils are not allowed to renegotiate parts of a collective agreement as long as such an agreement does not explicitly allow renegotiation with respect to particular topics.

workers would like to supply fewer hours (Constant and Otterbach 2011). Although no study exists on possible differences in working time preferences of full-time workers with different standard hours, Holst (2009) points to an asymmetry as part-time employees would like to work more while full-time employees would prefer to work fewer hours.

As argued by Pencavel (1986), employers mostly offer a "take-it-or-leave-it" package concerning working hours that includes standard working hours and requirements concerning overtime working. From the perspective of the employer many factors make a specific number of hours optimal. Theories on the determination of hours focus on fixed (e.g. investment into firm-specific human capital) versus variable costs (overtime premiums) of the factor labor. Higher fixed costs make it optimal to increase the number of hours worked[10]. In some cases employers demand some regular overtime of their workers, or at least they expect a willingness to work overtime if this is necessary for operational reasons such as temporarily high demand for the produced goods.

Beside employees' preferences and employers' demand, the institutional environment both restricts the range of possible working time agreements and also directly affects actual agreements. The institutional environment includes factors such as labor law and regulation, collective bargaining processes, normative practices and the macroeconomic climate. We consider the impact of a very powerful institution of the German labor market on overtime work, works councils. Their legal basis is the Works Constitution Act (WCA), which grants them considerable information, consultation and codetermination rights. Among other things working time arrangements are a major topic on the agenda of a works council. Section 87.1.3 of the WCA defines that works councils codetermine in the setting of temporal changes in agreed working hours. This naturally includes overtime work. The explicit agreement of the works council is required for the use of overtime in an establishment and the works council even has the right to veto

[10] See, e.g. Hunt (1999) and Hart (2004) for a detailed discussion on the overtime decision from a labor supply and labor demand perspective. Additional arguments on hours determination and employees' working hours preferences are provided by Lazear (1981) and Landers, Rebitzer and Taylor (1996).

overtime work. Hauser-Ditz, Hertwig and Pries (2008) analyze a survey of establishments of the private sector. In this survey 81% of the managers of 1235 codetermined establishments state that working time and overtime agreements are the most important agreements between management and works councils.

Codetermination rights can be used to avoid unhealthy and irksome working conditions. In addition works councils are encouraged to pursue social goals such as the reconciliation of family and working life. Too many working hours strain the worker's health as well as their social life and this may well induce works councils to oppose (too much) overtime work. This opposition will presumably become more pronounced with every additional working hour. In principle, this codetermination right also offers works councils the opportunity to persuade the management to hire additional employees instead of resorting to overtime.

As mentioned in our introduction, works councils are not mandatory. This offers the opportunity to analyze possible differences in overtime work between employees of establishments with a works council and those without. The use of quantile regressions furthermore allows us to consider the effects of works councils for different quantiles of the overtime distribution and to test the hypothesis that works councils will exert some pressure on the management if overtime hours are considered excessive but will tolerate small amounts of overtime.

In addition, the expected effect of the existence of a works council may depend on the number of standard working hours. If the number of standard working hours is low, additional disutility connected with overtime working will tend to be low and works councils will probably accept overtime work or might even encourage the use of it in order to increase total wage payments. In contrast, if the agreed standard working time already implies many hours, disutility from doing overtime will instead be high and the employees' representative body may well oppose demands of the employers to increase working time.

Contrary to our previous hypothesis that works councils tend to reduce overtime work, an opposite effect might also be conceivable. Besides having a direct influence on overtime, work councils are also able to influence the amount of

overtime work indirectly. As stated above, the most efficient number of employees and overtime hours results from minimizing the sum of fixed costs of employment and variable costs (overtime premiums) of the factor labor. Fixed costs include adjustment costs such as hiring and firing costs. Works councils have strong codetermination rights with respect to hires and dismissals. They are able to avoid hires and dismissals for particular reasons[11]. Furthermore, they bargain over redundancy payments if dismissals take place. This clearly influences hiring and dismissal costs and may well imply an indirect influence on overtime work if the cost relation between employment adjustment and overtime has been altered. In this case overtime work would be more frequently observed in codetermined establishments.

2.3 Data and descriptive statistics

For our empirical approach, we use waves 2001 and 2006 from the German Socio-Economic Panel. Further information about this data is provided by Wagner, Frick and Schupp (2007)[12]. We construct a dataset that only contains employees from the private sector between the ages of 20 and 60. We also drop employees from establishments that employ less than 5 workers because these establishments are not allowed to adopt a works council. Table 2.1 shows the descriptive statistics of our variables.

Our dependent variable is *overtime hours*. This variable measures the mean number of overtime hours worked per week. In our sample an employee works on average 3.071 overtime hours. Table 2.1 also contains some further variables with respect to overtime that are not used in the estimation but provide additional information on this issue. The dummy *overtime work* shows that 75.5 % of all observations worked overtime. Thus, our dependent variable is left-censored. Of

[11] See Gralla and Kraft (2011a) for a more detailed discussion on codetermination rights of works councils with respect to hires and dismissals.

[12] The data used in this study was extracted using the Add-On PanelWhiz for Stata®. PanelWhiz (http://www.PanelWhiz.eu) was written by Dr. John P. Haisken-DeNew (john@PanelWhiz.eu). See Haisken-DeNew and Hahn (2010) for details. The PanelWhiz generated do-file to retrieve the data used here is available from us upon request. Any data or computational errors in this study are our own.

those persons working overtime, the mean length of overtime work is 4.069 hours per week.

Our main independent variable is the dummy *works council*. This dummy has unit value if the observed person works in an establishment in which a works council exists. In our sample 57.6 % of all employees work in codetermined establishments.

Another covariate is the standard working time per week. There is a large number of studies discussing the effect of standard hours on overtime work in a work-sharing context[13]. Both in theory and in empirical studies the effects of standard working time on overtime hours are ambiguous. As mentioned earlier, an attenuation of the effect of standard working hours could be expected in codetermined establishments: if the marginal disutility of work rises with increasing working time and the aim of the overtime policy is avoidance of irksome working conditions, works councils will more often oppose the introduction or increase of overtime hours if standard working time is already high compared to cases where standard working time is rather low. Therefore the effects of works councils on the amount of overtime hours might depend on the level of standard working time. In order to control for such possible differences we also add an interaction term of works council and standard working time to our model.

We additionally control for person-specific characteristics. We control for the effects of education by adding two dummies, *university degree* and *vocational training,* into our model. These variables have unit value if the highest educational degree is a university degree or a completed apprenticeship. We also add the variable *tenure* in our model. This variable measures job tenure in years. In order to control for age effects, we add *age* and age^2 into our model. *Female* measures the effect of gender on the amount of overtime work and this variable has unit value if the observed person is a woman.

[13] See, e.g., Hunt (1999). Andrews, Schank and Simmons (2005) provide a short summary of previous studies on the effect of a change in standard working hours on actual working hours.

Table 2.1: Descriptive Statistics

	Mean	Std. Dev.
Overtime hours	3.071	3.873
Overtime hours given that person works overtime	4.069	3.977
Overtime work (dummy)	0.755	0.430
Works council (dummy)	0.576	0.494
Agreed working hours per week (x10)	362.461	63.595
University degree (dummy)	0.175	0.380
Vocational training (dummy)	0.700	0.458
Tenure	10.261	9.040
Age	40.788	9.754
Female (dummy)	0.393	0.488
Blue-collar worker (dummy)	0.429	0.495
Firm size: 5-19 workers (dummy)	0.193	0.394
Firm size: 20-99 workers (dummy)	0.222	0.416
Firm size: 100-199 workers (dummy)	0.112	0.315
Firm size: 200-1999 workers (dummy)	0.238	0.426
Firm size: 2000 workers and more (dummy)	0.235	0.424
East Germany (dummy)	0.201	0.401
Obs.	7395	

We control for occupation by adding the dummy *blue-collar worker.* This dummy has unit value if the observed person is a blue-collar worker. Differences between East and West Germany are measured by the dummy *east*. Finally, we add a year dummy, five establishment size dummies and nine industry dummies into our model in order to control for year, size and industry effects.

Table 2.2 shows mean values and tests differences of selected variables between establishments with and without a works council. Based on the full sample, the upper part of the table shows the means of both groups and the differences between them. Both the unconditional mean level of overtime hours and the mean number of overtime hours, given that an employee works overtime, do not

differ between employees from establishments with and without a works council. Nor do the incidence of overtime work and agreed working hours. The differences are always positive but of small magnitude and none of the variables are significantly different from each other. In the next step we only consider full-time employees. If we compare the means given that a person works at least 35 hours per week, the sign of the differences changes but they are still insignificant.

Table 2.2: Mean comparison tests of selected variables

	Works council	No works council	Difference
All			
Overtime hours	3.087	3.050	0.037
Overtime hours given that person works overtime	4.070	4.066	0.004
Overtime work (dummy)	0.758	0.750	0.008
Number of observations	4262	3133	
Only persons with at least 35 agreed working hours per week			
Overtime hours	3.265	3.375	-0.109
Overtime hours given that person works overtime	4.224	4.293	-0.069
Overtime work (dummy)	0.773	0.786	-0.013
Number of observations	3656	2510	

2.4 Method and Results

Our empirical study is based on two different estimation strategies. In general, we use two samples. The first sample contains all observations. The second sample is restricted to people who work at least 35 hours per week, which implies that this sample mainly contains full-time employees. Using each sample we estimate a model that identifies the effects of the existence of a works council on overtime hours (taking into account influences by other covariates). Based on the second sample we additionally estimate a model that controls for different effects of works councils given the particular level of contracted standard working time i.e. we add the interaction term *works council x agreed working hours* to our model[14].

First, we consider a Tobit model in order to provide results which can be compared with the findings of other studies. Note that this approach only estimates mean effects, i.e. it assumes that the effect of a works council does not differ in different quantiles of the overtime distribution. As heteroscedasticity leads to inconsistent regression results in a Tobit framework, we replace the variance σ^2 in the log-likelihood function by $\sigma_i^2 = \sigma^2[\exp(w_i'\alpha)]^2$. In this expression α is a vector of estimated coefficients of the heteroscedasticity term and w_i is a vector of several size and industry dummies[15]. We also perform Wald tests with the null hypothesis that the size and industry dummies have no influence on σ^2. In every estimated model we have to reject the null of homoscedasticity at 1%-level. Thus, the heteroscedastic Tobit model is the relevant one.

The last two columns in table 2.3 show the average marginal effects of the works council dummy (models 1 & 2) and the average marginal effects of the works council dummy given a particular level of the contracted standard hours (model 3). Standard errors are robust and clustered at individual level. We calculate two different types of average marginal effects: the column E(h|h>0) shows the

[14] We also estimated this model using the full sample. Our results of the interaction term are mainly driven by full-time employees. Thus, we refrain from showing the estimated results of this model based on the larger sample and concentrate on the sample of full-time employees.

[15] See, e.g., Greene (2008) for a discussion of heteroscedasticity in Tobit models.

average marginal effect of a works council on the level of overtime hours given that an employee works overtime, while the column Pr(h>0) contains the average marginal effect of work councils on the likelihood of overtime work[16].

In model 1 and model 2, we find no significant effects of works councils on the extent and the likelihood of overtime work. However, if we add the interaction term $works\,council \times agreed\,working\,hours$ to our model and calculate average marginal effects given a particular amount of agreed working hours, we find heterogeneous results. Although our specification allows us to calculate the marginal effect at any particular contracted working time, we only show the effects at the levels of 35 and 40 hours. The unions frequently ask for a level of 35 standard hours and, as a rule of thumb, usually 35 hours are regarded as a kind of minimum level of working time in the case of full-time employees. This number of standard working time is effective for 11 percent of our full-time observations. 40 agreed working hours are the mode of standard working time. In our sample, 41 percent of all observations state 40 hours as their contracted working time.

Table 2.3 shows that for an employee who has a 35-hour employment contract, the likelihood of working overtime increases by 8.3 percentage points if a works council exists. Additionally, on average he or she also works 0.721 overtime hours more per week. In contrast, an employee with a standard working time of 40 hours works on average 0.385 overtime hours less. The probability of working overtime also decreases by 4.0 percentage points.

[16] The average marginal effects are calculated by the margins command of STATA. For a detailed discussion of marginal effects in Tobit models, see Greene (2008). A detailed explanation of the margins command is provided by Cameron and Trivedi (2010).

Table 2.3: Average marginal effects of heteroscedastic Tobit models

	Effect of works councils at … agreed working hours	E(h|h>0)	Pr(h>0)
Model 1	No differentiation	-0.167 (0.110)	-0.019 (0.012)
Model 2	No differentiation	-0.167 (0.126)	-0.017 (0.013)
Model 3	35	0.721*** (0.230)	0.083*** (0.028)
	40	-0.385*** (0.138)	-0.040*** (0.014)

Notes: Model 1 is based on 7395 observations of part-time and full-time employees, Models 2 and 3 are based on 6166 observations of employees with at least 35 standard working hours. ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Standard errors in parentheses are robust and clustered at individual level. Standard errors in Model 3 are calculated by the delta method. For full estimation results see Table 2.5 in the Appendix.

As mentioned previously, Tobit models only estimate the mean effect of work councils on overtime work. Particularly with respect to overtime work the presence of a works council might exert a different influence among different quantiles of the distribution of overtime hours. This hypothesis can be motivated by increasing marginal disutility from working, inducing works councils to prohibit excessively long working days. In order to identify the effect of works councils on different parts of the distribution of overtime hours, we consider a linear quantile regression model[17]. To cope with the presence of censoring, we propose the use of the estimator of Peng and Huang (2008). See the description below for more details. In our approach, we focus on the upper part of the distribution that is on quantiles between the median and the 0.9 quantile because we expect an influence of a works council at the upper tail.

Our reasons for choosing the method of Peng and Huang (2008) instead of the Powell (1986) estimator were twofold. First, for the present sample the approach

[17] See, e.g, Koenker (2005).

of Powell (1986) presents considerable computational difficulties. Second, as discussed in Koenker (2008), the use of Peng and Huang (2008) methodology has advantages in terms of efficiency, i.e. the estimators typically have a smaller asymptotic variance. A detailed comparison of the two methodologies can be found in Koenker (2008) and Portnoy (2010).

For a precise description of the Peng and Huang (2008) approach, denoted by $\tilde{Y}_{i,j}$ the overtime hours of person *i = 1,…,N* in year *j = 1,…,n_i*, by $Z_{i,j}$ the corresponding covariate and define $\delta_{i,j} = I\{\tilde{Y}_{i,j} > 0\}$ as censoring indicators. The observations corresponding to zero overtime hours are thus considered as left-censored. In order to transform left censoring into right censoring, we `reversed time´, that is we set $\tau = 1 - \tilde{\tau}$ and $Y_{i,j} \coloneqq -\tilde{Y}_{i,j}$. Define an equally spaced grid of quantile values as $\tau_k = \frac{k}{100}$, $k = 0, \dots, 50$. Set $I\{Y_{i,j} \geq \bar{\beta}(0)^t Z_{i,j}\} \equiv 1$ and sequentially define the estimator $\bar{\beta}(\tau_k)$ as approximate solution of the estimation equation

$$\sum_{i=1}^{N}\sum_{j=1}^{n_i} Z_{i,j}\left(\delta_{i,j} I\{Y_{i,j} \leq \bar{\beta}(\tau_k)^t Z_{i,j}\} - \int_0^{\tau_k} I\{Y_{i,j} \geq \bar{\beta}(u)^t Z_{i,j}\}\frac{du}{1-u}\right) \approx 0 \qquad (2.1)$$

with $\bar{\beta}(u) \coloneqq \bar{\beta}(\tau_{k-1})$ for $u \in [\tau_{k-1}, \tau_k)$. The estimators of the coefficients in the left-censored model are now given by $(\hat{\beta}(u))_{u\in[0.5,0.9]} \coloneqq (-\bar{\beta}(1-u))_{u\in[0.5,0.9]}$. Standard errors are estimated by means of a clustered bootstrap method where for each *i = 1,…,N* the observations $(Y_{i,1}, Z_{i,1}, \delta_{i,1}), \dots, (Y_{i,n_i}, Z_{i,n_i}, \delta_{i,n_i})$ were considered as cluster. More precisely, we create N i.i.d. variables $\xi_1, \dots, \xi_N$ that follow an exponential distribution with parameter one and consider estimating equations of the form

$$\sum_{i=1}^{N}\xi_i\sum_{j=1}^{n_i} Z_{i,j}\left(\delta_{i,j} I\{Y_{i,j} \leq \bar{\beta}(\tau_k)^t Z_{i,j}\} - \int_0^{\tau_k} I\{Y_{i,j} \geq \bar{\beta}(u)^t Z_{i,j}\}\frac{du}{1-u}\right) \approx 0. \qquad (2.2)$$

Note that this approach is an extension of the bootstrap proposed by Peng and Huang (2008). The difference is that we account for possible dependencies within clusters. All results are based on 100 bootstrap replications. Computation was performed using Roger Koenker's *quantreg* package for the software R. Table 2.4 shows the results of this approach.

In Model 1, we find that the effect of a works council strongly depends on the quantile under consideration. At q(0.5), i.e. the median, works councils have a negligible effect on overtime hours. In higher quantiles, however the impact of the works council increases: the value of the 0.6 quantile is approximately 15 minutes lower for employees of codetermined establishments compared to employees from establishments without works councils. The difference increases to almost one hour per week at the 0.9 quantile. If we use the sample that only contains full-time employees, the results hardly change. The effect of the works council at the median triples, although it is still insignificant. The coefficients at the other quantiles are comparable to the results of Model 1, although the significance levels at q(0.6) and q(0.7) decrease.

In Model 3, we find a strong heterogeneity in the effects of works councils. On the one hand, the impact of a works council strongly depends on standard working time. On the other hand, it also strongly depends on the regarded quantile of the distribution. Regarding the effects from q(0.5) to q(0.7), the values of the conditional quantiles are approximately 1 hour higher in codetermined establishments than in non-codetermined establishments if an employee regularly works 35 hours per week. This difference, however, decreases at higher quantiles and disappears at the 0.9 quantile.

In contrast, employees with a 40-hours employment contract always work fewer overtime hours than employees from non-codetermined establishments. We find a significant reduction in overtime hours at the median, and the magnitude of this effect increases with higher quantiles. While at the median an employee of a codetermined establishment works approx. 20 minutes less than an employee from an establishment without a works council, this difference increases to

approximately one hour and 18 minutes if the 0.9 quantiles of both groups of employees are compared.

Table 2.4: The effect of works councils on overtime hours (censored quantile regression)

	Effect of works councils at … agreed working hours	Quantiles q(0.5)	q(0.6)	q(0.7)	q(0.8)	q(0.9)
Model 1	No differentiation	-0.047 (0.139)	-0.245** (0.114)	-0.361** (0.152)	-0.587*** (0.167)	-0.948*** (0.308)
Model 2	No differentiation	-0.132 (0.160)	-0.194 (0.119)	-0.321* (0.177)	-0.523*** (0.201)	-0.863*** (0.360)
Model 3	35	0.959*** (0.360)	0.953*** (0.366)	1.023** (0.406)	0.762* (0.435)	0.252 (0.531)
	40	-0.341** (0.163)	-0.556*** (0.173)	-0.641*** (0.232)	-1.017*** (0.286)	-1.295*** (0.444)

Notes: Model 1 is based on 7395 observations of part-time and full-time employees, Models 2 and 3 are based on 6166 observations of employees with at least 35 standard working hours. ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Standard errors in parentheses. Standard errors are bootstrapped with 100 replications and clustered at individual level. For full estimation results see Tables 2.6 – 2.8 in the Appendix.

2.5 Conclusion

Although works councils have extensive codetermination rights with respect to overtime work, only a few studies on this topic exist. In our study, we analyze how overtime working differs between establishments with works councils and establishments without works councils. On average works councils do not affect overtime hours. However, we find a strong heterogeneity in the effects of works councils, which depend on the one hand on the standard working time. On the other hand, the effect of a works council strongly differs among quantiles of the distribution of overtime hours. If the number of regular working hours is low, an employee of a codetermined establishment works more overtime than an employee of a non-codetermined establishment yet this effect decreases with

higher quantiles. In contrast, if standard working time is high, works councils reduce overtime working at the median. This prevention effect actually increases with higher quantiles.

Thus the effects of a works council on overtime hours depend heavily on the specific circumstances. How are these somewhat surprising results explained? If works councils do what they are expected to do, namely represent the workers' interests and preferences, the results could be interpreted in the following way: in the case of a working week of 35 hours disutility from working is lower than wages including overtime premiums, but with 40 hours the contrary is true. Work councils do not prevent overtime work in general. Our results provide evidence that they prevent an excessively long working week.

Our approach illustrates the use of quantile regressions to investigate the different effects of an institution like the works council on various regions of the response variable. This demonstrates the potential for further application of this method in many other areas and should help to provide a much more detailed and realistic comprehension of the working of institutions.

2.6 Appendix

Table 2.5: Heteroscedastic Tobit results

	Model 1 Coeff. (Std.)	Model 2 Coeff. (Std.)	Model 3 Coeff. (Std.)
Works council	-0.264 (0.174)	-0.252 (0.190)	13.507*** (3.219)
Agreed working hours (week) x 10	0.010*** (0.001)	0.009** (0.004)	0.030*** (0.007)
Agreed working hours (week) x Works council x 10			-0.035*** (0.008)
University degree	2.409*** (0.298)	2.617*** (0.329)	2.633*** (0.328)
Completed apprenticeship	1.176*** (0.238)	1.312*** (0.265)	1.310*** (0.263)
Tenure	-0.014 (0.009)	-0.014 (0.010)	-0.014 (0.010)
Age	0.252*** (0.051)	0.263*** (0.055)	0.263*** (0.055)
Age^2	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Female	-1.979*** (0.168)	-1.985*** (0.178)	-1.977*** (0.178)
Blue collar	-1.772*** (0.177)	-1.850*** (0.193)	-1.875*** (0.194)
Size 20-99	0.445** (0.201)	0.393* (0.219)	0.425* (0.219)
Size 100-199	0.527** (0.256)	0.506* (0.278)	0.561** (0.278)
Size 200-1999	0.560** (0.229)	0.420* (0.251)	0.425* (0.251)
Size >1999	0.842*** (0.252)	0.598** (0.275)	0.577** (0.276)
East	0.330* (0.169)	0.203 (0.185)	0.212 (0.185)
Year2006	-0,953*** (0.114)	-0.961*** (0.124)	-0.946*** (0.124)
No. of obs.	7395	6166	
Chi^2-value (H_0: Homosce.) (p-value)	52.47 (<0.001)	45.24 (<0.001)	45.82 (<0.001)

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Clustered standard errors in parentheses. Industry dummies included but not reported.

Table 2.6: Censored quantile regression results, full sample

	Model 1				
	q(0.5) Coeff. (Std.)	q(0.6) Coeff. (Std.)	q(0.7) Coeff. (Std.)	q(0.8) Coeff. (Std.)	q(0.9) Coeff. (Std.)
Works council	-0.047	-0.245**	-0.361**	-0.587***	-0.948**
	(0.139)	(0.114)	(0.152)	(0.169)	(0.308)
Agreed working hours (week) x 10	0.008***	0.007***	0.008***	0.008***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
University degree	2.627***	1.900***	1.877***	2.301***	2.165***
	(0.429)	(0.241)	(0.258)	(0.270)	(0.402)
Completed apprenticeship	1.690***	1.050***	0.695***	0.549***	0.556
	(0.350)	(0.186)	(0.187)	(0.188)	(0.298)
Tenure	-0.008	-0.010	-0.013	-0.026**	-0.033**
	(0.007)	(0.007)	(0.009)	(0.011)	(0.015)
Age	0.193***	0.178***	0.226***	0.268***	0.031***
	(0.047)	(0.055)	(0.037)	(0.047)	(0.088)
Age^2	-0.003***	-0.002***	-0.003***	-0.003***	-0.004***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Female	-1.490***	-1.613***	-1.741***	-2.194***	-2.746***
	(0.104)	(0.129)	(0.173)	(0.161)	(2.180)
Blue collar	-1.360***	-1.346***	-1.184***	-1.293***	-1.624***
	(0.137)	(0.140)	(0.158)	(0.192)	(0.252)
Size 20-99	0.296**	0.390**	0.506***	0.876***	1.702***
	(0.134)	(0.161)	(0.157)	(0.291)	(0.318)
Size 100-199	0.223	0.370	0.578*	0.944***	1.278***
	(0.187)	(0.242)	(0.305)	(0.342)	(0.468)
Size 200-1999	0.241	0.480**	0.593***	0.835***	1.393***
	(0.154)	(0.204)	(0.220)	(0.264)	(0.378)
Size >1999	0.553***	0.881***	1.229***	1.602***	2.390***
	(0.144)	(0.202)	(0.260)	(0.282)	(0.509)
East	0.269**	0.192**	0.216	0.332*	0.451**
	(0.116)	(0.097)	(0.155)	(0.190)	(0.207)
Year2006	-0.750***	-0.583***	-0.563***	-0.590***	-0.609***
	(0.094)	(0.088)	(0.128)	(0.131)	(0.183)
No. of obs.	7395				

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Clustered and bootstrapped standard errors in parentheses. Industry dummies included but not reported.

Table 2.7: Censored quantile regression results, full-time employees I

	Model 2				
	q(0.5) Coeff. (Std.)	q(0.6) Coeff. (Std.)	q(0.7) Coeff. (Std.)	q(0.8) Coeff. (Std.)	q(0.9) Coeff. (Std.)
Works council	-0.132 (0.160)	-0.194 (0.119)	-0.321* (0.069)	-0.523*** (0.201)	-0.863** (0.017)
Agreed working hours (week) x 10	0.000 (0.003)	0.005 (0.003)	0.006 (0.186)	0.012** (0.005)	0.028*** (0.000)
University degree	2.731*** (0.317)	1.940*** (0.267)	2.065*** (0.000)	2.498*** (0.350)	2.472*** (0.000)
Completed apprenticeship	1.774*** (0.284)	1.053*** (0.184)	0.776*** (0.001)	0.674*** (0.194)	0.736* (0.055)
Tenure	-0.009 (0.007)	-0.005 (0.006)	-0.008 (0.325)	-0.028*** (0.011)	-0.029 (0.118)
Age	0.185*** (0.048)	0.170*** (0.040)	0.207*** (0.000)	0.249*** (0.059)	0.290*** (0.001)
Age^2	-0.002*** (0.001)	-0.002*** (0.000)	-0.003*** (0.000)	-0.003*** (0.001)	-0.003*** (0.005)
Female	-1.512*** (0.110)	-1.569*** (0.122)	-1.784*** (0.000)	-2.210*** (0.168)	-2.737*** (0.000)
Blue collar	-1.417*** (0.135)	-1.329*** (0.158)	-1.244*** (0.000)	-1.449*** (0.233)	-1.878*** (0.000)
Size 20-99	0.298** (0.152)	0.318** (0.146)	0.379** (0.032)	0.619** (0.276)	1.553*** (0.000)
Size 100-199	0.258 (0.196)	0.376* (0.215)	0.459* (0.087)	0.758** (0.338)	1.287** (0.041)
Size 200-1999	0.188 (0.164)	0.305* (0.164)	0.376 (0.138)	0.656** (0.301)	1.361*** (0.000)
Size >1999	0.337* (0.188)	0.544*** (0.195)	0.801*** (0.001)	1.255*** (0.328)	2.069*** (0.000)
East	0.231** (0.105)	0.093 (0.137)	0.205 (0.281)	0.028 (0.176)	0.112 (0.667)
Year2006	-0.707*** (0.113)	-0.528*** (0.096)	-0.586*** (0.000)	-0.597*** (0.159)	-0.838*** (0.000)
No. of obs.			6166		

Notes: See Table 2.6.

Table 2.8: Censored quantile regression results, full-time employees II

	Model 3				
	q(0.5) Coeff. (Std.)	q(0.6) Coeff. (Std.)	q(0.7) Coeff. (Std.)	q(0.8) Coeff. (Std.)	q(0.9) Coeff. (Std.)
Works council	10.061*** (3.157)	11.511*** (2.976)	12.707*** 3.542 ()	13.218*** (4.527)	11.076*** (4.200)
Agreed working hours (week) x 10	0.017** (0.007)	0.022*** (0.007)	0.029*** (0.007)	0.034*** (0.009)	0.042*** (0.007)
Agreed working hours (week) x Works council x 10	-0.026*** (0.008)	-0.030*** (0.007)	-0.033*** (0.009)	-0.036*** (0.011)	-0.031*** (0.011)
University degree	2.850*** (0.356)	2.027*** (0.250)	1.996*** (0.281)	2.476*** (0.338)	2.510*** (0.536)
Completed apprenticeship	1.888*** (0.331)	1.009*** (0.228)	0.634** (0.256)	0.700*** (0.214)	0.755** (0.382)
Tenure	-0.013** (0.007)	-0.007 (0.007)	-0.009 (0.008)	-0.027*** (0.009)	-0.032** (0.013)
Age	0.188*** (0.035)	0.179*** (0.038)	0.223*** (0.052)	0.240*** (0.067)	0.326*** (0.125)
Age^2	-0.002*** (0.000)	-0.002*** (0.000)	-0.003*** (0.001)	-0.003*** (0.001)	-0.004** (0.002)
Female	-1.480*** (0.109)	-1.599*** (0.150)	-1.859*** (0.189)	-2.212*** (0.220)	-2.769*** (0.284)
Blue collar	-1.466*** (0.141)	-1.344*** (0.128)	-1.224*** (0.140)	-1.521*** (0.253)	-1.744*** (0.322)
Size 20-99	0.291** (0.148)	0.366*** (0.137)	0.416*** (0.154)	0.664*** (0.250)	1.569*** (0.476)
Size 100-199	0.318* (0.168)	0.509** (0.233)	0.521** (0.236)	1.013*** (0.281)	1.319*** (0.368)
Size 200-1999	0.164 (0.188)	0.345* (0.203)	0.454* (0.245)	0.747*** (0.287)	1.335*** (0.468)
Size >1999	0.304* (0.183)	0.608*** (0.230)	0.756** (0.298)	1.298*** (0.305)	2.168*** (0.623)
East	0.234* (0.131)	0.037 (0.120)	0.145 (0.206)	0.098 (0.213)	0.038 (0.343)
Year2006	-0.681*** (0.115)	-0.485*** (0.109)	-0.621*** (0.137)	-0.570*** (0.139)	-0.697*** (0.267)
No. of obs.			6166		

Notes: See Table 2.6.

3 Let's call it a day – The effect of works councils on working hours constraints in German establishments

This chapter is based on the SFB 823 Discussion Paper No. 36/12. It is co-authored with Kornelius Kraft and Julia Lang.

3.1 Introduction

The standard neoclassical models of labor supply tell us that only time endowment restricts the employee's working hours. Thus, working hours constraints, i.e. working hours that do not conform to the desired working hours of an employee, should not exist persistently. This prediction, however, has been challenged both by theoretical arguments and by empirical evidence in recent years. Using German data, for example, Holst (2009) as well as Constant and Otterbach (2011) show that there is a persistent gap between actual working time and desired working time, where fewer working hours are more frequently desired with income adjusted accordingly. Furthermore, less than fifty percent of all employees are satisfied with their current amount of working hours. The aim of our study is to analyze how works councils affect the likelihood of the existence of working hours constraints. Such works councils are a major institution within the German system of industrial relations and bargain over the organization of working time in an establishment[18]. They represent the interests of the employees at establishment level and have information, consultation and codetermination rights on a number of issues. Working time regulations in general and decisions on overtime are codetermined. Another emphasis of their activities is the recon-ciliation of work and family life. Thus, working hours constraints are clearly an issue that works councils may try to avoid.

The question as to why binding working hours constraints exist has been analyzed in a substantial number of studies[19]. Sousa-Poza and Henneberger (2002) as well as Otterbach (2010), for instance, use data from 21 countries and show that certain socio-economic characteristics explain the existence of a time mismatch. They identify income and agreed working time as major determinants of working hours constraints. Furthermore, family structures, especially the existence of children, influence the extent of desired hours and therefore a potential hours mismatch (Clarkberg and Moen 2001, Reynolds 2004, Tseng and Wooden 2005,

[18] Since the 1980s a considerable number of studies on the effects of works councils have been published. Frege (2002), Addison, Schnabel and Wagner (2004), and Jirjahn (2011) contain detailed surveys of this issue.

[19] See, for example, Otterbach (2010) for a survey of different studies on working hours constraints.

Holst 2007). Theoretical arguments provide no reliable explanation for working hours constraints. Different theoretical approaches such as principal-agent issues and firm-specific human capital (Kahn and Lang 1992) as well as implicit contracts (Kahn and Lang 1995) are at most weakly supported empirically. Job insecurity, in contrast, seems to have a positive influence on the likelihood of overemployment (Stewart and Swaffield 1997).

Compared to the determinants of working hours constraints, the consequences of such time mismatches have been analyzed less frequently. Empirical evidence shows that working time mismatch increases the probability of an employee changing their job within the company and in the worst case a constrained worker may even quit his or her job[20]. At the very least, such a job change destroys the job-specific human capital if the employee still works for the same employer. If the employee actually leaves the firm, the entire firm-specific human capital is lost.

Besides such welfare-decreasing effects of working hours constraints, additional negative effects on employee wellbeing with respect to job satisfaction and life satisfaction (Theodossiou and Zangelidis 2009, Wodden, Warren and Drago 2009, Grözinger, Matiaske and Tobsch 2008) as well as negative impact on health (Bell, Otterbach and Sousa-Poza 2011, Constant and Otterbach 2011, Grözinger, Matiaske and Tobsch 2008) have been identified. Wunder and Heineck (2012) find that not only an employee's own wellbeing is negatively affected by a working time mismatch, but even life satisfaction of his or her partner. Finally, if the mismatch between preferred working time and that which the employer requires is large, labor supply will not take place at all and this clearly affects welfare.

If working hours constraints are such a big issue, the question arises as to how works councils can help to reduce such constraints. Ellguth and Promberger (2007) provide evidence for a strong influence of works councils on working time. They find that codetermined establishments have significantly lower agreed

[20] See e.g. Antonji and Paxson (1992), Bijwaard, van Dijk and de Koning (2008), Böheim and Taylor (2004), Euwals (2001).

weekly working hours and also strongly differ in the usage of working time instruments such as overtime work and working time accounts. Besides a general influence on working time, works councils also have the objective to support the reconciliation of work and family life of the employees. In principle, such reconciliation means, among other things, that family life should not be (excessively) restricted by working time. Or in other words: works councils should prevent working time mismatches that negatively influence family life. As already mentioned above, family structures indeed influence time preferences and time mismatch. In particular the existence of children accounts for a major part of one's time endowment. Hence, a time mismatch of a working parent might strongly generate disutility from work because, besides insufficient leisure time, difficulties in childcare provision could emerge. For traditional reasons, time mismatch could influence women's behavior more strongly, and even prevent women from labor market participation.

Family-friendly practices are indeed more frequently used in codetermined establishments than in establishments without works councils. Heywood and Jirjahn (2009) show, for example, that the existence of a works council increases the likelihood of an establishment offering support with respect to childcare, keeping in touch with the employee during parental leave and also taking into account specific needs regarding working time and the job design of parents. Moreover, Beblo and Wolf (2004) find that codetermined establishments more frequently implement measures that facilitate the compatibility of work and family life. We therefore focus especially on the effect of works councils on working time constraints of parents.

Using data from the German Socio-Economic Panel (SOEP), we show that employees of establishments with works councils more often match their desired working hours, mostly due to a strong reduction of the probability of overemployment for parents, especially for mothers.

This chapter is organized as follows: in the next section, we discuss the legal background of German codetermination rights and, based on relevant working time mismatch theories, the potential impact of works councils on the outcome.

In Section 3.3, we describe our data, variables and our econometric models. Section 3.4 contains a discussion of our results. In Section 3.5 we discuss how a works council's influence on overtime can affect working hours mismatches. Finally, we conclude in Section 3.6.

3.2 Legal background and theoretical thoughts

The legal basis of the power of works councils is the German Works Constitution Act (Betriebsverfassungsgesetz, WCA). It defines that workers in establishments with at least five employees are allowed to adopt a works council. Works councils have extensive codetermination rights regarding social and workplace-related issues in an establishment. Although collective bargaining agreements might constrain the influence of works councils on the quantity of working hours per week, agreements regarding working time are the main topic area of works councils (Hauser-Ditz, Hertwig and Pries 2008). Above all Section 87.1.2 of the WCA has a fundamental influence on the quality of the working day, namely on beginning and ending, breaks and the distribution of working time over the week. Moreover, Section 87.1.3 of the WCA provides fundamental codetermination rights with respect to the use and amount of overtime work. Besides their influence on working time, works councils are also encouraged to facilitate reconciliation of work and family life (Section 80.1.2b of the WCA). On the one side works councils may contribute to a closer match of actual and preferred working time by agreements with the management on special arrangements regarding the working time of a parent. This takes into account the special requirements and duties of mothers and fathers. On the other side works councils may bargain over childcare services provided internally or externally by the establishment. Such employer-sponsored childcare facilities most likely affect the preferred working time of a parent and as such helps to alleviate a mismatch with actual working time in an establishment. Both options increase the likelihood of an improved working time match. However, not all establishments have a works council. In fact, only a minority do. This offers the opportunity to analyze possible

differences between establishments with and without a works council concerning hours match and mismatch.

Besides an adjustment through codetermination rights, German employees are also able to alter their working time according to the provisions on part-time employment of the Act on Part-Time Work and Fixed-Term Employment (Teilzeit- und Befristungsgesetz). The aim of this act is to support the realization of part-time work within an establishment. It allows every employee to reduce his or her working time as long as the change in working time does not unduly burden the employer. Although this act supports the possibility of an employee to reduce his or her working hours, a significant proportion of German employees are, as mentioned above, overemployed. Despite the fact that no direct link between this act and codetermination rights exists, works councils can still support the enforcement of the desired working time reduction of an employee. They could use their bargaining power and information rights in order to induce the management to comply with such a request that would otherwise not be accepted.

The simplest theory on labor supply and hour determination assumes the absence of restrictions of any kind and therefore an optimal match according to the preference of the workers can be achieved. In practice employers frequently make a "take-it-or-leave-it" offer concerning working hours (Pencavel 1986, 41). Several theories exist as to why an employer determines a specific number of hours and is not willing to negotiate about this[21]. However, we only discuss theories which might explain the influence of works councils on working hours constraints.

Golden (1998) as well as Clarkberg and Moen (2001) regard the determination of actual working time as the result of three forces: workers' preferences, employers' demands and the institutional environment in which hours decisions are mediated. In this connection, institutional environment is determined by legal constraints such as labor law and regulation, collective bargaining processes,

[21] See, e.g., Sousa-Poza and Henneberger (2002) for a discussion on the theoretical explanation of working hours constraints.

normative practices and the macroeconomic climate. The idea is that institutions are able to prevent exploitation of one side of the negotiators and direct the exchange towards a socially desired outcome. Works councils are explicitly involved in the process of working time determination. In addition works councils are encouraged to pursue social goals through their activities. This suggests that works councils try to reconcile the diverging preferences of employers and workers with regard to working hours.

Landers, Rebitzer and Taylor (1996) argue that employees are prepared to work more than desired in order to signal low disutility from work and therefore being a candidate for better paid positions within a firm. In principle, such overemployment is the result of the dynamic optimization of an employee in which disutility from the current time mismatch has to be compensated by the discounted additional future earnings that an overemployed worker expects. Addison, Teixeira and Zwick (2010), however, highlight that works councils increase the wage level, but also compress the wage distribution in an establishment. Thus, gains from pro-motions are lower, reducing the willingness of employees to be currently overemployed.

Another theoretical explanation for working time constraints is the job insecurity hypothesis. Steward and Sweffield (1997) argue that employers are able to increase working time without expecting quits if workers face a high risk of unemployment and the range of alternative jobs is scarce for macroeconomic reasons. Workers might accept overemployment rather than risk dismissal and unemployment. Works councils, however, have codetermination rights with respect to dismissals. Thus, they provide further protection from dismissal so that a working time mismatch caused by job insecurity should less frequently occur.

Freeman and Medoff (1984) and many others assert that unions act as an efficient channel to express dissatisfaction with working conditions. With regard to German industrial relations the body representing workers at establishment or firm level are works councils (FitzRoy and Kraft 1984, 1987). In combination with the strong codetermination rights regarding working time regulation, they provide

excellent opportunities to express the preferences of the employees and simultaneously to exert bargaining power concerning hours determination.

Finally, the effect of works councils on working hours constraints can also be rationalized by public choice theory. The decision as to who becomes a works councilor is the result of an election process, and these elections take place every 4 years. Workers interested in alternative working time rules will vote for candidates who promise to exert an influence in this direction. Thus, the elected employees will represent the working time preferences of the majority of the voters. This, however, also means that some workers will probably be worse off, namely if their preferences strongly deviate from the working time preference of the majority.

Similarly, the demand for family-friendly work policies probably reflects the preferences of the workforce and is of higher relevance if many parents work in an establishment. These parents then elect representatives who promise to commit to childcare.

A match between preferred and actual working time and in particular the introduction of employer-sponsored childcare services will probably be positively valued by public opinion. They may be regarded by works councils as fringe benefits, and bargaining for them may be part of a rent-maximization strategy (Heywood and Jirjahn 2009).

3.3 Data and descriptive statistics

For the empirical analysis we use the waves 2001 to 2009 of the German Socio-Economic Panel (SOEP) and construct an unbalanced panel of full-time private sector workers between the age of 20 and 60 (for further information on the data see Wagner, Frick and Schupp 2007)[22]. As works councils can be elected in

[22] We also used data that contained part-time employees. We were however unable to identify any significant effect of our independent variables on their working hours constraints. This might be explained by strong selectivity and heterogeneity in part-time work.

establishments with at least five employees, we drop all observations of persons working in very small firms with four workers and less.[23]

In the SOEP, information on the existence of a works council in an employee's establishment is only available for the years 2001 and 2006. To increase sample size, we make the assumption that the works council status does not change in a firm over time[24]. For the period before/after 2001 and 2006 in which employees do not change their job, we carry backward/forward the information on the existence of works councils. If workers stay in the same firm during 2001 and 2006 and report that they are represented by a works council in one year but not in the other year, we exclude observations for all years for which we do not exactly know whether the works council already/still existed (i.e. we drop the observations for all years except for 2001 and 2006). If workers switch jobs between 2001 and 2006, we use the works council information of the former employer up to the year of the job change and information of the new employer after the job change. If persons change job after 2006 or repeatedly between 2001 and 2006, we drop all observations concerned.

Our dependent variables are based on the difference between actual weekly working hours and preferred weekly working hours. The question about desired working hours in the questionnaire reads: "If you could choose your own number of working hours, taking into account that your income would change according to the number of hours: How many hours would you want to work?" Actual working hours are taken from the question "And how many hours do your actual working-hours consist of including possible over-time?" If both numbers are the same, there is no working hours mismatch and workers do not face any binding constraints. If preferred hours are higher than actual hours, persons are under-

[23] The data used in this study was extracted using the Add-On PanelWhiz for Stata®. PanelWhiz (http://www.PanelWhiz.eu) was written by Dr. John P. Haisken-DeNew (john@PanelWhiz.eu). See Haisken-DeNew and Hahn (2010) for details. The PanelWhiz generated do-file to retrieve the data used here is available from us upon request. Any data or computational errors in this study are our own.

[24] Using the IAB-Establishment Panel, Addison, Schank, Schnabel and Wagner (2006) show that approx. 2 % of all establishments dissolved or adopted a works council within 2 years. Thus, we think that the effect of a measurement error in the existence of a works council can be neglected.

employed. They are overemployed, in contrast, if they would like to work less than their actual working hours.

After excluding all observations with missing information on the relevant variables, our sample consists of 4992 full-time employees and 16140 observations. Table 3.7 in the Appendix presents the mean values of the variables we use in our estimations. It shows that there are large discrepancies between preferred hours of work and actual hours of work. On average, people work 42.48 hours a week, which exceeds their average contractually-agreed working hours of 38.54. Average preferred weekly working hours would be 37.69 - in other words, preferred working hours would be even less than the agreed working hours. However, there are also people who would like to work more. 6.6% of all people in the sample are underemployed, but the majority of employees, 66.5%, are overemployed and would prefer to work less than they do. Only 26.9% of all workers meet their working hours preferences exactly.

Regarding our main independent variable, namely a dummy for the existence of a works council, more than 60 per cent of all employees are represented by a works council in their establishment[25]. As we expect works councils to affect agreed and actual working hours (including potential overtime) in the interest of employees, we first descriptively analyze differences between firms with and without codetermination.

The mean values of working hours and hours constraints in Table 3.1 show that there are significant differences between employees in firms with and without works councils.

Agreed working hours are about one hour shorter in establishments with works councils, whilst actual working hours in firms without works councils exceed those in firms with works councils by as many as 1.309 hours. Thus, employees represented by works councils seem to work slightly less overtime. Works councils have strong decision rights with respect to overtime work and have to agree on its

[25] Although the majority of all establishments have no works council, those which have one are on average much larger and this explains the high percentage of workers represented by a works council.

use or extension. We discuss the issue of overtime as a possible way of adjusting actual working hours to preferred working hours in Section 3.5. Also, preferred hours of work are lower in codetermined establishments but, at about only 24 minutes, the difference is much smaller. The share of people without working hours constraints is 2.5 percentage points larger in firms with works councils. This is caused by a significantly lower percentage of overemployed workers of 4.7 percentage points. With respect to underemployment, works councils do not seem to enable employees to extend their working hours if they wish to work more. Underemployment is even more frequently observed in establishments with works councils. If a person is strongly constrained because of family duties and domestic work, preferences concerning working time, but also the possibility to realize preferred hours of work may differ. This should mainly be a problem for women, especially for those with children. Table 3.1 additionally shows the comparison of working hours for workers with and without a works council separately for men and women. Male workers, who are represented by a works council, are more likely to meet their working hours preferences, but again this is only caused by a lower probability of being overemployed.

With respect to underemployment, however, male employees in firms with works councils are even more often affected. For female employees the differences are less pronounced. All in all, women more often report facing working hours constraints. 25.1% of all female workers realize their preferred working hours compared to 27.8% of all male workers. Moreover, women are more frequently overemployed, whereas men are more often underemployed.

Table 3.1: Working hours for employees with and without works councils

	Works council	No works council	Difference
All			
Agreed working hours (week)	38.111	39.226	-1.115***
Actual working hours (week)	41.985	43.294	-1.309***
Preferred working hours (week)	37.541	37.936	-0.394***
No hours constraint (preferred=actual hours)	0.279	0.254	0.025***
Overemployed	0.647	0.694	-0.047***
Underemployed	0.074	0.053	0.021***
Number of observations	6150	9990	
Women			
Agreed working hours (week)	37.983	38.789	-0.806***
Actual working hours (week)	41.221	41.853	-0.632***
Preferred working hours (week)	36.019	36.282	-0.263**
No hours constraint (preferred=actual hours)	0.257	0.243	0.014
Overemployed	0.692	0.716	-0.023*
Underemployed	0.051	0.041	0.009
Number of observations	2179	2769	
Men			
Agreed working hours (week)	38.160	39.466	-1.306***
Actual working hours (week)	42.278	44.085	-1.807***
Preferred working hours (week)	38.125	38.843	-0.718***
No hours constraint (preferred=actual hours)	0.288	0.260	0.028***
Overemployed	0.630	0.681	-0.052***
Underemployed	0.083	0.059	0.024***
Number of observations	7221	3971	

***/**/* indicates statistical significance at the 1%, 5% and 10% level.

As mentioned above, children may also play an important role in the context of working hours constraints. Table 3.2 presents the differences in hours of work of

women and men with and without children. In our sample 19.1% of all full-time employed women and 40.7% of all male workers have children up to age 16.

Table 3.2: Working hours for employees with and without children

	Children	No children	Difference
Women			
Agreed working hours (week)	37.996	38.419	-0.423***
Actual working hours (week)	40.749	41.677	-0.927***
Preferred working hours (week)	35.832	36.207	-0.375***
No hours constraint (preferred=actual hours)	0.297	0.240	0.057***
Overemployed	0.649	0.715	-0.066***
Underemployed	0.054	0.045	0.009
Number of observations	947	4001	
Men			
Agreed working hours (week)	38.574	38.657	-0.082**
Actual working hours (week)	42.931	42.912	0.019
Preferred working hours (week)	38.548	38.265	0.283***
No hours constraint (preferred=actual hours)	0.276	0.279	-0.002
Overemployed	0.647	0.648	-0.001
Underemployed	0.076	0.073	0.003
Number of observations	4550	6642	

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level.

Full-time employed mothers work less than women without children and also prefer fewer hours. They are less often overemployed and less often affected by hours constraints. Thus, they seem to be frequently able to reconcile family and working life. It is possible that women with children are to a greater extent willing or more under pressure to advocate their working time preferences or employers are better prepared to adjust working hours to the needs of employee with family duties. However, mothers, who find it difficult to adjust their full-time working

hours to their demands, may not work at all or prefer part-time jobs, so this result may be driven by selectivity. In contrast to women, male employees with children have higher preferred working hours compared to men without children, maybe due to their role as breadwinner. As full-time working mothers on average seem to be more satisfied with their hours of work compared to women without children, the question arises as to whether works councils can especially help to assert working time preferences of employees with children against the employer. Table 3.3 reports the differences between full-time employed parents with and without works councils.

Table 3.3: Working hours constraints for employees with children and with/without works councils

	Works council	No works council	Difference
Women			
No hours constraint (preferred=actual hours)	0.329	0.255	0.074***
Overemployed	0.607	0.704	-0.096***
Underemployed	0.064	0.041	0.022
Number of observations	535	412	
Men			
No hours constraint (preferred=actual hours)	0.292	0.244	0.048***
Overemployed	0.617	0.705	-0.087***
Underemployed	0.089	0.050	0.039***
Number of observations	3023	1527	

Notes:***/**/* indicates statistical significance at the 1%, 5% and 10% level.

For mothers works councils seem to have strong positive effects on their chances of obtaining optimal working hours. The likelihood of being overemployed is 9.6 percentage points lower for mothers working in firms with works councils. For male employees with children the probability of working more than intended is also much lower in establishments with works councils, although they have a somewhat higher likelihood of being underemployed of 3.9 percentage points.

3.4 Econometric method and results

In line with previous studies (see e.g. Reynolds 2004, Tseng and Wooden 2005), we do not take into account the absolute difference between preferred and actual hours but only analyze which factors determine the probability of overemployment or underemployment. Thus, our dependent variable has three unordered categories[26]. Workers have either no hours constraint, are underemployed or are overemployed. First we estimate multinomial logit models with "no hours constraint" as base category. We use two different specifications. The first one includes a dummy for the existence of a works council whereas the second model additionally considers a works council's effect on hours constraints for employees with children by an interaction variable. As in the case of the descriptive analysis we also estimate all models separately for men and women. We take into account a set of socio-demographic and job-specific control variables (see also full estimation results in Tables 3.8 to 3.10 in the Appendix). We control for gender, age and marital status by including age in years and its squared value as well as dummies for women, married persons and for having at least one child up to age 16. Additionally, we add a dummy variable which equals one if a person lives in East Germany, two dummies for highest educational achievement (completed vocational training and holding a university degree) and a variable indicating monthly household income less own monthly wage (i.e. wage of the partner and other income if applicable). With regard to job and firm characteristics we include tenure in years, agreed weekly working hours, hourly wage, firm size dummies, industry dummies and dummies for blue and white collar workers differentiated by qualification level.

As mentioned before, persons with strong (expected) hours constraints might even choose to quit their job or to remain outside the labor market. If the samples of employed persons and persons not working are systematically different and factors affecting selection into the sample simultaneously affect the outcome of interest, our results could be biased. Unfortunately, to our knowledge, no

[26] Some studies treat this variable as being ordered. In our opinion it is not. Being, for example, underemployed is not a lower category than being overemployed. It is in fact a completely different labor market status that is a result of a bad match which is simply not comparable to another kind of bad match, namely being overemployed.

selection models with multinomial outcomes in the second stage exist. However, we can estimate binary probit models with sample selection. As a robustness test we therefore also consider sample selection, but this is only possible if we neglect the fact that employees can work more or less than they would prefer. We just differentiate between workers with and without hours constraints. As selection into the labor market is very different for women and men, we only estimate separate models and do not use the full sample[27]. In addition to the 11192 observations of male and 4948 of female full-time employees we include 5330 observations of men and 10289 of women who are unemployed or inactive[28]. Based on the two resulting larger subsamples of men and women we apply a probit sample selection model (Heckman probit model) introduced by Van de Ven and Van Pragg (1981). This model is a modification of the well-known Heckman sample selection model (1979) for continuous outcomes. The latent equation is

$$y_i^* = x_i\beta + u_{1i} \qquad (3.1)$$

such that the binary outcome (which equals one if a person's working hours exactly match her or his preferred hours of work)

$$y_i = (x_i\beta + u_{1i} > 0) \qquad (3.2)$$

is observed.

However, the dependent variable is not always observed but only if

$$y_i^{select} = (z_i\gamma + u_{2i} > 0) \qquad (3.3)$$

with

[27] For example, married women more often choose to stay at home, which is not the case for married men. The same is true for female and male workers with children.

[28] The share of persons participating in the labor market is quite low. However, note that we excluded all public sector employees.

$$u_1 \sim N(0,1)$$

$$u_2 \sim N(0,1)$$

$$corr(u_1, u_2) = \rho.$$

The selection equation is identified by adding several variables excluded in the estimation of having no hours constraints. We mainly use household and partner information as a dummy for being married and weekly working hours of the spouse (and a set of interaction variables), as these variables are insignificant in the multinomial logit model and thus do not explain hours constraints and underemployment or overemployment.

Although we are able to consider sample selection with this approach, the main disadvantage is that we lose some information as we cannot differentiate between overemployment and underemployment. The model only considers match and mismatch. Thus, we will concentrate on discussing the multinomial logit results and afterwards briefly present the Heckman probit results as a robustness check.

Table 3.4 shows the marginal effects of works councils on the probability of being overemployed or underemployed. As mentioned above, we estimate two different models. In the second one and in contrast to the first one, we differentiate between the effects of works councils on employees with and without children.

The results mainly confirm our findings based on the descriptive statistics. In the full sample employees whose interests are represented by a works council have a probability 2.3 percentage points higher of achieving their desired hours. This is due to the fact that they are less often overemployed. Works councils reduce the probability of working more hours than preferred by 3.2 percentage points. Model 2 differentiates between employees with and without children up to 16. The positive (reducing) effects of works councils on overemployment but also the negative effects on underemployment are more pronounced for people with children. Thus, they ensure that a larger share of workers meets their preferences,

but this is at the expense of those who would like to work more. However, the reduction of the share of overemployed workers in the presence of a works council is larger than the increased share of workers who cannot realize their preferences for more work. Overall, the probability of exactly meeting working time preferences for employees with children is 5.5 percentage points higher if they work in a firm with a works council.

In the next step we estimate both models separately for women and men. The marginal effects of Model 1 show, in contrast to the descriptive results, that all works council effects (both the positive and negative ones) are more pronounced for women. Women working in a codetermined establishment are 3.6 percentage points more likely to face no hours constraints, however the effect is insignificant. Moreover, they are 6.0 percentage points less likely to be overemployed compared to female employees in firms without works councils, but they also have a 2.3 percentage points higher probability of working less than they would like to. For men all effects are insignificant.

When we differentiate between women and men with and without children, the effects of works councils for both without children up to 16 are weak and insignificant. For men and women with children marginal effects of works councils are mostly significant and quite strong, especially for mothers, and similar but weaker for fathers. Female employees with children have a higher probability of 9.7 percentage points of exactly meeting their working time preferences compared to mothers working in firms without works councils. This is caused by a large reduction in the probability of being overemployed of 13.7 percentage points. These findings are consistent with the hypothesis that works councils support or even initiate the introduction of family-friendly work practices or corporate childcare. Moreover, works councils could be an efficient institution to help to communicate workers' preferences to the employer. However, the likelihood of underemployment is slightly higher for mothers working in establishments with works councils. Apparently establishments with works councils show a tendency towards "normal" working time.

Table 3.4: Marginal effects on working hours mismatch - multinomial logit models

			Difference in predicted outcome		
		Effect of works councils at …	Desired = Actual	Desired < Actual	Desired > Actual
Full sample N=16140	Model 1	No differentiation	0.023*	-0.032**	0.009
			(0.012)	(0.014)	(0.008)
	Model 2	Kids=0	0.008	-0.008*	0.001
			(0.014)	(0.016)	(0.009)
		Kids=1	0.055***	-0.081***	0.026**
			(0.018)	(0.020)	(0.011)
Female N=4948	Model 1	No differentiation	0.036	-0.060**	0.023**
			(0.022)	(0.025)	(0.011)
	Model 2	Kids=0	0.023	-0.041	0.019
			(0.023)	(0.026)	(0.012)
		Kids=1	0.097**	-0.137***	0.040**
			(0.041)	(0.043)	(0.018)
Male N=11192	Model 1	No differentiation	0.017	-0.018	0.001
			(0.015)	(0.017)	(0.010)
	Model 2	Kids=0	0.002	-0.007	-0.009
			(0.009)	(0.020)	(0.011)
		Kids=1	0.040**	-0.058***	0.017
			(0.020)	(0.022)	(0.013)

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Standard errors in parentheses. Included control variables see Tables 3.8 to 3.10 in the Appendix.

As mentioned above, selection effects into employment could bias our results on working hours constraints. Thus, we additionally estimate Heckman probit models which allow us to control for selection effects. Selection into employment should be more pronounced for women, especially for those who are married and/or have children. As traditionally in Germany, they still tend to be responsible for housework and family duties, whereas in many families men are still the breadwinners. Hence, faced with the decision to work or to stay at home, wives and mothers, who decide to participate in the labor market, may have special characteristics which could also have an impact on their perception of optimal working hours.

As some factors, for example being married, can have very different effects for men and women on their likelihood to work, and as selection into employment is a more important issue for women, we only run separate estimations for men and women and do not use the full sample. As mentioned above, we cannot

differentiate between overemployment and underemployment. We only estimate the effect of works councils on the probability of facing no hours constraints in this selection model. Table 3.4 shows that works councils have two opposing effects on the probability of exactly matching working time preferences. On the one hand, they reduce the probability of overemployment, on the other hand they increase the likelihood of underemployment. However, the first effect is much more pronounced than the second and we also find an overall positive effect of works councils on the probability of working preferred hours. The estimated marginal effects of the probit models with selection are comparable to those for the first category (desired hours = actual hours) of the multinomial logit models.

The complete estimation results of the selection equation and the second stage equation can be found in Table 3.11 in the Appendix. The results indicate that selection effects are only present for women. The marginal effects for works council existence of the second stage equation (with the binary dependent variable indicating a perfect match between actual and preferred hours) are reported in Table 3.5. Again, we estimate two models where we differentiate between men and women with and without children in Model 2.

Selection does not seem to severely bias our results presented above, as the effects shown in Table 3.5 are similar to those obtained in the multinomial logit models without controlling for potential selection bias. As an additional robustness test we also estimated an IV probit model where we treated the wage as endogenous and, for this purpose, instrumented the wage through several industry dummies. A Wald test, however, always rejected correlation between the error term of the reduced equation and the structural equation. Hence, we could not reject the null hypothesis that there is no endogeneity. Thus, we refrain from showing these results because they do not lead to contradicting estimates, in contrast to our previous results. Finally, we also changed the definition of our dependent variables as an additional robustness check. We changed the definition of being not constrained from a perfect working time match to a match that treats a deviation of up to 75 min per week (i.e. an average deviation of 15 min per day)

from the preferred working hours as still being not constrained. This wider definition does not change our results.

Table 3.5: Marginal effects working hours mismatch- Heckman probit models

		Effect of works councils at …	Absolute change in prob. of desired hours = actual hours
Female N=15237	Model 1	No differentiation	0.040* (0.024)
	Model 2	Kids=0	0.023 (0.024)
		Kids=1	0.113** (0.044)
Male N=16522	Model 1	No differentiation	0.019 (0.015)
	Model 2	Kids=0	0.002 (0.018)
		Kids=1	0.044** (0.020)

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Standard errors in parentheses. Included control variables and selection equation see Table 3.11 in the Appendix.

3.5 The role of preferences and overtime

Our previous results show that the likelihood of a perfect working time match increases if a works council exists in an establishment. This result is driven by a strong increase in the probability of observing a perfect match if people have children. In the following, we try to identify the source of the increase in this likelihood by analyzing the effect of works councils on preferred working hours and overtime. On the one hand, works councils may change preferred working hours. Works councils have to bargain about the beginning, breaks and the end of a work day. If they are able to enforce daily working time regulations that are more in line with the preferences of the employees, staff will presumably be prepared to work more hours per week. Thus, employees in codetermined establishments may desire to work more and then preferred working time would be closer to actual working time. In this case, the lower likelihood of

overemployment could be explained by an increase in the desired working time. Hence, we estimate the impact of works councils on preferred working time.

On the other hand, works council-induced constraints on the use of overtime might increase the likelihood of a perfect working time match. As already mentioned, whilst overtime can be an important source of working time mismatch, it may be strongly influenced by works councils[29]. We estimate a probit model where the dependent variable has unit value if the employee works overtime. Again, we use two models, one without and one with differentiation between employees with and without children[30]. The upper part of Table 3.6 shows the results of OLS estimates of the effects of the works council on preferred working time. The lower part contains the results of a probit model with a dummy for overtime working as dependent variable[31].

We find no effects of works councils on preferred working time, regardless of whether the observed person is a parent or not. Thus we expect that our results are rather driven by particular overtime effects of parents in codetermined establishments. The results for Model 2 in the probit equation indicate that parents in codetermined establishments work overtime significantly less often. The probability of not working overtime is 4.0 percentage points higher for parents represented by a works council. Hence, works councils reduce their actual working hours. For employees without children up to age 16 we find no significant reduction in the likelihood of overtime work. Hence, for this group works councils do not prevent overtime work.

[29] Hübler and Meyer (1997), Kölling (1997), Schank and Schnabel (2004) as well as Jirjahn (2008c) analyze the impact of work councils on overtime and find no or at most negligible effects. In contrast to our study, they use establishment data. Kraft and Lang (2008) use the SOEP and also estimate the effects of works councils. They, however, concentrate on the effect of works councils on the magnitude of overtime work after a works council has been adopted. Bauer and Zimmermann (1999) use the SOEP and estimate a model that is quite similar to our approach. They, however, do not control for the existence of a works council.

[30] Note that we lose 6 observations due to missing values in the dependent variable "overtime".

[31] Note that we do not separate our sample into male and female observations because our previous results show that both groups are similarly affected by works councils.

Table 3.6: Marginal effects of works councils on preferred working hours and on the incidence of overtime

Preferred working hours – Pooled OLS		
Model 1 N=16140	No differentiation	-0.013 (0.127)
Model 2 N=16140	Kids=0	-0.130 (0.144)
	Kids=1	0.227 (0.169)
Incidence of overtime - Probit		
Model 1 N=16134	No differentiation	-0.018 (0.012)
Model 2 N=16134	Kids=0	-0.008 (0.013)
	Kids=1	-0.040** (0.019)

***/**/* indicates statistical significance at the 1%, 5% and 10% level. Standard errors in parentheses. Included control variables see Tables 3.12 and 3.13 in the Appendix.

3.6 Conclusion

Although a large proportion of workers face working hours constraints that can strongly affect job satisfaction and health, the effect of labor market institutions on such constraints has largely been neglected in the previous literature. We analyze how worker representation on the establishment level by works councils affect the likelihood of being underemployed, overemployed or employed according to one's preferences. We find that works councils indeed increase the likelihood of matching employees' working time preferences by mainly reducing the likelihood of overemployment. However, we also find a small increase in the likelihood of underemployment. Additionally, our results show that parents even more frequently match their preferred working time which can be explained by a fundamental task of works councils, namely the reconciliation of family and working life.

Moreover, our results on overtime show that the somewhat reduced probability of the occurrence parents of working overtime can be a driving force for lower overemployment in codetermined establishments.

Hence, worker codetermination affects more areas than the more commonly investigated topics such as productivity, profits, wages, turnover and innovation. Employees will most likely very much appreciate cooperative solutions to problems connected with differences between their working time preferences and the expectations of the employers. In turn, labor supply may react to the employee-orientated determination of working conditions. Given the increasing contribution of married women to labor supply and the growing importance of reconciling family life and work against the background of demographic problems faced by most developed economies, our results are probably not insignificant.

Our results imply some questions for future research. If works councils reduce the likelihood of constrained working hours, which consequences will arise for the employer? Does a greater flexibility of agreements on working time towards employees' preferences in contrast restrict the power to determine working hours from the employer's view? Does this increase production costs and therefore imply a redistribution from the employer to the workers? Or is the reduction of working hours constraints rather a result of a coordination process that enhances efficiency by simply reducing information asymmetries between employers' and employees' preferences? While in the first case clearly no Pareto improvement is realized, the latter indeed increases welfare.

3.7 Appendix

Table 3.7: Mean values of used variables

	Mean	Std. Dev.
Agreed working hours (week)	38.536	2.054
Actual working hours (week)	42.484	5.256
Preferred working hours (week)	37.692	3.996
No hours constraint (preferred=actual hours) (dummy)	0.269	0.444
Overemployed (preferred<actual hours) (dummy)	0.665	0.472
Underemployed (preferred>actual hours) (dummy)	0.066	0.248
Hourly wage (€)	16.611	7.679
Tenure	11.470	9.139
Firm size: 5-19 workers (dummy)	0.163	0.369
Firm size: 20-99 workers (dummy)	0.218	0.413
Firm size: 100-199 workers (dummy)	0.109	0.311
Firm size: 200-1999 workers (dummy)	0.261	0.439
Firm size: 2000 workers and more (dummy)	0.249	0.433
Works council (dummy)	0.619	0.486
Female (dummy)	0.307	0.461
Age	41.219	9.621
Highest educational degree: University degree (dummy)	0.193	0.394
Highest educational degree: Vocational training (dummy)	0.697	0.459
Children (dummy)	0.341	0.474
East Germany (dummy)	0.239	0.426
Married (dummy)	0.618	0.486
Net monthly household income minus own income (€)	1135.600	1005.472
White collar low-skilled (dummy)	0.074	0.263
White collar medium-skilled (dummy)	0.267	0.443
White collar high-skilled (dummy)	0.208	0.406
Blue collar low-skilled (dummy)	0.161	0.367
Blue collar medium-skilled or high-skilled (dummy)	0.289	0.453
Obs	16140	

Table 3.8: Mulitnomial Logit, full sample

	Model 1		Model 2	
	Over-employed Coeff. (Std.)	Under-employed Coeff. (Std.)	Over-employed Coeff. (Std.)	Under-employed Coeff. (Std.)
Works Council	-0.148** (0.071)	0.068 (0.137)	-0.046 (0.081)	0.017 (0.152)
Kids	-0.069 (0.074)	0.024 (0.127)	0.129 (0.102)	-0.169 (0.184)
Works Council x Kids			-0.311*** (0.111)	0.250 (0.199)
Agreed working hours (week) x 10^{-1}	1.077*** (0.137)	-2.640*** (0.181)	1.082*** (0.137)	-2.652*** (0.180)
female	0.426*** (0.080)	-0.645*** (0.145)	0.431*** (0.080)	-0.653*** (0.146)
Female x Kids	-0.221* (0.133)	-0.312 (0.250)	-0.246* (0.133)	-0.269 (0.249)
Married	-0.032 (0.073)	-0.154 (0.129)	-0.030 (0.073)	-0.152 (0.129)
University degree	0.523*** (0.177)	0.353 (0.306)	0.526*** (0.177)	0.359 (0.306)
Completed apprenticeship	0.268** (0.130)	0.367* (0.215)	0.271** (0.130)	0.404* (0.216)
Tenure x 10^{-2}	-0.388 (0.821)	1.953 (1.313)	-0.417 (0.819)	2.002 (1.320)
Uni. degree x tenure x 10^{-2}	-2.631** (1.095)	-0.953 (1.857)	-2.611** (1.093)	-0.992 (1.870)
Compl. apprent. x tenure x 10^{-2}	-0.517 (0.860)	-1.994 (1.369)	-0.530 (0.857)	-2.035 (1.380)
Hourly wage	0.058*** (0.006)	-0.043*** (0.010)	0.058*** (0.006)	-0.043* (0.010)
Age	0.079*** (0.023)	0.078** (0.038)	0.080*** (0.023)	0.077** (0.038)
Age^2	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)
White collar (low)	0.339*** (0.112)	0.149 (0.194)	0.337*** (0.112)	0.152 (0.194)
White collar (middle)	0.574*** (0.092)	0.361*** (0.149)	0.569*** (0.092)	0.400*** (0.150)

Table 3.8: Mulitnomial Logit, full sample (cont.)

White collar (high)	0.851***	0.119	0.849***	0.120
	(0.115)	(0.208)	(0.115)	(0.209)
Blue collar (middle, high)	0.465***	0.220*	0.463***	0.221
	(0.079)	(0.130)	(0.080)	(0.131)
Agreed weekly hours (spouse)	0.019	-0.044	0.016	-0.043
	(0.018)	(0.034)	(0.018)	(0.034)
Household income minus own income x 10^{-1}	0.080***	0.019	0.081***	0.181
	(0.028)	(0.053)	(0.028)	(0.053)
East	0.441***	0.028	0.439***	0.032
	(0.076)	(0.136)	(0.078)	(0.136)
No. of obs	16140			
Pseudo-R^2	0.084		0.085	

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Clustered standard errors in parentheses. Industry, time and establishment size dummies included. Reference group for professional position: Blue collar (low).

Table 3.9: Mulitnomial Logit, women

	Model 1		Model 2	
	Over-employed Coeff. (Std.)	Under-employed Coeff. (Std.)	Over-employed Coeff. (Std.)	Under-employed Coeff. (Std.)
Works Council	-0.264**	0.398	-0.174	0.330
	(0.134)	(0.285)	(0.141)	(0.294)
Kids	-0.275**	-0.347	-0.026	-0.589
	(0.122)	(0.239)	(0.170)	(0.377)
Works Council x Kids			-0.445**	0.373
			(0.227)	(0.443)
Agreed working hours (week) x 10^{-1}	0.650***	-2.661***	0.689***	-2.703***
	(0.223)	(0.277)	(0.223)	(0.279)
Married	-0.098	-0.261	-0.184	-0.248
	(0.141)	(0.291)	(0.142)	(0.289)
University degree	0.250	0.183	0.230	0.228
	(0.327)	(0.564)	(0.328)	(0.567)
Completed apprenticeship	0.413	0.557	0.410	0.596*
	(0.253)	(0.357)	(0.255)	(0.356)
Tenure x 10^{-2}	0.770	3.186	0.749	3.305
	(1.724)	(2.294)	(1.743)	(2.289)
Uni. degree x tenure x 10^{-2}	-3.192	-4.920	-3.022	-5.029
	(2.171)	(3.415)	(2.189)	(3.428)
Compl. apprent. x tenure x 10^{-2}	-2.726	-7.138***	-2.862	-7.259***
	(1.794)	(2.497)	(1.825)	(2.512)

Table 3.9: Mulitnomial Logit, women (cont.)

Hourly wage	0.066***	-0.049**	0.066***	-0.049**
	(0.012)	(0.023)	(0.012)	(0.023)
Age	0.106***	0.030	0.108***	0.030
	(0.040)	(0.063)	(0.040)	(0.063)
Age^2	-0.001***	-0.001	-0.001***	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)
White collar (low)	0.574***	0.256	0.573***	0.262
	(0.175)	(0.329)	(0.175)	(0.328)
White collar (middle)	0.867***	0.640**	0.868***	0.644**
	(0.189)	(0.298)	(0.159)	(0.298)
White collar (high)	1.321***	0.446	1.323***	0.448
	(0.246)	(0.592)	(0.246)	(0.506)
Blue collar (middle, high)	0.771***	0.667	0.774***	0.659
	(0.221)	(0.435)	(0.221)	(0.434)
Agreed weekly hours (spouse) x 10^{-2}	0.003	-0.157**	0.000	-0.156**
	(0.032)	(0.065)	(0.032)	(0.065)
Household income minus own income x 10^{-1}	0.112**	0.028	0.111**	0.032
	(0.050)	(0.110)	(0.050)	(0.110)
East	0.322***	0.425*	0.309**	0.426*
	(0.139)	(0.239)	(0.138)	(0.238)
No. of obs	4948			
Pseudo-R^2	0.099		0.100	

Notes: See Table 3.8.

Table 3.10: Mulitnomial Logit, men

	Model 1		Model 2	
	Over-employed Coeff. (Std.)	Under-employed Coeff. (Std.)	Over-employed Coeff. (Std.)	Under-employed Coeff. (Std.)
Works Council	-0.098 (0.084)	-0.043 (0.156)	0.009 (0.099)	-0.135 (0.179)
Kids	-0.061 (0.078)	-0.024 (0.130)	0.114 (0.113)	-0.186 (0.199)
Works Council x Kids			-0.274** (0.130)	0.243 (0.224)
Agreed working hours (week) x 10^{-1}	1.132*** (0.173)	-2.785*** (0.259)	1.318*** (0.173)	-2.790*** (0.259)
Married	0.011 (0.088)	-0.087 (0.149)	0.010 (0.088)	-0.086 (0.149)
University degree	0.723*** (0.200)	0.512 (0.362)	0.728*** (0.200)	0.511 (0.367)
Completed apprenticeship	0.210 (0.146)	0.365 (0.262)	0.215 (0.145)	0.365 (0.263)
Tenure x 10^{-2}	-1.004 (0.889)	1.742 (1.576)	-1.032 (0.881)	1.765 (1.587)
Uni. degree x tenure x 10^{-2}	-2.387* (1.250)	-0.176 (2.138)	-2.405* (1.244)	-0.194 (2.154)
Compl. apprent. x tenure x 10^{-2}	0.463 (0.936)	-1.046 (1.630)	0.449 (0.928)	-1.051 (1.644)
Hourly wage	0.057*** (0.007)	-0.046*** (0.012)	0.057*** (0.007)	-0.046*** (0.012)

Table 3.10: Mulitnomial Logit, men (cont.)

Age	0.063**	0.107**	0.065**	0.106**
	(0.028)	(0.049)	(0.028)	(0.049)
Age^2	-0.001**	-0.002***	-0.001**	-0.002**
	(0.000)	(0.001)	(0.000)	(0.001)
White collar (low)	0.271*	0.178	0.264*	0.181
	(0.155)	(0.264)	(0.155)	(0.265)
White collar (middle)	0.434***	0.275	0.426***	0.283
	(0.116)	(0.177)	(0.116)	(0.178)
White collar (high)	0.649***	-0.030	0.645***	-0.029
	(0.130)	(0.232)	(0.130)	(0.232)
Blue collar (middle, high)	0.396***	0.152	0.392***	0.155
	(0.088)	(0.140)	(0.088)	(0.141)
Agreed weekly hours (spouse) x 10^{-2}	0.028	0.001	0.026	0.002
	(0.022)	(0.041)	(0.022)	(0.041)
Household income minus own income x 10^{-1}	0.053	0.050	0.054	0.050
	(0.035)	(0.061)	(0.035)	(0.061)
East	0.518***	-0.067	0.519***	-0.064
	(0.092)	(0.165)	(0.093)	(0.165)
No. of obs	11192			
Pseudo-R^2	0.085		0.086	

Notes: See Table 3.8.

Table 3.11: Probit with sample selection

	Women		Men	
	Model 1	Model 2	Model 1	Model 2
	Coeff. (Std.)	Coeff. (Std.)	Coeff. (Std.)	Coeff. (Std.)
Works Council	0.125* (0.074)	0.074 (0.077)	0.058 (0.047)	0.008 (0.056)
Kids	0.361*** (0.113)	0.234** (0.126)	0.022 (0.039)	-0.062 (0.061)
Works Council x Kids		0.245** (0.123)		0.129* (0.073)
Agreed working hours (week) x 10^{-1}	-0.170 (0.116)	-0.189 (0.115)	-0.445*** (0.093)	-0.443*** (0.093)
University degree	-0.316 (0.211)	-0.316 (0.210)	-0.475*** (0.118)	-0.478*** (0.118)
Completed apprenticeship	-0.373** (0.161)	-0.377** (0.161)	-0.195** (0.089)	-0.197** (0.089)
Tenure x 10^{-2}	-0.593 (0.965)	-0.581 (0.962)	0.288 (0.504)	0.302 (0.501)
Uni. degree x tenure x 10^{-2}	1.924 (1.203)	1.822 (1.207)	1.405** (0.685)	1.407** (0.683)
Compl. apprent. x tenure x 10^{-2}	1.904* (1.000)	1.932* (1.005)	-0.021 (0.530)	-0.016 (0.526)
Hourly wage	-0.034*** (0.007)	-0.034*** (0.007)	-0.028*** (0.004)	-0.028*** (0.004)
Age	-0.086*** (0.026)	-0.089*** (0.026)	-0.046*** (0.017)	-0.047*** (0.017)
Age^2	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
White collar (low)	-0.332*** (0.099)	-0.329*** (0.099)	-0.145 (0.091)	-0.141 (0.091)
White collar (middle)	-0.506*** (0.090)	-0.504*** (0.090)	-0.234*** (0.065)	-0.231*** (0.065)
White collar (high)	-0.737*** (0.133)	-0.736*** (0.132)	-0.349*** (0.073)	-0.347*** (0.073)
Blue collar (middle, high)	-0.450*** (0.126)	-0.448*** (0.126)	-0.209*** (0.050)	-0.208*** (0.050)

Table 3.11: Probit with sample selection (cont.)

Agreed weekly hours (spouse) x 10^{-2}	-0.014 (0.020)	-0.015 (0.020)	-0.029* (0.016)	-0.028* (0.017)
Household income minus own income x 10^{-1}	0.034 (0.050)	0.040 (0.050)	0.004 (0.033)	0.004 (0.033)
East	-0.160** (0.080)	-0.152* (0.079)	-0.242*** (0.057)	-0.241*** (0.057)
Selection equation				
Agreed weekly hours (spouse) x 10^{-2}	0.581*** (0.081)	0.580*** (0.081)	0.715*** (0.071)	0.715*** (0.071)
(Agreed weekly hours (spouse) x 10^{-2})^2	-0.061*** (0.018)	-0.061*** (0.018)	-0.125*** (0.018)	-0.125*** (0.018)
Household income minus own income x 10^{-1}	-0.916*** (0.051)	-0.961*** (0.051)	-0.940*** (0.049)	-0.939*** (0.049)
(Household income minus own income x 10^{-1})^2	0.118*** (0.007)	0.118*** (0.007)	0.126*** (0.008)	0.126*** (0.008)
Agreed weekly hours (spouse) x Household income x 10^{-3}	-0.044*** (0.013)	-0.044*** (0.013)	0.011 (0.016)	0.011 (0.016)
Married	0.853*** (0.155)	0.853*** (0.155)	1.536*** (0.133)	1.536*** (0.133)
University degree	1.152*** (0.119)	1.152*** (0.119)	1.427*** (0.119)	1.427*** (0.119)
Completed apprenticeship	1.007*** (0.092)	1.007*** (0.092)	1.112*** (0.083)	1.112*** (0.083)
Married x University degree	-0.121 (0.170)	-0.123 (0.170)	-0.352** (0.170)	-0.352** (0.170)
Married x Completed apprenticeship	-0.589*** (0.129)	-0.589*** (0.129)	-0.487*** (0.116)	-0.487*** (0.116)
Married x Agreed weekly hours (spouse) x 10^{-2}	-0.086*** (0.028)	-0.086*** (0.028)	-0.005 (0.031)	-0.005 (0.031)
Married x Household income minus own income x 10^{-3}	-0.185*** (0.050)	-0.185*** (0.050)	-0.395*** (0.050)	-0.395*** (0.050)

Table 3.11: Probit with sample selection (cont.)

Age	0.205***	0.205***	0.110***	0.110***
	(0.018)	(0.018)	(0.018)	(0.018)
Age^2	-0.003***	-0.003***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Kids	-1.134***	-1.134***	-0.040	-0.040
	(0.094)	(0.094)	(0.092)	(0.092)
Married x Kids	-0.419***	-0.418***	-0.187*	-0.187*
	(0.105)	(0.105)	(0.111)	(0.111)
East	-0.440***	-0.440***	-0.580***	-0.580***
	(0.072)	(0.072)	(0.065)	(0.065)
Kids x East	0.671***	0.673***	-0.032	-0.031
	(0.111)	(0.111)	(0.099)	(0.099)
Number of obs	15237	15237	16522	16522
Censored obs	10289	10289	5330	5330
Uncensored obs	4948	4948	11192	11192
Rho (Std.)	-0.255**	-0.271**	-0.124	-0.127
	(0.119)	(0.117)	(0.094)	(0.093)

Notes: See Table 3.8.

Table 3.12: Determinants of preferred working hours (pooled OLS)

	Model 1 Coeff. (Std.)	Model 2 Coeff. (Std.)
Works Council	-0.013 (0.127)	-0.130 (0.144)
Kids	0.091 (0.120)	-0.139 (0.162)
Works Council x Kids		0.357** (0.180)
Female	-1.402*** (0.169)	-1.404*** (-0.169)
Female x Kids	-0.283 (0.262)	-0.249 (0.263)
Agreed working hours (week)	0.407*** (0.024)	0.407 (0.024)
Married	0.227 (0.142)	0.227 (0.142)
Female x Married	-0.803*** (0.234)	-0.812*** (0.234)
University degree	-0.553* (0.285)	-0.556* (0.285)
Completed apprenticeship	-0.164 (0.213)	-0.166 (0.213)
Tenure	-0.032** (0.015)	-0.032** (0.015)
Uni. degree x tenure	0.046** (0.020)	0.046** (0.020)
Completed apprenticeship x tenure	0.029* (0.016)	0.029* (0.016)
Hourly wage	0.029*** (0.009)	0.029*** (0.009)
Age	-0.112*** (0.039)	-0.113*** (0.039)
Age^2	0.001** (0.000)	0.001** (0.000)
White collar (low)	-0.467** (0.182)	-0.462** (0.182)
White collar (middle)	-0.642*** (0.162)	-0.635*** (0.162)
White collar (high)	-0.324 (0.201)	-0.317 (0.200)
Blue collar (middle, high)	-0.353*** (0.123)	-0.349*** (0.123)

Table 3.12: Determinants of preferred working hours (pooled OLS) (cont.)

Agreed weekly hours (spouse) x 10^{-2}	-0.100*** (0.031)	-0.098*** (0.031)
Household income minus own income x 10^{-1}	-0.248*** (0.050)	-0.249*** (0.050)
East	0.521*** (0.124)	0.524*** (0.124)
No. of obs R^2	16140 0.143	16140 0.144

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Clustered standard errors in parentheses. Industry, time and establishment size dummies included. Reference group for professional position: Blue collar (low).

Table 3.13: Incidence of overtime (Probit)

	Model 1 Coeff. (Std.)	Model 2 Coeff. (Std.)
Works Council	-0.126 (0.081)	-0.059 (0.094)
Kids	1.545 (1.068)	2.132* (1.137)
Works Council x Kids		-0.196 (0.137)
Female	0.023 (0.115)	0.024 (0.115)
Female x Kids	-0.191 (0.157)	-0.213 (0.158)
Agreed working hours (week)	-0.024 (0.018)	-0.019 (0.019)
Agreed working hours (week) x Kids	-0.046* (0.027)	-0.058** (0.029)
Married	0.196** (0.099)	0.193* (0.099)
Female x Married	-0.631*** (0.149)	-0.625*** (0.149)
University degree	0.412** (0.204)	0.414** (0.204)
Completed apprenticeship	0.333** (0.134)	0.334** (0.135)
Tenure	-0.020** (0.008)	-0.020** (0.008)

Table 3.13: Incidence of overtime (Probit) (cont.)

Uni. degree x tenure	0.023* (0.014)	0.024* (0.014)
Completed apprenticeship x tenure	0.013 (0.009)	0.013 (0.009)
Age	0.103*** (0.026)	0.104*** (0.026)
Age^2	-0.001** (0.000)	-0.001** (0.000)
White collar (low)	0.188 (0.116)	0.187 (0.116)
White collar (middle)	1.005*** (0.101)	1.002*** (0.101)
White collar (high)	1.964*** (0.136)	1.962*** (0.136)
Blue collar (middle, high)	0.662*** (0.086)	0.660*** (0.086)
East	0.601*** (0.096)	0.637*** (0.096)
No. of obs Pseudo R^2	16134 0.106	16134 0.107

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Clustered standard errors in parentheses. Industry, time and establishment size dummies included. Reference group for professional position: Blue collar (low).

4 Higher wages, overstaffing or both? The employer's assessment of problems regarding wage costs and staff level in codetermined establishments

This chapter is based on the SFB 823 Discussion Paper No. 18/12. It is co-authored with Kornelius Kraft.

4.1 Introduction

There has been a long-standing debate in the literature on the effects of employee involvement in the operational decision-making of a firm. In Germany, wide-ranging codetermination rights are granted by law to employees, especially in personnel decisions, if they adopt a works council in their establishment. Thus works councils are, alongside unions, a powerful institution within the German system of industrial relations. The influence of such works councils has been examined since the mid-1980s focusing on different topics such as productivity, R&D, profitability, wages and employment. Starting with FitzRoy and Kraft (1985, 1987, 1990) as well as Kraft (1986), subsequent studies controversially discuss the gains and costs of German codetermination rights[32].

Almost all studies examine how objectively measured variables differ between establishments with and without works councils. In the case of wages, for example, recent studies find a remarkable wage markup in codetermined establishments[33]. Intuitively, this markup, in association with lower profitability, might be used in support of the hypothesis that works councils shift rents from the employer to the employees. The problem connected with these approaches, however, is that no point of reference is identified. High wages may well be justified if they are compensated by their main reference point, namely productivity. Productivity, however, may systematically differ between codetermined and non-codetermined establishments for many reasons, and may also be affected by the existence of works councils themselves. Hence, comparing the wage level between establishments with and without works councils, especially as an indication and source of rent shifting, might be misleading if economic reasons justify a difference.

The point of reference is even more complicated if employment is considered. In principle the intersection of the wage rate with the labor demand curve should be used and this would also be related to establishment-specific characteristics such

[32] Frege (2002), Addison, Schnabel and Wagner (2004), and Jirjahn (2011) present surveys on the effects of works councils.

[33] See, e.g., Addison, Schnabel and Wagner (2001), Hübler and Jirjahn (2003), Gerlach and Meyer (2007), as well as Addison, Teixeira and Zwick (2010).

as productivity but in a non-trivial way. The German codetermination rights acknowledge a profound influence on hires and dismissals. At a minimum this might lead to bureaucratization and delays in personnel decisions. A potentially inefficient employment level is empirically hard to identify because the absolute employment level has to be related to the establishment's labor demand.

In contrast to other studies our approach is based on subjective assessments of expected problems by the management, namely overemployment and overpayment. The advantage of our approach is that establishment-specific heterogeneity is expected to be taken up by the managers. The assessment of the existence of overpayment and overemployment implies too large a difference between the actual levels of wage and employment and, from the employer's point of view, optimal levels of both variables rather than solely their absolute levels. As mentioned earlier, the crucial point with any statement on the appropriateness of a wage or employment level is the point of reference. In the case of wages, the relation to productivity matters and productivity will be the result of observable as well as unobservable qualification advantages or – as many argue – simply by the existence of a works council itself. Hence, in such situations a subjective evaluation of the wage level by the managers may turn out to be useful. Also, where overemployment exists, a subjective assessment by the management considers all establishment-specific background information that determines employment. This information is difficult for researchers from outside to take into account. Hence, in such circumstances, subjective appraisal by the management may be regarded as a more reliable measurement of the efficiency of an establishment's recent employment level.

In the first place, we consider the effect of the existence of a works council on both personnel issues. Subjective approaches to identify the influence of works councils on wages and employment are very rare. To our knowledge, only Gold (1999) uses a subjective measurement of overemployment as a dependent variable. Using the NIFA-Panel, he finds that managers of a codetermined establishment are more likely to report overemployment as well as excessive redundancy costs than managers of establishments without works councils.

In the next step, we additionally control for heterogeneous effects of different types of work councils. Heterogeneity in the economic consequences of works councils due to different kinds of works council's behavior has rarely been analyzed. This is probably caused by the difficulty in producing reliable classifications for works councils. Information on this issue is obviously hard to come by. Studies on the effects of different works council types are performed by Dilger (2002, 2006) and Pfeifer (2011). Dilger (2002) examines how different types of works councils (own classification by Dilger) affect hires, dismissals, and turnover in the German mechanical engineering industry. He shows that works councils that intervene in day-to-day business significantly reduce all three dependent variables. Works councils that do not intervene, however, have no significant influence. In a further study (Dilger 2006) he takes up his approach from 2002 concerning the types of works councils and extends it by controlling for the relations between works councils and management. In addition to the results estimated in his earlier study, he now finds a reduction of subjectively measured profit levels but no effect on innovations in establishments with intervening works councils. Pfeifer (2011) shows that establishments with works councils have higher productivity, higher wages, and lower profitability. Using data which is fairly similar to ours, he also considers different types of works councils. He finds the strongest effects on productivity if works councils usually negotiate with the management and also agree to a compromise. The strongest effects on wages and profitability, however, are identified in establishment with works councils which negotiate with the management but do not usually come to a compromise. Works councils that are largely in line with the management have the weakest impact[34].

Using wave 2006 from the IAB Establishment Panel, we show in this paper that on average in establishments with works councils (of all types) managers are more likely to complain of too large a number of employees. However, this is not true in the case of overpayment. If we additionally control for different types of works councils, we find strong evidence for heterogeneity: managers of establishments

[34] After the publication of this chapter as a discussion paper (Gralla and Kraft 2012), a similar study has been published by another author. Pfeifer (2012) analyzes the same research questions and also finds similar results.

with negotiating works councils are more likely to complain of overemployment but are not more likely to complain of overpayment. In establishments with works councils that are mostly in line with the management, however, we find no higher likelihood of overemployment and in fact a lower probability for the existence of overpayment.

This chapter is organized as follows: in the next section, we discuss the legal background and theories regarding codetermination. In Section 4.3, we describe our data and variables. Section 4.4 contains an explanation of the econometric model that we use and a discussion of our results. Furthermore, Section 4.5 contains inferences using an objective measured variable, namely labor costs. Finally, we conclude in Section 4.6.

4.2 Legal and theoretical background

The source of German codetermination rights is the Works Constitution Act (*Betriebsverfassungsgesetz*). It allows the staff of every establishment with at least five employees to adopt a works council and provides, compared to other countries, extensive rights to information, consultation and codetermination. Codetermination rights mainly exist with respect to social and workplace-related aspects within an establishment. For example, works councils are able to prevent dismissals if these dismissals neglect social aspects such as age or family background. Another reason for intervention is if (in the view of the works council) further employment (possibly after retraining) is feasible. Furthermore, they can also veto with respect to a hiring if it is thought that the person to be hired will disturb the peace within the establishment (*Betriebsfrieden*) or the works council fears that the new employee will substitute permanent staff without an operational need for this reorganization. In the case of collective redundancies, works councils have to negotiate what is referred to as "social plans". These plans determine redundancy payments and the periods of notice.

The influence of works councils on wages is limited. Firstly, works councils are not allowed to participate directly in wage negotiations. Nor are they allowed to call

strikes, and therefore they are not able to initiate the strongest form of industrial action. Furthermore, they cannot change parts of a collective bargaining agreement as long as no "opening clause" (*Öffnungsklausel*) of the agreement explicitly allows such an interference. Nevertheless, works councils are able to influence wages indirectly. If, for example, an establishment makes use of profit sharing, the works council has to bargain the organization and extent of such payments. Furthermore, works councils can negotiate benefits that go beyond the scale of collective bargaining agreements. Finally, collective bargaining agreements only define wage groups. Works councils and employers, however, have to determine which wage group should be used for a particular vacancy. Therefore, works councils indirectly define the wage that a particular worker earns.

The theory of codetermination is highly controversial. Jirjahn (2005) provides a detailed discussion about the possible effects of works councils from a theoretical point of view. On the one hand, in line with the property rights theory, it is argued that works councils negatively affect the economic performance of an establishment. They reduce its flexibility and adaptability to market conditions by reducing the room for maneuver of the management. Furthermore, they use their bargaining power resulting from codetermination rights to shift rents from the employer to employees. This will ultimately reduce profits, and obviously lower expected profits will also negatively affect the incentives to invest in such an establishment.

As stated above, works councils are able to prevent or, at least, delay dismissals. One might therefore expect less flexibility where dismissals are inevitable for economic reasons. Based on this theory, it could be assumed that establishments with works councils will more often suffer from personnel problems and also realize a wage-employment relation which is off the profit-maximizing labor demand curve. This would be a contradiction to the popular Right-to-Manage approach and establishments with works councils would in this case more

frequently state that overemployment prevails if works councils exist[35]. Overemployment may be a short- or long-term phenomenon. Most people will interpret it as a temporary phenomenon as management will find ways to reduce employment to its optimal level over time. Additionally, if overemployment were actually a permanent phenomenon, the management would simultaneously state that they expect to have overpayment because overemployment stands for a solution to the right of the labor demand curve. Then the wage would be higher than productivity. A major exception to this argumentation would be the existence of efficient contracts where the wage-employment combination must be off the labor demand curve. In this case it would always be in the interest of the management to reduce employment (and to breach the efficient contract) [36].

On the other hand, participation theory argues that codetermination can increase an establishment's performance. Works councils improve communication between employees and management in such a way that efficiency gains occur. Another line of argument is that the information rights granted to works councils may lead to reduced information asymmetries within an establishment. This would enable agreements to be reached which otherwise would not have been possible.

Freeman and Lazear (1995), for example, argue that the information rights of works councils can decrease the likelihood of bankruptcy for an establishment. The reason being as follows: information asymmetries prevent the implementation of some pareto-efficient agreements between managers and employees if an ex-post break of such an agreement increases manager's but decreases employee's pay-offs. If the employees are aware of the incentives to break an agreement they would refuse such offers right away. In an unfavorable economic situation, for example, employees could decrease their claims toward the establishment in order to save their jobs if they trust the senior management. If a works council does not exist in an establishment, such concessions are less

[35] See Booth (1995) for a detailed discussion of different approaches to modeling labor market bargaining.

[36] Please note that in this case we implicitly assume that, in addition to wages, employment is part of the works council's utility function.

likely because the employees would then expect manager to exaggerate the gravity of the economic situation. With respect to our study, if participation theory describes reality well, establishments with works councils would be less likely to report personnel problems.

4.3 Descriptive statistics

The aim of this study is to analyze how the existence of a works council influences the likelihood of an establishment suffering from overemployment and overpayment. As mentioned earlier, the innovative aspect of our study is the use of subjective evaluation by the senior management concerning perceived problems. Whilst subjective assessments are sometimes regarded as unreliable, the advantage of this approach in our view is that the management uses its perception of an optimal situation as a benchmark on which to base its assessment. This includes the location of the labor demand curve (from the view of the managers). Hence, this approach enables us to identify whether the relation between wage and labor is on or off the labor demand curve.

This study uses the IAB Establishment Panel, Wave 2006. Access to the data was provided via remote access at the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB)[37]. This panel is an annual survey of more than 15,000 German establishments. For the purpose of our study, we are only able to use data from 2006 because this is the only wave with information on the relations between works councils and management, which are subsequently used to differentiate between types of works councils. We restrict our sample to establishments with at least five employees because smaller establishments are not allowed to adopt a works council. Furthermore, we drop observations from agriculture, nonprofit organizations, and public administration. Finally, our sample contains 5940 observations. Table 4.1 shows means and standard deviations of our variables.

[37] For a detailed description of the IAB Establishment Panel, see Kölling (2000).

We examine the influence of works councils on two dichotomous variables. The first variable, *overemployment*, has unit value if the management of the establishment states that they expect to have too many employees during the next two years. In our sample, 9.7 percent of the establishments surveyed report that they expect such a problem. The second dependent variable is *overpayment*. This variable takes unit value if an establishment foresees a high financial burden on wage costs during the next two years. 36.9 percent of all establishments state that they are confronted with this problem.

In Section 4.5, we will also use an objective measure as dependent variable, i.e. wages, in order to draw additional inferences. The IAB Establishment Panel contains just one piece of information regarding labor costs: the establishments state the total amount of gross pay in the month of June 2006 excluding the employer's social security contribution. We divide this variable by the number of employees and use its logarithmic value as a proxy for mean monthly ln(wage).

Our main independent variable is *works council*. This is a dummy variable that has unit value if a works council exists in an establishment. In our sample, 35.4 percent of all establishments have a works council. This is a high share of codetermined establishments. Beckmann, Föhr and Kräckel (2010) use representative data and show that 13.7% of all German establishments with more than 5 employees had a works council in 2006. Our relatively high number of codetermined establishments results from the fact that the likelihood of the existence of a works council increases with establishment size and large establishments are overrepresented in the IAB Establishment Panel. In a second part of our study, we consider different types of works council. The types are defined according to the behavior of a works council towards the management. We test empirically whether the estimated effects depend on the type of works council or not.

The industrial relations-oriented literature on works councils has been discussing for some time how the types of works councils can be distinguished. Kotthoff (1981, 1994) identifies 6 types of works councils, namely isolated, ignored, behaving as a part of the management, autonomous, respected, and cooperative

but exerting countervailing power. Nienhüser (2005) characterizes the first three types of works councils as weak works councils and the last three types as strong works councils.

Table 4.1: Descriptive statistics

	Mean	Std. dev.
Overemployment	0.097	0.296
Overpayment	0.369	0.482
Works council	0.354	0.478
Works council (type A)	0.277	0.448
Works council (type B)	0.077	0.267
Increasing Sales	0.322	0.467
Decreasing Sales	0.139	0.345
Saturday	0.670	0.470
Temporary work	0.020	0.059
Technology	0.703	0.457
Collect. agreement (firm level)	0.090	0.286
Collect. agreement (industry level)	0.442	0.497
Outsource	0.037	0.188
Insource	0.033	0.178
Single establishment	0.709	0.454
Share of low-educated workers	0.183	0.252
Share of highly educated workers	0.087	0.157
Share of part-time contracts	0.152	0.205
Share of fixed term contracts	0.052	0.118
Active owner	0.478	0.500
Labor costs per employee	2102.862	971.766
Employment	138.498	290.833
No. of obs.	5940	

Note: Due to missing values, *Labor costs* is only observed in 5281 establishments.

The IAB Establishment Panel does not contain as much differentiated information about different types of works councils. Instead, for our purpose, we just use two different types of works councils based on evaluations by the management.

Originally the management was given the three following alternatives (only one statement is possible):

> *1 Business decisions usually have to be put through against the works/staff council.*
> *2 The works/staff council often diverges from the management's opinion when it comes to business decisions; nevertheless a consensual solution is eventually found in most cases.*
> *3 Most business decisions are mutually agreed upon by the works/staff council and the management.*

Alternative 1 has only been selected by about 1% of all observations. As this low number implies too few observations for a useful empirical test, we merge option 1 and 2 to what we call *works council type A*. The second kind of works council is of a more cooperative type and we call them *works council type B*. While the management in 27.7 percent of all establishments reports having a works council of the first type, the second type only exists in 7.7 percent of all observations. Hence, put differently for those establishments where a works council exists, 78.2 percent of all managers asses their work council as being of type A and 21.8 percent of all managers asses their works council as a type B representative body. Clearly this dichotomization aims at distinguishing works councils according to how vigorously worker interests are pursued. Some may prefer to call the type A works council a strong one and the type B works council a weak one.

The way the works councils behave will affect their bargaining power and, as bargaining power is mainly used for rent-sharing activities, type B works councils are expected to be less successful in claiming rents. If this hypothesis is true and wages and employment are part of the utility function of works councils, in both areas less problems are expected to be stated compared to the situation when a type A works council is present.

We consider several additional covariates. First we control for expected changes in sales in 2006. If sales are expected to increase in the near future, the

management will probably less frequently state that overemployment is a problem. In contrast, if the sales forecast is pessimistic, problems will be more likely because fewer employees are necessary.

In order to control for expected changes in sales and also for different effects of decreasing or increasing sales, we generate two different dummy variables. The variable *increasing sales* has unit value if sales in 2006 are expected to increase and equals zero if sales stagnate or decrease. In contrast, the variable *decreasing sales* has unit value if sales are expected to decrease in 2006 and equals zero otherwise.

Furthermore, it is possible that flexibility in employment and working time may also affect the existence of personnel problems. In order to control for employment flexibility we add the variable *temporary work* into our model. This variable is defined as the ratio of temporary workers to all employees. A higher share of temporary work increases the flexibility of the management to react to personnel problems, especially to overemployment.

Such flexibility can also be reached through fixed-term contracts. Hence, we generate the variable *share of fixed term contracts*, i.e. the number of employees with a fixed term contract divided by total employment. A high share of fixed term contracts enables a fairly smooth adjustment of employment in the short run simply by not extending such contracts. Hence problems with overemployment should be less frequently reported.

As an alternative to adjusting the number of workers, the number of hours may be altered if necessary. This hypothesis is considered by the variable *Saturday,* which is a dummy variable that has unit value if the employees of an establishment work Saturdays on demand.

Part-time employment might also affect adjustment behavior by increasing the possibilities of the management to deploy the employees. If this were true, overemployment should pose less of a problem. We measure the influence of working time flexibility by *share of part-time contracts*. *Share of part-time*

contracts is the share of employees with part-time contracts divided by total employment.

We also control for the influence of collective bargaining agreements. In Germany, two different kinds of collective bargaining agreements exist. Usually, unions and employer's associations negotiate wages at industry level. Hence, we add the dummy *collect. agreement (industry level)* to our model and this dummy has unit value if the establishment is covered by such a collective bargaining agreement. As an alternative to industry-wide agreements, however, a company and a union can agree to a collective bargaining agreement at company level. We also control for the effect of such agreements by the dummy *collect. agreement (firm level).*

Furthermore, we control for the influence of the use of a more or less advanced technology by the establishment. In the IAB Establishment Panel the management has to rate its technology compared to other establishments of the same industry, on a five-level Likert scale where 1 means "state-of-the-art" and 5 "obsolete". We generate a dummy *technology* that has unit value if the management rates its technology with 1 or 2. The effect of technological advance is ambiguous. On the one hand, advanced technology could reduce production costs so the firm would achieve a competitive advantage in comparison to its rivals. This would positively affect growth and employment prospects. If this were true, less personnel problems should be expected. On the other hand, advanced technology could also be applied to substitute labor. Hence, overemployment in particular would arise, at least temporarily.

If an establishment has to implement strong structural adjustments, the probability of personnel problems might be affected. Insourcing and outsourcing in particular are likely to influence the expectation of problems with respect to overemployment if the labor force cannot be adjusted smoothly. To take account of possible influences of this kind we add two dummy variables, *insource* and *outsource*. *Insource* has unit value if other establishments or establishment units have been integrated into the observed establishment. In this case personnel problems could arise if the integrated units are suboptimally adapted. *Outsource*

has unit value if parts of the observed establishment are outsourced. Outsourcing is a method of reducing recent problems in an establishment. Hence, there may be less likelihood of problems in the future.

Additionally, we add the dummy *single establishment* in order to distinguish between single establishments and establishments that are part of a multi-site company. Multi-site companies have the option of relocating capacities between different establishments, implying that problems regarding labor costs and employment can be reduced more easily. Hence, it can be expected that single establishments are more likely to suffer from personnel problems.

Furthermore, we also take the qualification level of employees into account. For this purpose, we add two variables to our regression. The variable *share of low-educated workers* is defined as the number of less skilled employees divided by total employment. In contrast, *share of highly educated workers* is defined as the share of employees with a university degree.

In addition, active involvement of the capital owners in decision making could influence the probability of assessing the recent employment level and wage level as overemployment and overpayment. In many cases companies are nowadays led by managers who do not hold any capital shares. Their decisions on wage and employment levels only indirectly affect their personal income. This is obviously different for capital owners and therefore the assessment as to whether a problem exists or not may be determined by capital ownership.

An active owner might state such problems because overemployment and overpayment reduce profits. Hence, it is the owner's business income that is directly involved. In contrast, the remuneration of an employed manager does not depend, or at most only partially depends, on the establishment's profits so that his or her perception of personnel problems might be less sensitive. We control for the influence of active ownership through the dummy *active owner* that has unit value if at least one owner or a family member of the owner works in the

establishment[38]. In order to take size effects into account, we add several size dummies to our regression. Finally, we also add industry dummies and state (German Bundesländer) dummies to our model to control for state specific effects and industry specific effects.

4.4 Method and results

The aim of this study is to analyze the influence of works councils on two binary variables. As OLS ignores the discreteness of our dependent variables and also leads to predictions above zero and below one, we estimate a Probit model. Clearly, we could estimate two univariate Probit models. This, however, would ignore a potential correlation between the error terms of both equations. Hence, we estimate a bivariate Probit model that accounts for correlated disturbances. This model can be deduced from a generalized index function model with two latent variables y_1* and y_2* that may be correlated[39]. These variables are defined as:

$$y_1^* = x_1^T \beta_1 + u_1, \;\; y_1 = 1 \; if \;\; y_1^* > 0, 0 \; otherwise, \qquad (4.1)$$

$$y_2^* = x_2^T \beta_2 + u_2, \;\; y_2 = 1 \; if \;\; y_1^* > 0, 0 \; otherwise, \qquad (4.2)$$

where u_1 and u_2 are joint normal with zero means, variances one, and correlation ρ. If $\rho = 0$ two separate Probit models could be estimated because both error terms are independent. However, if $\rho \neq 0$ two independently estimated Probit

[38] The wave 2006 of the IAB Establishment Panel does not contain detailed information about the position of the owner in the establishment. We only know how many working proprietors and unpaid family members are employed in the establishment. Although this information does not ensure that the proprietor manages the establishment, we use this variable as a proxy for active management by the owner because it is unlikely that the owner of an establishment does not have the last word in the decision-making at his or her establishment.

[39] For a detailed discussion about bivariate Probit models, see Greene (2008).

equations would be inefficient. The bivariate Probit model relaxes the assumption of independence. Here, the bivariate normal cdf is

$$\Phi(x_1^T\beta_1, x_2^T\beta_2, \rho) = \int_{-\infty}^{x_1^T\beta_1}\int_{-\infty}^{x_2^T\beta_2}\phi(z_1, z_2, \rho)dz_1\,dz_2 \qquad (4.3)$$

where

$$\phi(z_1, z_2, \rho) = \frac{e^{-\frac{(x_1^T\beta_1)^2+(x_2^T\beta_2)^2-2\rho x_1^T\beta_1 x_2^T\beta_2}{2(1-\rho^2)}}}{2\pi(1-\rho^2)^{\frac{1}{2}}}. \qquad (4.4)$$

Therefore, the log likelihood function is

$$lnL = \sum_{i=1}^{N} ln\ \Phi\left(q_{i1}x_{i1}^T\beta_1, q_{i2}\ x_{i2}^T\beta_2, \rho_i^*\right) \qquad (4.5)$$

with $q_{i1} = 2y_{i1} - 1, q_{i2} = 2y_{i2} - 1$ and $\rho_i^* = q_{i1}q_{i2}\rho$.

Within this framework, we estimate two different models. The model is based on the following equations

$$Overemployment_i = \alpha_1 + \beta_1 W_i + \gamma_1 x_i^T + u_{i1} \qquad (4.6)$$

and

$$Overpayment_i = \alpha_2 + \beta_2 W_i + \gamma_2 x_i^T + u_{i2} \qquad (4.7)$$

In the first model, W_i is substituted by the works council dummy. Hence, this model treats works councils in accordance with almost all literature as a unitary variable. The second model contains the variables *works council (type A)* and *works council (type B)* instead of the variable *works council*. So it additionally controls for potential heterogeneity in works councils behavior.

Table 4.2 shows the results of our estimates and the first two columns contain our estimates without controlling for heterogeneity of works councils. The last two columns show the estimated effects of different kinds of works councils. A Wald test always rejects independence of overemployment and overpayment so that a correlation between both error terms exists[40].

Regarding the results which are based on the simple distinction of whether a works council exists or not, we find that establishments with a works council are more likely to suffer from overemployment. Overpayment, however, does not occur more frequently in codetermined establishments. If we control for heterogeneity of works councils, we find different results: type A works councils increase the likelihood of overemployment and do not affect the likelihood of overpayment. In contrast, type B works councils do not affect the likelihood of overemployment and even reduce the likelihood of overpayment.

Most of the control variables work well in both models. If sales are expected to increase, the probability that overemployment problems will be reported is reduced. In contrast, if sales are expected to decrease, in the view of the managers both overemployment and overpayment become more probable. The use of temporary work decreases the likelihood that overemployment will be a problem during the next two periods. Advanced technology reduces expected problems with respect to employment and payment. Hence, advanced technology appears to affect employment prospects positively. Collective bargaining at industry level is connected with more complaints by managers concerning expected overpayment.

[40] The p-values of these tests are in the third from last row of each table.

Table 4.2: Regression results (full sample)

Bivariate Probit				
Dep. Var. / Variables	Over-employment	Over-payment	Over-employment	Over-payment
	Coeff. (Std.error)		Coeff. (Std.error)	
Works council	0.323*** (0.072)	-0.044 (0.053)		
Works council (Type A)			0.392*** (0.076)	0.035 (0.057)
Works council (Type B)			0.149 (0.103)	-0.242*** (0.073)
Increasing sales	-0.190*** (0.059)	0.045 (0.039)	-0.187*** (0.059)	0.047 (0.039)
Decreasing sales	0.697*** (0.061)	0.156*** (0.051)	0.696*** (0.061)	0.154*** (0.051)
Saturday	0.030 (0.055)	0.141*** (0.039)	0.028 (0.055)	0.141*** (0.039)
Temporary work	-1.932*** (0.624)	0.248 (0.300)	-1.979*** (0.638)	0.216 (0.301)
Technology	-0.115** (0.052)	-0.103*** (0.038)	-0.112** (0.052)	-0.100*** (0.038)
Collect. agreement (firm level)	-0.033 (0.091)	0.040 (0.067)	-0.036 (0.091)	0.034 (0.067)
Collect. agreement (industry level)	0.009 (0.059)	0.085** (0.042)	0.004 (0.059)	0.079* (0.042)
Outsource	0.143 (0.120)	0.117 (0.091)	0.140 (0.108)	0.109 (0.091)
Insource	0.254** (0.120)	0.231** (0.094)	0.238** (0.120)	0.214*** (0.094)
Single establishment	-0.019 (0.059)	0.054 (0.044)	-0.012 (0.059)	0.062 (0.044)
Share of low-educated workers	0.088 (0.111)	0.186** (0.079)	0.092 (0.111)	0.188** (0.079)
Share of highly educated workers	-0.008 (0.184)	-0.350** (0.139)	-0.013 (0.185)	-0.360*** (0.139)
Share of part-time contracts	0.042 (0.135)	-0.041 (0.102)	0.051 (0.135)	-0.033 (0.102)

Table 4.2: Regression results (full sample) (cont.)

Share of fixed term contracts	-0.266 (0.231)	-0.086 (0.146)	-0.228 (0.230)	-0.062 (0.147)
Active owner	-0.019 (0.057)	0.269*** (0.042)	-0.013 (0.057)	0.275*** (0.042)
p-value of Wald test [$\rho = 0$]	<0.001		<0.001	
McFadden-R^2	0.074		0.076	
No. of obs.	5940			

Notes: * statistically significant at 0.10 level; ** at 0.05 level; *** at 0.01 level. Size dummies, state dummies and industry dummies are included but not reported. Robust standard errors in parentheses.

Insourcing always leads to a higher likelihood of problems observed with overemployment as well as with overpayment in the near future. In contrast to our stated hypothesis, managers from single establishments do not expect problems with respect to overpayment and with respect to overemployment. Low and high qualification levels have the expected effects with respect to the probability that overpayment problems are stated. Active ownership has no effect on overemployment. The management from these establishments, however, more frequently state overpayment, which could be explained by a more aggressive counteraction against higher wages.

In a Probit model, the estimated coefficients cannot be interpreted as marginal effects. Hence, we calculate the influence of the existence of a works council on overemployment and overpayment by calculating the difference between the average predicted probabilities of codetermined and non-codetermined establishments. These marginal effects are presented in Table 4.3. The standard errors of the marginal effects are calculated by the delta method. As we are only interested in the marginal effects of works councils, we waive to show the effects of the other variables for reasons of clarity. Additionally, we calculate semi-elasticities in order to control for the relative effect of a works council. Remember that only 9.7 percent of all establishments suffer from overemployment, but 36.9 percent of all establishments suffer from overpayment. Hence, solely interpreting the absolute effect (i.e. marginal effect) of the works council dummies might lead

to a distorted picture. As with marginal effects, we calculate semi-elasticities by calculating the difference between the average logarithm of the predicted probability of stating problems of codetermined and non-codetermined establishments. That is, the average semi-elasticity of a dependent variable is $\frac{1}{N}\sum_{i=1}^{N} SE_{Y_i}$ whereas

$$SE_{Y_i} = \ln(Y_i|Works\ Council_i = 1) - \ln(Y_i|Works\ Council_i = 0) \qquad (4.8)$$

and Y_i is the probability that the management states that its establishment suffers from overemployment and overpayment. The estimated semi-elasticities are also shown in Table 4.3.

Regarding the marginal effect of *works council*, we find that the likelihood that an establishment with a works council will suffer from overemployment is 5.1 percentage points higher than the likelihood in an establishment without a works council. Expressed in relative terms, works councils increase the likelihood of overemployment by 60.4 percent. The likelihood of the existence of problems with overpayment in codetermined establishments does not significantly differ from the likelihood in establishments without a works council. Summarizing, these results show that the existence of a works council implies a higher likelihood of finding a wage-labor relation that is off the labor demand curve[41].

Regarding the results with works councils differentiated according to their type, we find a strong heterogeneity in our results: the likelihood that an establishment will suffer from overemployment increases by 6.5 percentage points if its works council has been classified as being of type A. Expressed in proportional terms, the likelihood that the management of such an establishment will state overemployment increases by 72.0 percent. In contrast, we find no significant effect on overpayment.

[41] Due to our cross-sectional data, we are not able to control whether overemployment is permanent or just the result of a delaying of necessary adjustment of employment by works councils.

Table 4.3: Effects of works councils on overemployment and on overpayment (full sample)

Dep. Var. / Variables	Overemployment Marginal effects (Std. error)	Overpayment Marginal effects (Std. error)
Works council	0.051*** (0.012)	-0.015 (0.019)
Works council (Type A)	0.065*** (0.014)	0.013 (0.020)
Works council (Type B)	0.024 (0.018)	-0.083*** (0.024)
p-value of F-test $\mathrm{ME}_{\text{WoCo Type A}} = \mathrm{ME}_{\text{WoCo Type B}}$	0.012	<0.001
	Semi-elasticities (Std. error)	Semi-elasticities (Std. error)
Works council	0.604*** (0.133)	-0.046 (0.056)
Works council Type A	0.720*** (0.135)	0.037 (0.059)
Works council Type B	0.277 (0.186)	-0.272*** (0.088)
p-value of F-test $\mathrm{SE}_{\text{WoCo Type A}} = \mathrm{SE}_{\text{WoCo Type B}}$	0.008	<0.001
No. of obs.	5940	

Notes: * statistically significant at 0.10 level; ** at 0.05 level; *** at 0.01 level. Standard errors are calculated by the delta method.

Works councils that are in line with the management (*works council type B*), however, have quite different effects. Here, the management does not report overemployment more frequently than establishments without works councils. Surprisingly, we find a strong negative impact on the likelihood of overpayment. This likelihood is reduced by 8.3 percentage points for establishments with works councils of type B which is, in relative terms, a reduction of 27.2 percent.

A Wald test also rejects equality of the marginal effects at 5%-level (p-value: 0.012) and of the semi-elasticities (p-value: 0.008) in the overemployment

equation. In the overpayment equation, equality can also be rejected. The p-values of the marginal effect and the semi-elasticity are $p<0.001$.

The Works Constitution Act grants a works council extended codetermination rights if an establishment employs more than 20 workers. Works councils in larger establishments have additional codetermination rights regarding hires and the transfer of employees. Furthermore, the management must also keep the works council informed at least once every quarter about the economic situation of the establishment[42]. Due to the fact that these additional rights especially concerning employment increase the bargaining power of a works council, we repeat our estimates with a subsample that only contains establishments with more than 20 employees. Table 4.6 in the Appendix shows the estimated coefficients of all covariates based on this subsample. Table 4.4 contains the estimated marginal effects and semi-elasticities of our main independent variables.

Compared to the estimates with the complete sample, we find slightly different results regarding the existence of overemployment and overpayment in codetermined establishments. Without controlling for heterogeneity of works councils, the estimated difference in the likelihood that the establishments suffer from overemployment is 5.3 percentage points (i.e. 56.8 percent) higher than in establishments without works councils. Hence, in absolute as well as relative terms, the effect is similar to the previous results based on the full sample. We also find no significant effect on the existence of overpayment.

[42] See Pulte (2009) for a more detailed description of the link between firm size and codetermination rights.

Table 4.4: Effects of works councils on overemployment and on overpayment (N>20)

Dep. Var. / Variables	Overemployment Marginal effects (Std. error)		Overpayment Marginal effects (Std. error)	
Works council	0.053*** (0.013)		-0.008 (0.021)	
Works council (Type A)		0.067*** (0.015)		0.023 (0.023)
Works council (Type B)		0.028 (0.021)		-0.083*** (0.027)
p-value of F-test $\mathrm{ME}_{\text{WoCo Type A}} = \mathrm{ME}_{\text{WoCo Type B}}$		0.033		<0.001
	Semielasticities (Std. error)		Semielasticities (Std. error)	
Works council	0.568*** (0.145)		-0.022 (0.057)	
Works council Type A		0.673*** (0.145)		0.062 (0.061)
Works council Type B		0.271 (0.185)		-0.242*** (0.086)
p-value of F-test $\mathrm{SE}_{\text{WoCo Type A}} = \mathrm{SE}_{\text{WoCo Type B}}$		0.013		<0.001
No. of obs.	3662			

Notes: * statistically significant at 0.10 level; ** at 0.05 level; *** at 0.01 level. Standard errors are calculated by the delta method.

Regarding the estimates that control for different kinds of works councils, we still find that the likelihood of overemployment in codetermined establishments is higher than the likelihood of overemployment in non-codetermined establishments if the works council is characterized as a type A works council. We also find no significant effect of type B works councils on overemployment. Additionally, the null hypothesis of equality of these effects can still be rejected at 5%-level. In the case of overpayment, our results are also similar to the previous results. The influence of type A works councils is still insignificant and the marginal effect is very close to zero. Type B works councils, however, still have a negative

and highly significant coefficient. Both marginal effects are again significantly different from each other (p-value: <0.001).

Summarizing our results, we find strong differences between the two types of works councils. Without controlling for heterogeneity, we find that establishments with works councils more frequently report problems with overemployment, but do not suffer from overpayment more frequently than establishments without this form of worker representation. Our findings are not easy to interpret on the basis of the property rights and the participation theory. The absence of complaints of too high wages supports the view of positive productivity effects of such an institution. The higher likelihood that managers will complain of overemployment is evidence in favor of the property rights theory[43]. Perhaps works councils have "two faces".

One limitation of this approach is a potential lack of causality of the estimated effects. Recent studies on reasons for the adoption of a works council argue that the existence of a works council is not random so that the use of a work council dummy as independent variable may not identify causal effects[44]. Although we cannot be sure that our results are causal, theoretical predictions and the fact that codetermination rights more strongly affect employment than wages indicate that our results might indeed be causal.

4.5 Inference using objective measures

Given that our estimations are based on subjective measures of the economic situation and that the results concerning overpayment are somewhat surprising, we compare the results with objective measures. In doing so, we mainly repeat the approach of Pfeifer (2011) to estimate the impact of different types of works

[43] This conclusion is not true with respect to type B works councils.
[44] See, e.g., Kraft and Lang (2008), Beckmann, Föhr and Kräkel (2010) and Mohrenweiser, Margison and Backes-Gellner (2012).

councils on wages[45]. Table 4.6 in the Appendix contains the results of a regression on ln(wage) with both types of works councils as independent variables[46].

Unfortunately, some establishments do not report their labor costs. Therefore the number of observations drops to 5281 in the large sample (N>4) and to 3261 in the small sample (N>20). The lower number of observations might affect the comparability of the estimates on wages and the estimates on our subjective variables if some establishments with a specific set of personnel problems do not state their labor costs. In order to test for such a possible selectivity bias, we also repeat the estimations on the subjective variables using the reduced number of observations. These results are presented in Tables 4.7 to 4.10 in the Appendix. The results of these regressions are almost identical to our previous results. Hence, on this basis, the hypothesis for a selection-induced bias finds no support.

Regarding the regressions on wages, we find a wage markup in codetermined establishments for both types of works council. However the markup is not of the same magnitude. Compared with establishments without a works council, wages in establishments with type A works councils are approx. 16 percent higher. Establishments with type B works councils, however, have a wage markup of approx. 13 percent. Both markups are also significantly different from each other at 5%-level in both samples. Note that the management of establishments with type B works councils less frequently state that they suffer from overpayment. Hence, based on the results of the subjective and objective wage variables together, the wage markup in these establishments must be overcompensated by higher productivity. In establishments with type A works councils, wage markup and productivity seem to offset each other.

[45] Due to poor data, we only estimate wage equations and do not estimate production functions because the IAB Establishment Panel does not contain information about capital, and only contains an inaccurate definition of intermediate inputs.

[46] Note that, in contrast to our previous models, we forego the use of dummies for expected sales growth as independent variables in this model because such expectations should have no causal effect on recent average wage costs in an establishment.

4.6 Conclusion

In this study, we examine whether, from the manager's point of view, codetermined establishments more frequently report having a high financial burden on wage costs and overemployment. Furthermore, we also consider heterogeneity in the behavior of works councils and investigate whether different types of works councils have different effects on the reported problems regarding payment and employment.

Our results show that in comparison with establishments without works councils codetermined establishments more frequently suffer from overemployment but do not suffer more frequently from overpayment. Apparently, higher wages in codetermined establishments that have been identified in previous studies seem not to be perceived as a problem by the management. Probably, higher productivity countervails.

According to our results the main effect of works councils is on employment and this impact is in accordance with the Works Constitution Act, which explicitly grants codetermination rights in this area. Works councils are (in theory) expected to abstain from wage bargaining. If they have an impact on remuneration this seems to be compensated by higher productivity. In our view these results also show that rent sharing is more than higher wages. Employment or employment protection is a highly valued good, which apparently is a determinant of the works councils' utility function.

As expected, in most cases works council do not lead to pareto improvements, as redistribution takes place. However this is not true for works councils of type B.

Finally, our results raise questions regarding future research. More research, especially on overemployment in codetermined establishments, is necessary. Is the higher likelihood of overemployment in codetermined establishments a temporary phenomenon, i.e. do works councils only delay dismissals, or does overemployment exist permanently? If the latter were true, do works councils lead to the implementation of efficient contracts because, for example, they are able to enforce their stability?

4.7 Appendix

Table 4.5: Effects of works councils on overemployment and overpayment (20<N)

Bivariate Probit				
Dep. Var. / Variables	Over-employment	Over-payment	Over-employment	Over-payment
	Coeff. (Std.error)		Coeff. (Std.error)	
Works council	0.313*** (0.079)	-0.022 (0.059)		
Works council (Type A)			0.377*** (0.082)	0.063 (0.063)
Works council (Type B)			0.154 (0.108)	-0.232*** (0.078)
Increasing sales	-0.233*** (0.069)	-0.012 (0.048)	-0.230*** (0.069)	-0.009 (0.048)
Decreasing sales	0.679*** (0.076)	0.166** (0.067)	0.680*** (0.076)	0.165** (0.067)
Saturday	0.064 (0.070)	0.147*** (0.052)	0.061 (0.070)	0.147*** (0.052)
Temporary work	-2.193*** (0.713)	-0.022 (0.337)	-2.240*** (0.729)	-0.062 (0.339)
Technology	-0.158** (0.064)	-0.119** (0.049)	-0.154** (0.064)	-0.114** (0.049)
Collect. agreement (firm level)	-0.015 (0.103)	0.013 (0.078)	-0.020 (0.103)	0.002 (0.079)
Collect. agreement (industry level)	-0.032 (0.072)	0.106** (0.054)	-0.040 (0.073)	0.096* (0.054)
Outsource	0.199* (0.115)	0.145 (0.100)	0.198* (0.115)	0.138 (0.100)
Insource	0.232* (0.130)	0.182* (0.104)	0.215* (0.130)	0.161 (0.104)
Single establishment	-0.002 (0.064)	0.014 (0.050)	0.008 (0.064)	0.022 (0.050)

Table 4.5: Effects of works councils on overemployment and overpayment (20<N) (cont.)

Share of low-educated workers	0.083 (0.134)	0.268*** (0.099)	0.087 (0.133)	0.271*** (0.100)
Share of highly educated workers	-0.083 (0.233)	-0.470*** (0.177)	-0.089 (0.234)	-0.484*** (0.177)
Share of part-time contracts	-0.010 (0.184)	-0.043 (0.142)	-0.021 (0.184)	-0.057 (0.143)
Share of fixed term contracts	-0.065 (0.301)	0.112 (0.203)	-0.012 (0.301)	0.153 (0.204)
Active owner	-0.065 (0.070)	0.332*** (0.052)	-0.056 (0.070)	0.344*** (0.052)
p-value of Wald test [$\rho = 0$]	<0.001		<0.001	
McFadden-R^2	0.073		0.073	
No. of obs.	3662			

Notes: See Table 4.2.

Table 4.6: Effects of heterogeneous works councils on ln(labor costs)

OLS regression		
Sample	4<N	20<N
Variables	Coeff. (Std.error)	Coeff. (Std.error)
Works council (Type A)	0.171*** (0.015)	0.158*** (0.015)
Works council (Type B)	0.133*** (0.018)	0.124*** (0.018)
Saturday	0.005 (0.011)	-0.006 (0.013)
Temporary work	0.165* (0.055)	0.142 (0.088)
Technology	0.020*** (0.011)	0.012 (0.011)
Collect. agreement (firm level)	0.042** (0.017)	0.034*** (0.018)
Collect. agreement (industry level)	-0.008 (0.011)	-0.008 (0.013)
Outsource	0.013 (0.025)	0.029 (0.025)
Insource	0.036 (0.024)	0.051** (0.025)
Single establishment	-0.026** (0.011)	-0.018 (0.012)
Share of low-educated workers	-0.265*** (0.024)	-0.254*** (0.027)
Share of highly educated workers	0.700*** (0.034)	0.728*** (0.041)
Share of part-time contracts	-0.830*** (0.038)	-0.781*** (0.050)
Share of fixed term contracts	-0.078* (0.046)	-0.238*** (0.058)
Active Owner	-0.043*** (0.011)	-0.031*** (0.012)
No. of obs.	5281	3261
R^2	0.552	0.600
p-value of F-test [$\beta_{\text{WoCo Type A}} = \beta_{\text{WoCo Type B}}$]	0.018	0.033

Notes: See Table 4.2.

Table 4.7: Regression results of the main independent variables without establishments that do not state labor costs (full sample)

Bivariate Probit				
Dep. Var. / Variables	Over-employment	Over-payment	Over-employment	Over-payment
	Coeff. (Std.error)		Coeff. (Std.error)	
Works council	0.296*** (0.077)	-0.058 (0.057)		
Works council (Type A)			0.373*** (0.082)	0.011 (0.061)
Works council (Type B)			0.100 (0.109)	-0.226*** (0.077)
p-value of Wald test [$\rho = 0$]	<0.001		<0.001	
McFadden-R^2	0.073		0.074	
No. of obs.	5281			

Notes: * statistically significant at 0.10 level; ** at 0.05 level; *** at 0.01 level. All previously used covariates are included but not reported. Robust standard errors in parentheses.

Table 4.8: Effects of works councils on overemployment and on overpayment variables without establishments that do not state labor costs (full sample)

Variables \ Dep. Var.	Overemployment Marginal effects (Std. error)		Overpayment Marginal effects (Std. error)	
Works council	0.047*** (0.013)		-0.021 (0.020)	
Works council (Type A)		0.062*** (0.015)		0.004 (0.022)
Works council (Type B)		0.016 (0.016)		-0.078*** (0.026)
p-value of F-test $\mathrm{ME}_{\text{WoCo Type A}} = \mathrm{ME}_{\text{WoCo Type B}}$		0.006		0.000
	Semi-elasticities (Std. error)		Semi-elasticities (Std. error)	
Works council	0.552*** (0.143)		-0.060 (0.060)	
Works council Type A		0.685*** (0.145)		0.011 (0.063)
Works council Type B		0.188 (0.200)		-0.246*** (0.091)
p-value of F-test $\mathrm{SE}_{\text{WoCo Type A}} = \mathrm{SE}_{\text{WoCo Type B}}$		0.005		0.002
No. of obs.	5281			

Notes: * statistically significant at 0.10 level; ** at 0.05 level; *** at 0.01 level. Standard errors are calculated by the delta method.

Table 4.9: Regression results of the main independent variables without establishments that do not state labor costs (N>20)

Bivariate Probit				
Dep. Var. / Variables	Over-employment	Over-payment	Over-employment	Over-payment
	Coeff. (Std.error)		Coeff. (Std.error)	
Works council	0.293*** (0.082)	-0.061 (0.062)		
Works council (Type A)			0.360*** (0.086)	0.009 (0.066)
Works council (Type B)			0.127 (0.113)	-0.231*** (0.082)
p-value of Wald test [$\rho = 0$]	<0.001		<0.001	
McFadden-R^2	0.071		0.073	
No. of obs.	3261			

Notes: See Table 4.7.

Table 4.10: Effects of works councils on overemployment and on overpayment without establishments that do not state labor costs (N>20)

Dep. Var. / Variables	Overemployment Marginal effects (Std. error)		Overpayment Marginal effects (Std. error)	
Works council	0.051*** (0.014)		-0.023 (0.023)	
Works council (Type A)		0.065*** (0.016)		0.003 (0.025)
Works council (Type B)		0.023 (0.022)		-0.083*** (0.029)
p-value of of F-test $ME_{WoCo\ Type\ A} = ME_{WoCo\ Type\ B}$		0.029		0.002
	Semi-elasticities (Std. error)		Semi-elasticities (Std. error)	
Works council	0.530*** (0.151)		-0.059 (0.060)	
Works council Type A		0.640*** (0.153)		0.009 (0.064)
Works council Type B		0.224 (0.195)		-0.237*** (0.089)
p-value of F-test $SE_{WoCo\ Type\ A} = SE_{WoCo\ Type\ B}$		0.015		0.003
No. of obs.	3261			

Notes: See Table 4.8.

5 Separating introduction effects from selectivity effects: The differences in employment patterns of codetermined establishments

This chapter is based on the SFB 823 Discussion Paper No. 43/11. It is co-authored with Kornelius Kraft.

5.1 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 employment[47].

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 controversially. Although we cannot solve all problems, we argue that the comparison of

[47] 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.

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. 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 chapter is organized as follows: firstly we summarize the theoretical background (Section 5.2) and the results of previous empirical studies on the impact of works councils (Section 5.3). In Section 5.4 we describe our methodology and the dataset. Next, we discuss our results regarding employment growth (Section 5.5), hires and dismissals (Section 5.6). Finally, with Section 5.7 we draw our conclusion.

5.2 Theoretical background

The German Works Constitution Act increases workers' power by conceding rights to codetermination 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 agreements[48].

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

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

participation theory, the neoclassical approach (with the variants insider-outsider theory and rent-seeking theory) and the employment security view[49].

On 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

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

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 outsiders. 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. 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).

5.3 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. Using linked employer-employee data, Hirsch, Schank and Schnabel (2010) analyze the effects of works councils on separation rates, by considering whether an employee becomes unemployed or works in another establishment after separation. They find that works councils reduce separation to unemployment and to employment whereas magnitude and significance of the estimated effects strongly depend on the employee's characteristics. 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 majority 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) highlight 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.

5.4 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 and 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.

5.4.1 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 $dln(Emp)_{i,t+1} = ln(Emp)_{i,t+1} - ln(Emp)_{i,t}$. 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 dismissals[50].

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

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

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

$$Share\ of\ dismissals_{Jan-June,i,t+1} = \frac{100 \times \Sigma_{Jan-June,i,t+1}}{Employment_{June,i,t}} \qquad (5.1)$$

where $\Sigma_{Jan-June,i,t+1}$ 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

$$Share\ of\ hires_{Jan-June,i,t+1} = \frac{100 \times hires_{jan-June,i,t+1}}{Employment_{June,i,t}}. \qquad (5.2)$$

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

5.4.2 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. Thus, 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 model[51]. Insufficient profits are (in the presence of fixed costs) usually the result of unsatisfying capacity utilization. Hence, employment reduction is probable.

[51] It could be argued that profits are the result of economic activity and not the cause. However, several studies use profits as 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.

Table 5.1: 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	

The IAB Establishment Panel contains assessments of the profit situation by the management of an establishment measured according to a Likert scale[52].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

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

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 (obsolete). Moreover, we add a dummy for the age of a firm which has unit value if the firm was founded before 1990[53].

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 5.1 displays the descriptive statistics of our data.

5.4.3 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

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

$$y_{i,t+1} = \beta_0 + \beta_1 Works\ Council_{i,t}^{adopted} + \beta_2 Works\ Council_{i,t}^{treatment\ group} + \beta_3 Works\ Council_{i,t}^{pre-existent} + \gamma_1 X_{i,t} + \gamma_1 T_{i,t} + \varepsilon_{i,t}\ . \quad (5.3)$$

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 council[54].

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 establishment which adopt a works council and establishments that do not[55]. Secondly, we are able to identify how these establishments perform after adoption compared to other establishments, independent of the reason for adoption.

5.5 Works councils and employment growth

Table 5.2 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

[54] 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.

[55] 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.

the advantage that they are able to detect nonlinearities as well as kinks in size effects. We also experimented with alternative measures of firm size[56]. None of our results were affected. The 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.

Table 5.2: OLS with employment growth as dep. variable

	Pooled OLS	**DiD OLS**	**Pooled OLS**	**DiD OLS**
Estab. size	N > 4		N > 20	
Variables	Coeff. (std. err.)	Coeff. (std. err.)	Coeff. (std. err.)	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)
Other Covariates	yes	yes	yes	yes
No of obs.	54,515		31,918	

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. Table 5.5 in the Appendix shows full regression results.

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

[56] We used ln(Employment), Employment and Employment^2 as well as solely Employment as a measurement of size.

employees. The last two columns in table 5.2 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. Backes-Gellner, Jirjahn and Mohrenweiser (2011) show that the influence of a works council increases over time, which they explain by a "learning effect". In our approach, differences between short-run and long-run influences may probably be reflected by a gap between the effect of pre-existing works councils and the sum of effects 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. 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 significance[57]. 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 that is rather unlikely for the average of our sample. Hence, these results are more plausibly explained by the neoclassical theory, where the management adjusts

[57] 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.

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.

5.6 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 $\sigma_i^2 = \sigma^2[\exp(w_i'\alpha)]^2$, where α denotes estimated parameters of the heteroscedasticity term and w_i' is a vector of several size and industry dummies[58]. Table 5.6 in the Appendix 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 been interpreted, we also estimate semi-elasticities in order to identify the proportional effect of works councils. These semi-elasticities are shown in Table 5.3.

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 approach[59]. Clearly, this effect is dominated by establishments with experienced

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

[59] 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).

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 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 rejected[60]. Hence, the short-run impact of works councils on hires is quite similar to the long run effect.

Table 5.3: Semi-elasticities of share of hires

	Pooled Het. Tobit	**DiD Het. Tobit**	**Pooled Het. Tobit**	**DiD Het. Tobit**
Estab. Size	N > 4		N > 20	
Variables	Semielasticity (std. err.)	Semielasticity (std. err.)	Semielasticity (std. err.)	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. Table 5.6 in the Appendix shows full regression results.

Table 5.7 in the Appendix illustrates the results of the estimations on dismissals. The LR Test again rejects the hypothesis of homoscedasticity. Furthermore, Table 5.4 contains the corresponding semi-elasticities. The estimates of pooled Tobit

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

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. 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.

Table 5.4: Semi-elasticities of share of dismissals

	Pooled Het. Tobit	**DiD Het. Tobit**	**Pooled Het. Tobit**	**DiD Het. Tobit**
Estab. Size	N > 4		N > 20	
Variables	Semielasticity (std. err.)	Semielasticity (std. err.)	Semielasticity (std. err.)	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. Table 5.3 in the Appendix shows full regression results.

The introduction itself does not change dismissals, but it has a negative impact on hiring behavior[61]. To sum up, the impact of works councils takes place by affecting

[61] 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

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. The codetermination 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.

out that the hiring effect has to overcompensate a potential quit effect. Otherwise, a reduction in employment growth should not be observed.

5.7 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. 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.

5.8 Appendix

Table 5.5: OLS with employment growth as dep. variable

	Pooled OLS	**DiD OLS**	**Pooled OLS**	**DiD OLS**
Estab. size	N > 4		N > 20	
Variables	Coeff. (std. err.)	Coeff. (std. err.)	Coeff. (std. err.)	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)

Table 5.5: OLS with employment growth as dep. variable (cont.)

Age of estab.	-0.008***	-0.008***	-0.010***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)
Size21-50	0.008**	0.008***	Ref.	Ref.
	(0.002)	(0.002)		
Size51-100	0.010**	0.010***	0.003	0.003
	(0.003)	(0.003)	(0.002)	(0.002)
Size101-250	0.003	0.003	-0.002	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Size251-500	0.001	0.001	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)
Size>500	-0.008**	-0.008***	-0.011***	-0.011***
	(0.003)	(0.003)	(0.003)	(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.

Table 5.6: Het. Tobit model with share of hires as dep. variable

	Pooled Het. Tobit	**DiD Het. Tobit**	**Pooled Het. Tobit**	**DiD Het. Tobit**
Estab. Size	N > 4		N > 20	
Variables	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]	18,437.49	18,434.45	10,136.72	10,132.96
(p-value)	(0.000)	(0.000)	(0.000)	(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 5.7: Het. Tobit model with share of dismissals as dep. 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]	17,741.49	17,747.69	8,872.28	8,876.78
(p-value)	(0.000)	(0.000)	(0.000)	(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.

6 The effects of ownership concentration and codetermination on productivity

This chapter is based on the study „Die Wirkung von Eigentümerkonzentration und Mitbestimmung auf die Produktivität“ published in Schmollers Jahrbuch, 2010. It is co-authored with Kornelius Kraft.

6.1 Introduction

The theory of management controlled corporations is based on the assumption that the ownership structure of a corporation is widely spread across its owners and highly decentralized. Such ownership structure explains the often assumed scope of the management to act in its own interest rather than in the interests of the owner of a firm. In most countries, however, some corporations also have a highly concentrated ownership structure with one, or at most few, dominant owners. The effects of the existence of such concentrated ownership are ambiguous. On the one hand, concentrated ownership supports the ability to control the management by the owner because both incentives and possibility to control the management enhances. Furthermore, major ownership reduces potential problems of free-riding with respect to control manager's effort. In contrast to small shareholders, the wealth of a major shareholder is strongly linked to the performance of his or her corporation. Additionally, the management's job security is more strongly linked with the major shareholder's goodwill so it has to follow the major shareholder's instructions. Small shareholders however usually do not have such strong influence on management's behavior. Thus, concentrated ownership structures can result in a better performance of corporations with a centralized ownership structure.

On the other hand, also contrary arguments with respect to ownership and firm performance exist. One argument is that a dominant owner protects a corporation against hostile takeovers so that the ability of the capital market to monitor management's performance is reduced. A major shareholder could also use his or her power to act in his or her interest and possibly work against the interests of other, minor shareholders. Such behavior could especially be expected if the voting rights of an owner diverge from his or her cash-flow rights. A major owner, for example, might force the management to sign contracts that are very unfortunate to the firm but increase the payoff of the major owner[62]. Such behavior would simply shift rents from minor owners to the major owner. Major owners may also use the cash-flow of a firm to finance their hobbies and

[62] She or he, for example, might enforce contracts with other firms that are also controlled by the owner.

private interests, i.e. they use the corporation to increase their utility directly. In many cases such situations leads the major owner in a conflict where he or she has to decide whether to maximize corporation's profits or to take advantage of his or her control rights and exploit resources from the firm (La Porta et al. 2002, Cronqvist and Nilsson 2003).

The aim of our study is to analyze how ownership concentration and codetermination by employees in supervisory boards affect productivity. On the one hand, these effects will be estimated separately. On the other hand, we also estimate the effects of both factors if they exist in a corporation simultaneously. The idea of our study is that the representation of the interests of labor and capital might not always be efficient. From the point of view of the capital side, for example, an efficient representation of interests can rather be expected if a major shareholder exists. From the view of the labor side, codetermination in the supervisory board provides the possibility to represent the employees' interests. A high concentration of the one side (e.g. labor) however might be misused at the costs of the other side (e.g. capital). Thus, the aim of our study is to analyze if mutual control by both labor and capital reduces the possibility of abuse of power in the supervisory board and therefore results in a prevention of reduction of productivity.

For this purpose, we use German data that contains 1583 (1670) observations from 383 (381) corporations for the years 1996-2008. We estimate a Cobb-Douglas production function and find that ownership concentration has no effect in firms with no employee representatives in the supervisory board. Almost parity codetermination reduces productivity. This reduction however diminishes with increasing capital concentration. Furthermore, the incidence of an owner in the supervisory board affects productivity of codetermined corporations.

This chapter is organized as follows: in the next section, we discuss the theoretical background of the effects of mandatory codetermination rights. In Section 6.3, we discuss related literature. Section 6.4 contains a discussion about our data, empirical strategy and results. We conclude in Section 6.5.

6.2 Theoretical background

The modern corporation is frequently characterized by the separation of ownership and management (Berle and Means 1932). In the case of widely held shares, it might be true that the management is the only institution that controls corporate processes. Such broad distribution of ownership can mainly be found in the USA and UK. In other countries a higher concentration of capital ownership is rather typical (Cronqvist and Nilsson 2003). In this context, Denis and McConnell (2003, 11) conclude: "Equity ownership in Germany has historically been more concentrated than in the U.S." A higher capital concentration has two diverging effects: on the one hand, it enables the possibility of an efficient control of the management. On the other hand, it prevents a hostile takeover by other investors. This generates scope for potential misuse of power. Morck, Wolfenzon and Yeung (2005) characterize such behavior as „Economic Entrenchment". The dominant owner forces the management to increase his or her utility at the costs of minor shareholders and other stakeholders. For example, he or she might force the management to sponsor major events in order to improve the owner's reputation. Linked with this issue is also a capital ownership by the managers.

In the empirical literature, the link between ownership concentration and economic performance has frequently been analyzed. For this, an inverted U-shaped link between performance and ownership concentration is implied. If a capital owner controls a small share of a company, an increase in his or her share increases firm performance caused by a convergence of the behavior of the management towards the aims of all shareholders and stakeholders ("Alignment-Effect"). A further increase in capital ownership however leads to the domination of a protective effect ("Entrenchment-Effect") which results in an egoistic behavior by the dominant owner at the costs of all other shareholder and stakeholder. These empirical findings however have been criticized by Demsetz and Lehn (1985) as well as Demsetz and Villalonga (2001). They argue that capital concentration, especially by the management, is not exogenous. It is rather an endogenous result that is caused by other market influences that determine an efficient level of capital concentration.

Another frequently neglected argument that affects performance of firms with a dominant owner is the ability of the management. If a firm, for example, is owned by a family, members of the management will rather be chosen from a pool of family members than on the basis of performance related factors like qualification and ability. Bloom and van Reenen (2007) as well as Bloom, Sadun and van Reenen (2010) show that firms, in which the eldest son becomes manager of a firm through inheritance, realize a decline in firm's performance compared to firms with employed managers.

How such harmful behavior might be avoided if the capital market is not able to control a firm perfectly discusses Stiglitz (1985). He argues that beside the shareholder side, stakeholders are also able to control the management. In his opinion two institutions might also be able to control firms: banks and employees. The possibility of employees to participate and control in the supervisory board in German corporations is ensured by German codetermination rights. Jirjahn (2011) provides a detailed survey of the effects of codetermination in the supervisory board. Studies of this kind of codetermination show conflicting results. On the one hand, legally given codetermination rights are seen as an intervention of the state. Codetermination by employees restricts the owner's freedom of choice and also separates economic risk from the decision making process in the supervisory board. This might result in insufficient profitability, a decline of investments and, in the worst case, a migration of firms. At least necessary decision on adjustment of production in bad economic situations will be delayed in order to save jobs. A main argument against codetermination is that except of Germany no other country has such pronounced codetermination rights and in no other country codetermination rights are voluntarily adopted.

In contrast, participation theorists highlight that codetermination reduces information asymmetries in a corporation (Freeman and Lazear 1995). The management has, compared to other shareholders and stakeholders, the best information about the current economic situation of a corporation. Such information asymmetry might be used to shift rents from the employees to the employer. At this, the management refers the economic situation to the

employees worse than reality in order to reduce employee's claims towards the corporation. Since employees know such incentives, they will mistrust the management, even if the corporation is indeed in a threatening economic situation. Participation in the supervisory board by the employees might reduce information asymmetries so that the possibility of cheating by the management vanishes. This enables agreements between employees and the management that otherwise would not be feasible. In bad economic situations, such behavior might secure the existence of the corporation and jobs. Additionally, employees have information about potential problems in the daily workflow and also potential ideas for improvement. If no possibility to communicate such issues exists, inefficiencies in production will persist. Codetermination rights might help to improve communication between employees and the management so that efficiency gains will occur. Furthermore, codetermination might reduce opportunistic behavior by the management. This enhances incentives of employees to invest in firm specific human capital so that, in the long run, productivity gains emerge.

Fauver and Fuest (2006) discuss the link between employee representation and potential agency problems. Employees in the supervisory board are well informed supervisors of the management. If they are interested in long term success of the corporation, they might be an institution that even controls the management efficiently. In contrast, if employee representatives are the only dominant member in the supervisory board, i.e. if no dominant owner exists, they might use their power in order to increase employee's rents at the costs of the other shareholders and stakeholders. For example, they might use their power to enforce an employment level above the efficient amount of employees[63].

The hypothesis that we analyze in this study is whether the capital side and the labor side mutually control each other so that undue benefits of the one side can be restricted or even prevented. In this case, both sides have to be organized efficiently. That means, the capital side has to be concentrated and the

[63] For a more detailed discussion of the effect of codetermination with respect to the employment level see Kraft (1998) and Kraft (2001).

corporation has to be codeterminated in order to enable a representation of employees' interests. In such situation capital and labor might be well organized and the membership in the supervisory board allows efficient communication of both sides' interests as well as efficient control of the management. This might have the unexpected consequence that codetermined corporations with dominant owners realize higher productivity than non-codetermined companies. At least potential negative effects of dominant ownership and codetermination respectively could be prevented.

In practice, some might argue that in Germany the capital owner also has a seat in a supervisory board of a corporation. However, this is only true for a minority of German corporations. In our sample, in only 33 percent of all corporations the share owner also belongs to the supervisory board of not codetermined firms. In codetermined firms, the share of such active owners drops to 22 percent. The majority of members of supervisory boards are managers from other firms or banks as well as former members of the top-management. In principle, the owners' representatives of German supervisory boards are dominated by agents that control the management, i.e. other agents. Hence, the interests of the principal might even be badly represented so that efficiency losses may occur.

6.3 Related literature

With respect to codetermination in supervisory boards, only a few studies exist. Gorton and Schmid (2004) use a sample of 250 German corporations and analyze the effect of codetermination on Tobin's Q. In their study, they compare one-third codetermination with almost-parity codetermination and find that the latter have a lower Tobin's Q than the first corporations.

Fauver and Fuest (2006) extend the approach of Gorton and Schmid (2004.) They use a larger dataset and estimate different model specifications. They find, compared to non-codetermined corporations and corporations with almost-parity codetermination, a higher Tobin's Q in one-third codetermined corporations across different industries. Their study is comparable with our approach because

they also control for ownership concentration. They find negative effects given a low ownership concentration yet a positive effect in medium concentrated and codetermined corporations. This positive effect, however, is only caused by one-third codetermination and not almost-parity codetermination. They conclude that codetermination seems to have an inverted u-shaped effect on Tobin's Q.

FitzRoy and Kraft (2005) estimate production functions with data from codetermined and non-codetermined corporations before and after the commencement of the German law on codetermination 1976. They find no negative effects of almost-parity codetermination. The same results find Kraft and Ugarkovic (2006) with respect to return on equity. Kraft and Stank (2004) as well as Kraft, Stank and Dewenter (2011) additionally find no effects on innovations[64].

The effects of capital structure on firm performance have been analyzed by a large number of studies. Benson and Davidson III (2009) provide a survey of previous studies, especially with respect to the effect of managerial ownership. Furthermore, Vishny (1997), Denis (2001) as well as Denis and McConnell (2003) provide detailed surveys. In a nutshell, previous studies find an effect of concentration of ownership and firm performance. Regarding managerial ownership, however, Benson and Davidson III (2009, 3) note that „Empirical studies, however, have been unable to reach consensus about the actual relation between managerial ownership and firm value".

[64] A few studies also mainly focus on the effects of one-third codetermination and omit almost-parity codetermination, see, e.g., Boneberg (2009) and Wagner (2011). We focus on almost-parity codetermination. Hence, we refrain from discussion the results of these studies.

6.4 Empirical approach

The aim of our study is to analyze how capital concentration, almost-parity codetermination and their interaction affect productivity[65]. For this, we estimate a Cobb-Douglas production function. Our dependent variable is ln(value added). As independent variables, we use lagged values of ln(Capital) and ln(Labor). Additionally, we add a concentration ratio and an import ratio into our model. Both variables are measured at industry level and are used as a proxy for market competition. Our main independent variables are Herfindahl index for ownership concentration, the type of dominant owner and the incidence of almost-parity codetermination. In our first model, we estimate how the effect of codetermination differs given changes in ownership concentration. In a second model, we estimate whether the effect depends on the type of dominant owner, i.e. if the dominant owner is a person or another corporation.

6.4.1 Dataset

Our estimates are based on self-collected data of German stock companies. Due to some missing data with respect to the capital concentration, we use two samples. Both samples contain data for the years 1996 to 2008. The first sample contains 1583 observations of 383 corporations. The second sample contains 1670 observations of 381 corporations. The difference in both samples results from missing information about all owners of a firm (first sample) and missing information about the types of owner of a firm respectively (second sample). We could also generate one sample for both estimations. This however would reduce the number of observations and therefore reduce the efficiency of our estimates. Hence, we prefer to use two samples. Our data only contains corporations from the production sector that do not act as a holding or belong to the steel industry and coal industry because both industries have their own codetermination rights, the Montanmitbestimmungsgesetz. 74 (70 in the second sample) corporation are almost parity codetermined according to the German Codetermination Act. We

[65] Our study compares the differences in productivity between almost-parity codetermined firms and firms that are not almost-parity codetermined, i.e. firms without employees in the supervisory board and firms with one-third codetermination.

used data from the Hans Böckler Stiftung to identify these companies. Finally, our data contains 404 (406) observations of codetermined corporations. At mean, we observe a company 4.1 (4.4) years. These relative low mean observation periods have two reasons. At first, we dropped observations of a company after it changed its accounting methods, declared bankruptcy or changed the company structure, i.e. if it converted to a holding or to a GmbH. Furthermore, in 2005 our data has been enlarged with additional companies. This however reduces the mean observation time.

Our accounting data is from annual reports of the Hoppenstedt-Finanzdatenbank and the annual reports of the corporations. We also deflated our financial data by annual prices of the production sector. Price data is from the Federal Statistical Office of Germany. We obtained the information about the ownership structure of a company from *Wer gehört zu wem*, a dataset of the Commerzbank AG. Information about import concentration and market concentration are obtained from the reports of the German Monopolies Commission. Unfortunately, these reports are only published every two years. Hence, we calculated the mean in the year before and the year after a missing year in order to close these gaps.

Table 6.1 contains the mean values and standard deviations of our variables. Value added is defined as sales minus material costs. *Capital* is the total capital used. Value added and capital are measured in 1000 euros. *Labor* is the number of employees in a corporation. *CoDet76* is a dummy that has unit value if the observed company is codetermined according to the German Codetermination Act of 1976. *Herfindahl* measures capital concentration. It is defined as the Herfindahl index of the shares of all owners, where an owner has to keep at least 5 percent of a firm in order not to be defined as part of the public float. If no dominant owner exists, we set the Herfindahl index to 0.00001 so that the Herfindahl index is always between 0.00001 and 1. The mean value of HERF in our data is 0.600 which is a high value compared to other countries. This however can be explained by the large number of stock companies that are not listed at a stock exchange. They belong to families and other (foreign) corporations respectively.

Furthermore, the ownership of German stock companies is highly concentrated compared to other countries (Faccio and Lang 2002).

Additionally, we add the dummy *active owner* into our model. This variable has unit value if the owner of a firm also belongs to the supervisory board. Such active owner might have different effects on firm's performance. On the one hand, he or she might increase performance due to a better control of the management by the principal so that waste of resources or insufficient effort might be avoided. On the other hand, he or she might force the management to invest into less profitable projects that increase the owner's utility at costs of firm performance.

As an alternative to the Herfindahl index, we use several ownership dummies to control ownership effects. We split the owners into three groups and generate three dummies: *Person, Corporation,* and *Bank*. Each dummy has unit value if the dominant owner, a person or a family, another corporation or a bank, of a corporation owns at least 25% of all shares. For the estimates with these three variables, we use the second sample.

The effect of corporation age is measured be *invAGE.* This variable is the inverted value of the age of a firm measured in years. As an alternative specification, we also used *Age* and Age^2 was well as *ln(Age).* This however does not change our results. The variable *import ratio* measures the proportion of imports expressed as percentage share of sales at 2-digit industrial level. The classification of industries bases on WZ 2003. We use this variable in order to measure international pressure of competition.

In order to measure national pressure of competition, we add the variable *market conc.* in our model. This variable is defined as the Herfindahl index of market shares in each 4-digit industry (WZ 2003) multiplied by 100. Furthermore, we add time dummies and industry dummies into our model.

Table 6.1: Descriptive statistics

Variable	Mean	Std. Dev.
Value Added (in 1000 Euro)	289423.100	865757.800
Capital (in 1000 Euro)	940783.100	3986895.000
Labor	2542.152	6748.779
CoDet76	0.245	0.430
Herfindahl	0.600	0.353
Person	0.245	0.485
Corporation	0.476	0.500
Bank	0.020	0.140
active owner	0.304	0.460
invAge	0.021	0.049
Import ratio (in percent)	62.785	15.825
market conc. (x100)	8.922	11.611

Note: Means and standard deviations of Person, Corporation and Bank are based on 1670 observations. All other values are based on 1583 observations.

6.4.2 Results

Table 6.2 shows the results of our estimates. Standard errors are robust and clustered at firm level. We use lagged values of capital and labor in order to prevent potential endogeneity problems. The null hypothesis H_o: $\beta_{\ln K} + \beta_{\ln L} = 1$, i.e. constant returns to scale, cannot be rejected in all specifications. In both specifications of Table 6.2, capital concentration has a positive, although not significant effect on productivity. Furthermore, an active owner in non-codetermined firms seems to have no significant effects. A reason for this result might be that the costs of generating private benefits and gains from better control of the management offset each other[66].

In this study however, the coefficient of the interaction term *Herfindahl x CoDet76* is of particular interest. This coefficient is positive and highly significant.

[66] As a robustness check, we also controlled for nonlinear effects of capital concentration. We were no able to refuse that linear functional form is the right one. Additionally, in our opinion, no objective categorization of a Herfindahl index is possible so we concentrate on this specification.

Table 6.2: Production function regression results

	Model 1 Coeff. (Std.)	Model 2 Coeff. (Std.)
lnCapital (t-1)	0.346*** (0.030)	0.355*** (0.029)
lnLabor (t-1)	0.662*** (0.036)	0.659*** (0.036)
CoDet76	-0.313*** (0.091)	-0.371*** (0.097)
Herfindahl	0.062 (0.058)	0.066 (0.059)
Herfindahl x CoDet76	0.397*** (0.112)	0.402*** (0.401)
Active owner		0.008 (0.043)
Active owner x CoDet76		0.208** (0.088)
invAge	-0.300 (0.408)	-0.245 (0.400)
Import ratio	0.008** (0.003)	0.007** (0.003)
market conc.	0.002 (0.002)	0.002 (0.002)
Constant	2.305*** (0.350)	2.257*** (0.338)
Time / Industry dummies	Included	Included
No. of obs	1583	
P-Value (H$_0$: $\beta_{\ln K} + \beta_{\ln L} = 1$)	0.649	0.503
R^2	0.931	0.931

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Clustered standard errors in parentheses. P-Value shows the p-value of an F–test with the null of constant returns to scale.

Furthermore, we also find a significant positive effect of *active owner x CoDet76.* In general, our results show different effects of codetermination in the supervisory board. If the shares of a corporation are widely distributed, codetermination seems to reduce productivity. These results indicate that in such companies without any opposing group the employees use their power to enforce their interests. For example, they might use their power to delay a necessary

reduction of employment during crisis. With increasing capital concentration however this negative effect diminishes.

We even find weak evidence that in highly concentrated corporations codetermination increases productivity: in model 1 the null H_0: $\beta_{CoDet76} + \beta_{Herfindahl} \times 1 + \beta_{CoDet76 \times Herfindahl} \times 1 \leq 0$ can be rejected at 5%-level[67]. Note that this test assumes that one owner holds all shares. In the second model we find no significant positive effect. This however might be caused by a potential collinearity of active ownership and the concentration of capital. In corporations with low capital concentration the negative effect of codetermination on productivity dominates.

Table 6.3 shows the results of our estimates where we use ownership dummies instead of the Herfindahl index in order to control for different types of owners. The reference group is no dominant owner. The aim of this approach is to analyze whether a person more efficiently controls a firm than a corporation because the latter might also be bad controlled[68]. In our data, no bank is the dominant owner of a codetermined corporation. Hence, our models do not contain an interaction term of *Bank* and *CoDet76*. The results in Table 6.3 support our previous results. All interaction terms have a positive effect on productivity. We also do not find a difference in the effects of a person and a corporation.

[67] The p-value of this one-sided t-test is 0.042.

[68] Unfortunately, our data does not allow identifying the capital structure of corporations so we do not have any information about the "owner of the owner".

Table 6.3: Production function regression results with different types of dominant owners

	Model 1 Coeff. (Std.)	Model 2 Coeff. (Std.)
lnCapital (t-1)	0.323*** (0.032)	0.333*** (0.031)
lnLabor (t-1)	0.684*** (0.038)	0.677*** (0.038)
CoDet76	-0.111* (0.064)	-0.281*** (0.110)
Person	0.032 (0.039)	0.043 (0.057)
Person x CoDet76	0.157* (0.084)	0.315*** (0.119)
Corporation		0.018 (0.052)
Corporation x CoDet76		0.226** (0.109)
Bank		-0.114 (0.099)
invAge	-0.061 (0.335)	-0.099 (0.328)
Import ratio	0.004 (0.003)	0.005* (0.003)
market conc.	0.001 (0.002)	0.001 (0.002)
Constant	2.748*** (0.333)	2.604*** (0.328)
Time / Industry dummies	Included	Included
No. of obs	1670	
P-Value (H$_0$: $\beta_{\ln K} + \beta_{\ln L} = 1$)	0.649	0.637
R^2	0.931	0.936

Notes: ***/**/* indicates statistical significance at the 1%, 5% and 10% level. Clustered standard errors in parentheses. P-Value shows the p-value of an F–test with the null of constant returns to scale.

As already mentioned above, Demsetz and Lehn (1985) as well as Demsetz and Villalonga (2001) argue that capital concentration is not exogenous. In their opinion, the capital market determines the degree of capital concentration. Hence, the existence of a dominant owner might be endogenous. In principle, one

might estimate an iv-model in order to take potential endogeneity into account. Unfortunately, especially if the effects of capital concentration on firm's performance are estimated, instruments are generally hard to find (Coles, Lemmon and Meschke 2012). Czarnitzki and Kraft (2009) use the variance of cash flow as a valid instrument. Regrettably, we are not able to calculate a meaningful variance due to the short observation periods of our companies. Additionally, Zhou (2001) argues that the use of a fixed effects estimator strongly reduces the explanatory power of the capital concentration coefficient due to a low volatility of ownership. The ownership effect might "hide" behind the fixed effect. Hence, we interpret our results following Laeven and Levine (2008), namely by the theoretical foundation and robustness of our results.

6.5 Conclusion

Our study analyzes the effects of ownership concentration and codetermination in the supervisory board on productivity. We find that the effect of codetermination strongly depends on the ownership concentration in a corporation. In companies with widely spread distribution of shares, almost-parity codetermination reduces productivity. This negative effect however diminishes with increasing capital concentration. We also find similar effects if the owner belongs to the supervisory board. Furthermore, this positive effect is independent from the kind of share owner, i.e. it doesn't matter if the owner is a person or family or another corporation. Our results provide evidence that efficiency losses caused by employee representatives may be reduced and also might turn to efficiency gains if a major shareholder exists and acts as a kind of strong opponent. Especially, our results show that codetermination should not be analyzed and assessed as an independent, isolated issue. It rather strongly depends on other conditions like the ownership structure and the composition of the supervisory board. Hence, future research on codetermination in supervisory boards might pay more attention to the "environment" of employee representatives in supervisory boards. It appears that the effects of the constellation of supervisory boards on efficient control of the management and,

in association with this, productivity strongly depends on the ownership structures *and* the presence of employee representatives

7 Final Remarks

The aim of this dissertation is to provide a more detailed insight into the effects of German codetermination rights. For this, I examine major hypotheses regarding codetermination from different perspectives that have not been considered so far in order to complement or, if necessary, revise previous conclusions. One finding of this thesis is that codetermination cannot be considered as an isolated issue. It interacts with its environment so that its effects strongly depend on several characteristics that have to be considered. For instance, as for many economic issues, the answer to the question if works councils affect overtime work or supervisory board codetermination affects productivity is: "it depends". Furthermore, heterogeneity between establishments with and without works councils has to be considered, especially with respect to rent-sharing issues. In this case, there is a danger that apples and oranges are compared. Accordingly, previous studies on the effects of work councils on rent sharing mainly focus on wage effects and show that codetermined establishments pay higher wages and that they are also less profitable. This leads to the conclusion that works councils shift rents from the employer to the employees which results in decreasing profits. Chapter 4 of this thesis however questions this conclusion because codetermined establishments do not more frequently suffer from too high wages. Hence, this wage markup that exists between codetermined and non-codetermined establishments seems not to be caused by rent shifting or, at least, the rent shifting effect is negligible. Establishments with works councils however more frequently suffer from overemployment. Hence, there is indeed a rent shifting behavior. This leads to a higher wage bill yet this roots in a (probably temporarily) too high employment level. In fact, the wage markup that has been identified by other studies must either be caused by other factors that have not been identified so far or be compensated by works council induced effects like higher productivity.

Furthermore, heterogeneity is a major aspect with respect to the identification of the effect of an adoption of a works council on employment growth. Here, the chosen control group causes misleading results. If simply establishments with and without works councils are compared, the effect on employment growth will be

underestimated. This results from a difference in employment growth between establishments that do not adopt a works council and establishments that will adopt a works council. As the latter growth faster than the first, a comparison of establishments with and without works councils is misleading. Furthermore, previous studies find that works councils reduce hires and dismissals, which leads to the conclusion that works councils reduce employment fluctuation. Although a reduction of fluctuation cannot be contested, a lower share of dismissals in codetermined establishments cannot be a source of reduced fluctuation because lower shares of dismissals are already observed before adoption. In contrast, hires are indeed reduced. Thus, works councils seem to make employers act with reserve in the case of hires so that the positive argument of fluctuation reduction changes to a rather negative argument, namely a delay or even in the worst case a prevention of hires.

The aim how employers react on codetermination is essential for analyzing how (long term) welfare is affected by codetermination. Clearly, employees profit from codetermination. Otherwise such an institution would not exist. Although, this thesis only discusses effects on overtime work and working time preferences and therefore ignores many other areas in which works councils may increase employee's utility, Chapters 2 and 3 show that works councils help to improve employee's life-work balance and also support the reconciliation of family and working life. However, the rather negative aspect of codetermination on the employer's side in Chapter 4 and 5 shows that codetermination does not lead to a Pareto improvement of welfare. Whether the negative effects of Chapters 4 and 5, whereas especially Chapter 5 suggests a negative long term effect, are compensated by the positive effects of codetermination cannot be answered in this thesis and is a question for further research. Here the question arises whether it is anyway possible to evaluate if, for example, the negative welfare effect of reduced employment growth can be compensated by or even compared with such soft factors like utility gains from a better working-life balance as it is caused by the reduction of overtime work.

This thesis may initiate a rather negative conclusion with respect to German codetermination rights. That however is not the intention of it. The reader should know that codetermination is not a black-box as it is treated by some studies. It is a general term for different instruments that are given to employees and may be used in line with their preferences in particular situations and lead to particular reactions by managers. If, as it is written in Chapter 5, the adoption of a works council reduces employment growth, than no one would pronounce that codetermination is harmful per se. It rather means that there are some parts of German codetermination rights which, at mean, lead to a lower employment growth compared to non-codetermined establishments. Of course, there may be other aspects of German codetermination rights that are able to affect welfare positively, even in the sense of Pareto. As a final remark I would like to point out an argument that has not been stated so far. A main argument against codetermination, which appears in several chapters of this dissertation, is that if codetermination increases efficiency, managers would introduce it voluntarily. In the same sense, some also might argue: if mandatory codetermination is harmful in the long run, it would not be a major part of German industrial relations for almost 100 years.

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Eidesstattliche Versicherung

Hiermit versichere ich, dass ich diese Dissertation selbstständig verfasst habe. Bei der Erstellung der Arbeit habe ich mich ausschließlich der angegebenen Hilfsmittel bedient. Die Dissertation ist nicht bereits Gegenstand eines erfolgreich abgeschlossenen Promotions- oder sonstigen Prüfungsverfahren gewesen.

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