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# Flexible Collective Bargaining Agreements: Still a Moderating Effect on Works Council Behaviour?

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# Flexible Collective Bargaining Agreements: Still a Moderating Effect on Works Council Behaviour?*

Tobias Brändle†

October 11, 2013

**Abstract**

We analyse the interaction between different labour market institutions in Germany, a country with a long tradition of strong bargaining partners. A number of studies have established that industry-level bargaining exerts a moderating role on firm-level co-determination: works councils generate rather than redistribute rents in plants covered by collective bargaining agreements. This work analyses whether these findings still hold, given recent developments in the German system of industrial relations towards more bargaining decentralisation, such as opening clauses or company-level pacts for employment. In addition, we provide evidence pertaining to whether labour market reforms targeted at one institution (a push of collective bargaining agreements towards more flexibility) are counteracted by altering the effects of other, unaffected institutions (the rent-seeking behaviour of works councils). Analysing institutional changes and augmenting a theoretical model provides hypotheses, which are then tested using empirical analysis of representative German plant level data. We find that the existence of flexibility provisions in collective bargaining agreements do not drive works council behaviour towards rent-seeking. Regarding rent-generation, we find an amplifying effect: works council existence is associated with higher productivity in plants covered by industry-level contracts. These findings, however, depend on the level of collective bargaining: they do not hold in plants covered by firm-level contracts.

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*JEL code: J53, J31*

# 1 Introduction

In recent years the German system of industrial relations has changed significantly. While the dual structure (collective bargaining agreements (CBAs) on the industry level and employee representation on the plant level) still covers the majority of employees, there is a clear trend towards (external) bargaining decentralisation, manifesting itself for example in declining collective bargaining coverage (Ellguth and Kohaut 2011). The social partners (unions and employers' associations) have introduced a number of flexibility measures to counteract this development (so-called internal decentralisation). The vast majority collective contracts nowadays contain opening or hardship clauses (OC), and company-level pacts for employment (CLP) are also more common, not only in case of a crisis (Kohaut and Schnabel 2007, Bellmann and Gerner 2012a). In light of these changes, the question arises whether it still holds true that collective bargaining agreements exert a moderating effect on works council behaviour, such that rent-generating behaviour becomes more likely and rent-seeking behaviour becomes less likely.[1] The first conjecture is that increased flexibility and more decentralisation of CBAs could lead to 'worse' works council behaviour, i.e. more rent seeking and/or less rent generation, which could be measured through higher wages and/or lower productivity in affected plants.

We add to a growing literature on the economic effects of works councils. While the scientific community is often in dispute about whether works council presence per se leads to socially preferable economic outcomes,[2] the effects resulting from an interaction of works councils and collective bargaining are rather undisputed, which is surprising given the extent to which these institutions have changed since the last decade.[3] From a policy perspective, this issue is particularly interesting. First, Germany is increasingly regarded as a role model for labour market reforms throughout Europe and beyond, as it outperforms most of its neighbours in the aftermath of the 2009 bank and economic crisis in terms of (high) employment growth and (low) unemployment rates. Second, in the on-going discussion on the economic effects of labour market reforms, the virtues of

[1] The moderating effect has first been termed in an article by Hübler and Jirjahn (2003). It has been cited very often in almost any study on the system of industrial relations in Germany and beyond. However, until now, its central findings remain unquestioned.

[2] See, for example regarding the employment effects of works councils, Addison and Teixeira (2006) and Jirjahn (2010).

[3] An exception is the article by Ellguth et al. (2012), which analyses the interaction between opening clauses, works councils, and the wage level in covered plants.

increased flexibility for firms, for example in the form of bargaining decentralisation, seem to be undisputed.

This paper uses both theoretical and empirical methods to analyse the stability of the interaction effects between works councils and CBAs over time and of whether bargaining decentralisation exerts a corrupting effect on works council behaviour. The theoretical part builds on a model of a dual system of industrial relations by Hübler and Jirjahn (2003), where works councils bargain with management for a mark-up on the contracted wage in exchange for increased effort. We add a measure of works council bargaining power, which influences the moderating role collective bargaining exerts on the effects of works councils on productivity and wages. We argue that works council bargaining power could change if flexible measures need to be applied, but that there is also an anticipation effect on works council behaviour if flexibility provisions exist in a CBA. As from an institutional point of view the direction of the effect is, however, unclear, and it remains an empirical question whether this leads to increased works council rent-seeking behaviour.

The empirical part of the paper tests the (ambiguous) theoretical predictions using representative German plant data, the IAB Establishment Panel, with a focus on the time period between 2005 and 2008, as information on OCs and CLPs is restricted to those waves. We account for various covariates at the plant level, including the capital stock, and estimate differences in plant-level productivity and wages between different bargaining regimes and with regard to works council existence. We show that even if more decentralised collective bargaining increases their rent-seeking opportunities, works councils do not seem to change their behaviour. Works council presence in plants with flexible collective contracts is associated with higher productivity, while wages stay the same.

Our results are interesting because the literature so far points to the existence of a trade-off for plants when choosing an optimal level of bargaining. While central (collective) bargaining reduces distributional conflicts at the firm level, decentralised (individual) bargaining is associated with a higher firm performance. Works councils have so far been seen to amplify this trade-off: they have a moderating role in collectively covered firms and seem to prefer to engage in rent-seeking activities in non-covered firms. Our results, however, suggest that an (internal) decentralisation of CBAs does not change the works council behaviour the same way external decentralisation does.

The rest of the paper is structured as follows. Section 2 gives a short overview of the literature on the economic effects of works councils regarding rent-seeking and rent-generation. Section 3 summarises recent developments in the German system of industrial relations, which we then include in a theoretical model in Section 4. We lay out our data

and econometric procedure in Section 5, while Section 6 contains the empirical results and a number of robustness checks. Section 7 concludes and formulates policy implications.

# 2 Rent-Seeking versus Rent-Generation: a Short Review of the Works Council Literature

According to the literature on industrial relations, works councils have multiple possible effects, namely rent-seeking, voice, monopoly, and insurance (Hirsch et al. 2010).[4] While early work on works council behaviour mostly suggests negative effects on firm performance (Fitzroy and Kraft 1990), the majority of recent studies leads to more differentiated results.[5] For an overview of the literature so far in general, see also Addison (2009) and Jirjahn (2011).

For simplification, we consider only two potential effects of works councils: rent-generation and rent-seeking (cf. left two arrows of Figure 1). Rent-generation means an increase in firm performance, e.g. higher productivity or profits. Works councils can achieve this via multiple channels. They can, for example, increase the motivation of the workforce through a collective voice mechanism (Freeman 1976); increase human capital formation in a plant through increased training (Stegmaier 2012), longer tenure (Boockmann and Steffes 2010), or a reduction in the number of workers who quit (Hirsch et al. 2010, Pfeifer 2011); reduce information asymmetries between management and employees (Freeman and Lazear 1995); or generally enact productivity-enhancing work practices through their rights ensured by the Works Constitution Act (*Betriebsverfassungsgesetz*, WCA). Indeed, for example Wagner et al. (2006) Wagner (2008), Jirjahn (2012), and Mueller (2012) find that works councils can have positive effects on productivity.[6] Only a few studies, however, recognise possible interaction effects with collective bargaining.

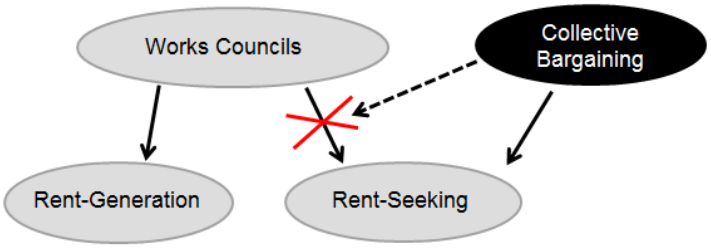
[4]Contrary to analysing the effects of works councils, a large number of studies also looks at the potential determinants of works councils' existence or introduction, see for an overview Oberfichtner (2013).

[5]In a review article, Addison et al. (2004) explains the differences in findings by identifying three phases of economic research on works councils, closely related to the evolution of suitable (firm-level) data. The first phase analyses mainly small cross-section samples up to the mid-1990s; the second phase analyses larger, regional or industry-specific data, for example the Hanover Firm Panel, mostly up to the mid-2000s; and the third phase analyses nationally representative data, for example the IAB establishment panel. With the emergence of linked-employer-employee data, most notably the LIAB, the economic research on works councils might have entered a fourth phase.

[6]Studies usually find heterogeneous works councils effects by establishment size, sectors and even between employees: Wagner et al. (2006) and Wagner (2008) find, for example, larger productivity effects in collectively covered plants and in the manufacturing sector, while Jirjahn and Mueller (2012) additionally find that the productivity effects of works councils is larger in firms with non-foreign ownership, while Mueller (2013) also finds that the effects may be non-linear along the (unconditional) productivity distribution of plants. Furthermore, Boockmann and Steffes (2010) find that works councils increase tenure mostly for blue-collar men, while the same is true for wages in the study by Addison et al. (2010).

On the contrary, rent-seeking behaviour implies the transfer of economic rents, i.e. profits, to employees. While this does not need to have an impact on economic welfare per se, a number of studies argue that rent-seeking could lead to lower output or efficiency, for example because of a suboptimal level of investments (cf. Addison (2009).[7] However, works councils are severely limited in their ability to bargain over wages. First of all, they are not allowed to call a strike (see section 74 (2) WCA or Behrens 2009 for an analysis). However, works councils still have the power to use their co-determination rights or the threat of decelerating firm processes in order to influence, for example, restrictions on working time, overtime payments or higher bonuses. Indeed, works councils have been found to be correlated with higher wages (Jirjahn 2003, Addison et al. 2010), higher separation payments (Berger and Neugart 2012), and higher wage cushions (Jung and Schnabel 2011). On the contrary, Grund and Schmitt (2013) use household-level data from the German Socio Economic Panel (GSOEP) and do not find significantly positive effects of works councils on wages using a difference-in-differences approach. A recent contribution by Beckmann and Kräkel (2012) analyses the effects of works councils on internal rent-seeking and finds that they might be beneficial by disentangling rent-seeking and production issues in a model with endogenous establishment size.

Figure 1: The Moderating Effect of CBAs on Works Council Behaviour (Dotted Line).




*Source: Own representation.*

Regarding the interaction of works councils and collective bargaining, the law is very clear: Section 77 (3) WCA formally bans works councils from negotiating over items that have been established as part of collective bargaining contracts. Theoretically, the argument has been put forward by Freeman and Lazear (1995), Hübler and Jirjahn (2003) and Behrens (2009) that the existence of a CBA reduces the possibility of a works council to engage in rent-seeking activities (=moderating effect, dotted arrow in Figure 1). Using

[7]For a similar argument regarding the effects of union bargaining, see Walsworth (2010). Jirjahn (2012) analyses the effects of works councils on plant survival, a proxy for long-term efficiency, and finds mixed results. Additionally, Pfeifer (2012) analyses the effects of works council existence on human resource problems, an indicator of how management decisions are affected by employee involvement, and find mixed effects, too.

data from the Hanover Firm Panel, Hübler and Jirjahn (2003) also find that works councils have indeed larger effects on productivity in collectively covered firms, while the wage effect is smaller. Similarly Mueller (2011) analyses the impact of works councils on profits (as the difference between rent-generation and rent-seeking). Using data from the IAB establishment panel and an objective measure of firm profits, he shows that works councils increase profits mainly in collectively covered firms. Therefore, the literature confirms the division of roles in the German dual system of industrial relations: rent-seeking activities are performed via industrial-level bargaining agreements (most right arrow in Figure 1), while works councils focus on productivity-enhancing measures. However, several points need to be discussed: the article by Hübler and Jirjahn (2003) is based only on regional data and fails to control for important variables such as the capital stock of a plant. Furthermore, it analyses a time period before the German system of industrial relations underwent severe changes (see below) and does not distinguish between different levels of collective bargaining. Mueller (2011) only analyses the combined effect and does not distinguish between rent-generation and rent-sharing, nor does he acknowledge bargaining decentralisation.

# 3 New Developments in the German System of Industrial Relations

## 3.1 The Dual System of Industrial Relations

In large parts of the German labour market, particularly in manufacturing, wages and other working conditions, especially working time, are negotiated in regional and industry-wide collective bargaining agreements (*Flächentarifverträge*) between trade unions and the respective employers' associations. Meanwhile, co-determination at the plant level between works councils and management focuses on optimising operational processes, especially the allocation of labour, on monitoring, and sometimes on supplementing the implementation of collective (or individual) contracts. According to the Collective Bargaining Agreement Act (*Tarifvertragsgesetz*, TVG), employers can bargain collectively with their employees by joining an employers' association and implementing a central collective bargaining agreement or by bargaining directly with the union in charge (firm-level contract, FLC, see section 1, 2 TVG). Once in place, these contracts are legally binding for all union members and member firms, but are generally extended to all employees and serve as a minimum standard that cannot be bypassed by negotiations at the plant level. This constrains the rights of works councils to negotiate over wages and working conditions via so-called plant-level agreements (*Betriebsvereinbarungen*). Contrary to the

decision to bargain collectively, which is made by the firm, the decision to establish a works council is made by the employees, who can elect a works council in a plant with at least five full-time employees. Once in place, a works council is equipped with certain information, consultation and co-determination rights, increasing with certain firm size thresholds. For a more detailed description on works councils, see, for example, Addison (2009). This dual structure of industrial relations in Germany has been established in order to reduce distributional conflicts at the plant level and to foster trust and cooperation. In fact, as described in Section 2, the literature on the economic effects of works councils seems to confirm the existence of interaction effects of collective bargaining coverage and works council behaviour.

## 3.2 Recent Changes in Collective Bargaining

While institutions have been considerably stable during the second half of the last century in Germany, they have changed during recent decades. Encountering increasing pressure from employers, economists, politicians, and employees, the unions have made concessions to allow for more flexibility within CBAs (Kohaut and Schnabel 2003). Most CBAs nowadays contain opening clauses (*Tariföffnungsklauseln*), which allow firms to deviate from the collectively negotiated wages or working conditions to a certain extent at the plant level (for an overview, see Brändle et al. 2011 or Heinbach 2009). Also, company-level pacts for employment (*Betriebliche Bündnisse für Arbeit*) have become more widely accepted by unions as a tool for adapting collective agreements to firm-specific needs and for finding efficient bargaining solutions together with the employees (for most recent evidence on CLPs, see Bellmann and Gerner 2012a).

The differences between the two measures are as follows. Opening clauses are regulated in section 4 TVG, specific to each regional and industry-wide collective contract and are very heterogeneous (Heinbach and Schröpfer 2007). Some OCs contain the possibility to reduce wages by a significant amount, while others only define minor deviations from standard working time. For their actual application, they rely on the agreement of the respective works council, or, if none exists, of the employees.[8] Heinbach (2007) uses data from on CBAs a national archive in order to classify opening clauses. Opening clauses on working time were dominant until the late 1990s, while opening clauses on compensation are currently the most common type. However, maybe because they are so heterogeneous and of limited magnitude, a large number of firms do not know whether their CBA contains opening clauses (Kohaut and Schnabel 2007). Recent findings show the existence of a potential *price for flexibility*, i.e. higher wages induced by the existence of OCs and

[8]Only recently have unions been prevented from vetoing a plant-level agreement based on opening clauses (BAG AZR 105/09).

then lower wages resulting from their application (Garloff and Gürtzgen 2012). Works councils seem to dampen both of these effects (Ellguth et al. 2012).

Company-level pacts for employment are not regulated by any law directly.[9] Starting in the mid-1990s, social partners have used them to save jobs in the event of a firm crisis (Massa-Wirth and Seifert 2005, Bellmann et al. 2008). They have become, however, more and more common and are nowadays also often signed pre-emptively to increase the competitive position of a firm (Ellguth and Kohaut 2008). An important difference from OCs is that CLPs are not necessarily limited in magnitude or time, and can therefore lead to more serious deviations from the collectively bargained minimum conditions. While CLPs were initially put in place to guarantee the employment of a plant, first findings by Bellmann et al. (2008) were mixed in this regard. Also, the formal concessions employers have to make as a bargain for lower wages, such as increased training, do not always seem to be met (Bellmann and Gerner 2012b). However, recent evidence from the 20008/2009 crisis shows that CLPs can indeed increase employment growth (Bellmann and Gerner 2012a).

## 3.3 Institutional Analysis

The introduction of these flexibility provisions might have an influence on the interaction between works councils and collective bargaining. A CBA *de jure* reduces the possibility of works councils to engage in rent-seeking activities, see, e.g., section 87 of the WCA: works councils may only co-determine working conditions that have not been formalised by law or collective agreements. However, the introduction of flexible elements explicitly demands negotiations on compensation and other issues that have not been previously negotiated. Opening clauses in collective bargaining agreements are usually implemented as exceptions in section 77 (3) WCA, such that works councils have to approve their application, see also Heinbach and Schröpfer (2007). Plant-level agreements over wages and employment follow section 92a WCA, which allows a works council to propose concessions on a number of working conditions in order to prevent job losses.[10]

Therefore, a first institutional analysis of the recent changes in the German system of industrial relations might conclude that the moderating effect of CBAs on works council behaviour is weakened. Through the need for negotiating on the plant level over issues that had previously been restricted to CBAs on the industry level, works councils might

[9] In fact, they use a loophole in section 77 (3) WCA together with section 92a WCA, where plant-level agreements are possible if collective agreements explicitly allow for them and they secure employment in a plant.

[10] Furthermore, there is a relative gain in importance of firm-level contracts as opposed to industry-wide CBAs (Ellguth and Kohaut 2011). This additionally may put works council members, who are often also union representatives (Müller-Jentsch 1995), in a position where they have to take part in wage negotiations.

be in a position where they again focus more on rent-seeking than on rent-generation.

# 4 An Extended Model of the Dual System of Industrial Relations

In this section we incorporate the institutional changes in the German system of industrial relations into a theoretical model to derive hypotheses on how a change in collective bargaining flexibility affects the behaviour of works councils. We base our considerations on a model of a dual industrial relations system by Hübler and Jirjahn (2003). In this setting, works councils and employers bargain over the rent of employment after the first stage of wage bargaining has taken place on the individual level or on the industry level by collective bargaining. The rent of employment depends positively on the effort level of employees $e$, the rent-generation parameter.[11] Works councils try to distribute the rent more equally by increasing the difference $w - \overline{w}$ between the actually paid wage and the bargained wage. The motivation is that works councils cannot influence $\overline{w}$ directly but instead via a mark-up over the bargained wage, representing, e.g. overtime bonuses or a wage cushion (see Section 2).

We generalise the original model of Hübler and Jirjahn (2003) by introducing an additional parameter of bargaining power, $\beta$ $(1 - \beta)$, for the works council (firm), which we assume to be affected by flexibility provisions in a CBA, and by the introduction of the base wage level $\overline{w}$. The idea is that the introduction of flexibility provisions could change the level of wages set in collective bargaining agreements, but that their actual implementation depends on the works council. The embodiment of these measures crucially depends on the bargaining power of a works council. Only strong works councils can, for example, limit the magnitude of concessions made in CLPs or force a compromise by the firm.

Using this framework, in the model works councils and firms bargain over the rent of employment $N$ by maximising a Nash product in the following form:

$$\Omega = [(\theta - e)(w - \overline{w})N]^{\beta} \cdot [(1 + e)F(N) - wN - \alpha(F(N) - \overline{w}N)]^{1-\beta}, \qquad (1)$$

where $\theta$ is a reference level of productivity and $F(.)$ is a basic production function. The outside option of the firm $\alpha$ represents its production level in case of a conflict between

[11] Instead of effort, $e$ can also be interpreted as the introduction of (improved) work practices at a plant or a general productivity level (Hübler and Jirjahn 2003, 476). However, effort or reorganisation of work is costly for employees. Works councils are eligible to negotiate on reoganisations of the work environment according to sections 90 and 91 WCA.

management and works councils. It can be interpreted as the inverse of a works council's institutional power to hinder decision making and disrupt production, and differs between various institutional settings: works councils power is restricted in covered plants, see the discussion above.

$$\alpha = \begin{cases} 1 & \text{no council present} \\ 0 < \alpha < 1 & \text{council in a covered plant} \\ 0 & \text{council in an uncovered plant.} \end{cases}$$

The two parties choose the optimal levels of $e$ and $w$, i.e. optimal rent-generating and rent-seeking parameters, as follows:

$$e^* = \frac{1}{1+\beta}(\theta + \beta(\alpha - 1)) \tag{2}$$

and

$$w^* = \frac{\beta}{1+\beta}(\theta + 1 - \alpha)\frac{F(N)}{N} + \overline{w}, \tag{3}$$

which is a generalised result from Hübler and Jirjahn (2003).[12]

Looking at the interaction of works council behaviour, collective bargaining and flexible measures, we first obtain the following basic results:

$$\frac{\partial e^*}{\partial \alpha} = \frac{\beta}{1+\beta} > 0, \tag{4}$$

and

$$\frac{\partial w^*}{\partial \alpha} = -\frac{\beta}{1+\beta}\frac{F(N)}{N} < 0 \tag{5}$$

which can be interpreted as follows. When a plant with a works council introduces (abolishes) collective bargaining $\alpha$ rises from zero to above zero (falls to zero) and productivity increases (falls). The overall effect on wages depends on the combination of a negative effect on the works council mark-up $\frac{\partial w^*}{\partial \alpha}$ and a potentially higher base wage ($\frac{\partial w^*}{\partial \overline{w}} = 1$). It depends on the distribution of bargaining power $\beta$ and the shape of the production function $F(.)$.[13] However, as regards works council behaviour, a positive change in $\alpha$ reduces rent-seeking and increases rent-generation opportunities. This represents the moderating role of collective bargaining on works council behaviour.[14]

When flexibility provisions exist in a CBA, the first intuition would be to just reverse this effect. However, works council behaviour only deviates from a focus on

[12] The original results are a special case where $\beta$ is equal to 0.5 and $\overline{w}$ is equal to zero.

[13] Assuming a decreasing, but monotonically positive shape, the works council markup is decreasing in $N$. Hence, for larger firms, the overall wage effect is ceteris paribus more likely to be positive.

[14] Put differently: when a works council is introduced $\alpha$ falls from one to less than one, wages rise and productivity falls, but this effect is smaller in collectively covered plants (the change in *alpha* is smaller, i.e. it does not fall to zero).

productivity-enhancing measures when the need to negotiate the implementation of opening clauses or employment pacts exists. So formally, the mere existence of a flexibility provision should not change the institutional environment of a works council, i.e. the parameter $\alpha$. We would therefore expect no ex-ante change in the moderating role of collective contracts on works council behaviour, at least not regarding the increased incentives for productivity-enhancing measures.

It can be the case, however, that the introduction of opening clauses causes a *price for flexibility effect*, i.e. higher pay settlements in the form of a higher base wage $\overline{w}$ as a concession to the employees since their wages might be lowered if OCs are applied, see Fitzenberger and Franz (1999) or Garloff and Gürtzgen (2012). Hence, the existence of flexible measures could affect the wage level in a plant. Also, the effect might be lower for plants with a works council because it could be anticipated that works councils could, to some extent, prevent concessions in case of the application of flexible measures (Ellguth et al. 2012).

*H1: The existence of flexible measures in CBAs has no effect on plant-level productivity, but has a positive effect on the wage level. The latter effect could be smaller in plants with a works council.*

The implementation of flexible measures usually depends on their acceptance by the employees, who can be represented by works councils (Heinbach and Schröpfer 2007). Management demands large concessions from them in order to prevent job losses or to react to increased competition. The works councils (the employees) now have to bargain over items that have not been debatable until now, which can be modeled by a negative change of $\overline{w}$ (increase in bargaining scope). (Stronger) Works councils might be able to reduce the amount of concessions made by the employees (rent-protection), by sacrificing (only some) productivity-enhancing work practices in the negotiations for plant-level agreements (rent-generation). For example, we know for CLPs that these concessions are not always met and that they depend on works council existence (Bellmann and Gerner 2012b). Therefore, we argue that a works council crucially affects the outcome of the negotiations on the implementation of flexibility provisions.[15]

[15]Formally, in the model the moderating effect of collective bargaining crucially depends on works council bargaining power. When works councils bargaining power $\beta$ is larger (smaller), this will lead to more (less) rent-generation:

$$\frac{\partial^2 w^*}{\partial\alpha\partial\beta} = -\frac{1}{(1+\beta)^2}\frac{F(N)}{N} < 0 \tag{6}$$

and

$$\frac{\partial^2 e^*}{\partial\alpha\partial\beta} = \frac{1}{(1+\beta)^2} > 0. \tag{7}$$

What we do not know, however, is whether the flexibilisation of collective bargaining changes works council bargaining power. We know that works councils usually oppose bargaining decentralisation, which could be interpreted such that their bargaining power falls (Nienhüser and Hoßfeld 2010). Similarly, it

*H2: The implementation of flexible measures in CBAs has a negative effect on the wage level in a plant. This effect could be smaller in plants with a works council, but could be compensated by a negative effect on plant-level productivity.*

Summing up the theoretical considerations, we would predict that works council behaviour does not change when flexibility provisions are introduced, but when they are applied in collective bargaining agreements. To test these predictions, we rely on an empirical analysis. By distinguishing between the existence and the application of flexibility provisions, we can identify whether bargaining decentralisation reduces the moderating effect of collective bargaining on works council behaviour, or whether bargaining decentralisation changes the interaction of the two institutions in another way, for example via a change in the bargaining power of works councils.

# 5 Data and Econometric Model

## 5.1 Data

To test our hypotheses, we use the Establishment Panel (EP) of the Institute for Employment Research (IAB), a representative German plant survey containing up to 16,000 observations per year. Starting in 1993 for West Germany and 1996 for East Germany, the IAB conducts this survey every year in personal interviews with personnel managers. The sample plants are a random stratum of 16 industries and 10 firm size classes from the population of all German plants with at least one employee subject to social security contribution. It covers about 1% of all firms and about 7% of all employees in Germany. The IAB corrects for panel mortality, exits and newly founded firms. The data contain rich information on firm characteristics, such as the number of employees, turnover, ownership, investment activities, and economic prospects; and on labour market institutions, such as collective agreements, works councils, government subsidies, and active labour market policies. For more information, see the IAB website (www.iab.de) or Fischer et al. (2009). We are able to make use of this data set through controlled remote data access via FDZ (*Forschungsdatenzentrum*).

Information on OCs and CLPs is restricted to certain (recent) waves of the panel, so we focus on the time period between 2005 and 2008. In waves 2005 and 2007 the data contains items on opening clauses. Plants respond whether they know if opening clauses exist in their collective agreement, whether they use such clauses, and which type of opening clause they use. Kohaut and Schnabel (2007) have analysed these items and

can be argued that the increase in authority by bargaining over wages and working conditions they were not allowed to bargain over before (more scope) does not increase their bargaining power because only deviations at the expense of employees are possible.

find that a significant number of plants do not know about OCs, that about half of the plants that do know about them also use them, and that plants that use them are more likely to have a bad profit situation. In the waves 2006 and 2008 the IAB EP contains items on company-level pacts for employment. There is information on the current and previous existence of employment pacts, their duration, legal form, which exact measures they contain and the reason they have been signed. Ellguth and Kohaut (2008) analyse this data and find that it is important to distinguish between employment pacts that are signed because of a crisis in the plant and pacts signed to get a competitive advantage.

To capture the flexibility of collective bargaining agreements, we use two different dummy variables that indicate (a) that a flexible measure (OC or any CLP) ever existed in the plant or (b) that an opening clause or a crisis CLP is ever applied. This distinction is based on previous findings in the literature on flexibility provisions and on our theoretical hypotheses. As regards opening clauses, for example Ellguth et al. (2012) and Garloff and Gürtzgen (2012) find that their existence has very different effects compared to their application. We argue here that the same could be said for the two different types of CLPs. Pacts for competitiveness are usually founded in rather good times to prevent negative effects of a crisis in the future. They are also rather limited in the magnitude of concessions employees make. Crisis pacts, on the other hand, have far more reaching consequences for a plant and they are, similarly to the application of OCs, only applied in a situation where the survival of the plant could be in danger (Bellmann and Gerner 2012a). As we combine the two measures, we have to impute missing values over time, because the information on each of the flexible measures is only available in different waves of the survey. However, opening clauses have been shown to be rather stable over time, meaning that, once introduced, they are seldom abolished (Heinbach 2007). Also, CLPs are usually negotiated for a longer period of time (Ellguth and Kohaut 2008). Both arguments reduce, however, our possibilities to use time variance in our analysis.

To measure rent-seeking and rent-generation, we use two variables often used in the literature (see Beckmann and Kräkel 2012, Hirsch and Mueller 2012, Mueller 2012). As regards rent-seeking, we compute the average wage level per plant. We have information on the monthly sum of salaries in a plant and divide it by the number of employees working in the plant.[16] As our preferred measure of rent-generation, we compute the average labour productivity in a plant. We calculate value added as total turnover less intermediates (sales times one minus the share of intermediate inputs) and divide this by the number of employees.[17]

[16]The sum of salaries is measured in June of each year and therefore excludes Christmas bonuses etc. The availability of linked-employer-employee data could be used to measure individual wages directly. However, for the productivity measure this is not feasible. Therefore we rely on plant-level information to make the two measures comparable.

[17]An alternative strategy in the literature uses the total monthly wage sum or total value added, while

For our analysis we restrict our sample to plants with at least five employees subject to social security contribution, because of the legal threshold to introduce a works council. We use only plants in manufacturing and services, excluding agriculture, households, public administration, and not-for-profit organisations, to reflect a profit-maximising environment. We further exclude plants with missing values on covariates. To calculate a productivity measure, we need information on intermediate inputs. Therefore, we use only plants with sales as their business volume, excluding banks, insurance companies, and public bodies, which state their total assets, total premium paid or budget volume. Furthermore, we calculate the capital intensity of a plant following the approach by Mueller (2008), which uses investment activity to approximate a plant's capital stock. Hence, in specifications with capital stock approximation, we rely on plants with valid information on the share of expansion investments and on plants in industries with information on user duration of capital investments from the German Federal Statistical Office (www.destatis.de). Our regression sample is an unbalanced panel of a maximum of 21,761 observations from 9,032 plants in four waves of the survey, reduced by about a third when adding the variable for capital stock approximation and other observation-sensitive control variables to our model (14,663 observations in 6,113 plants).

For an overview of our regression sample, see Table 4 in the Appendix. We control for sourcing activities, firm-sponsored training, various measures of economic outlook as well as investments, export activity and the capital stock per employee. We add information on plant ownership, firm age and legal form. The possible selection of employees into firms with different bargaining regimes should be captured by various measures for the composition of the workforce, the churning rate and (imputed) standard working time. We also include dummy variables if the firm pays above the bargained wage or orientates to a CBA. Additionally, firm size, industry, and region dummy variables are included in our models.

Table 1 shows the incidence of collective bargaining, works councils and the two measures of bargaining decentralisation in our data. Using cross-sectional weights provided by the IAB, we can see that from all plants in the regression sample, about 40% have collective contracts. While only one in twenty non-covered plants has a works council, this share is three times larger in covered plants. This well observed fact is documented in the literature of works councils and correlates with other plant characteristics such as firm size (Jirjahn 2009). As regards the existence of flexible measures, we only look at

respectively adding the number of employees as a control variable (see, e.g., Hirsch and Mueller 2012). Jirjahn (2010) has argued that this would assume a linear effect of firm size on wages and productivity, which, in turn, Beckmann and Kräkel (2012) suggest not to be the case. By dividing by the number of employees, we implicitly assume a similar restriction. However, by additionally controlling for firm-size effects using indicators for different firm size classes, we allow for a non-linear influence as well.

Table 1: Empirical Distribution of Plants According to Different Institutions of Industrial Relations

| | **Works Council** | | |
|---|---|---|---|
| All Plants | No | Yes | Total |
| **Collective Bargaining** | 4,862 | 3,950 | 8,812 |
| | (87.61%) | (12.39%) | (100.00%) |
| Individual Bargaining | 10,178 | 2,771 | 12,949 |
| | (94.81%) | (5.19%) | (100.00%) |
| Total | 15,040 | 6,721 | 21,761 |
| | (92.08%) | (7.92%) | (100.00%) |
| Covered Plants Only | | | |
| **Flexible Measures Exist** | 1,219 | 2,585 | 3,804 |
| | (73.25%) | (26.75%) | (100.00%) |
| No Flexible Measures | 3,643 | 1,365 | 5,008 |
| | (92.25%) | (7.75%) | (100.00%) |
| **Flexible Measures Applied** | 734 | 1,940 | 2,674 |
| | (70.03%) | (29.97%) | (100.00%) |
| Not Applied | 4,128 | 2,010 | 6,138 |
| | (90.71%) | (9.29%) | (100.00%) |

*Note: Numbers denote observations; shares in parentheses representatively weighted.*
*Source: IAB Establishment Panel 2005 to 2008, own calculations (controlled remote data access via FDZ).*

collectively covered plants and find that about a quarter of them state that they have an opening clause or that any CLP has existed during the data. Note that we code the share of plants not knowing about opening clauses as not having any (Kohaut and Schnabel 2007). The share of plants with works councils largely differs between these groups. While only 8% of covered plants without flexible measures have a works council, this number is over one in four for covered plants with flexible measures. Among the plants with flexible measures, about 60%, or 13% of all covered plants, use these provisions. The share of plants with a works council is a little bit higher for plants applying flexible measures, at about 30%.

## 5.2 Econometric Model

To investigate the interaction effects between works councils and (flexible) collective bargaining, we use multivariate analyses, where we determine the joint effects of the existence of works councils ($WC$) and various bargaining regimes ($BR$) on productivity and wages at the plant level. We base our econometric model on the estimation of a productivity function or a wage bill equation that can be derived from a basic Cobb-Douglas production function, as demonstrated by, for example, Beckmann and Hegedues (2011). We

estimate the model:

$$y_{jt} = \alpha + \beta_1 \cdot BR_{jt} + \beta_2 \cdot WC_{jt} + \beta_3 \cdot BR_{jt} \cdot WC_{jt} + \gamma \cdot X'_{jt} + \mu_t + \epsilon_{jt}, \tag{8}$$

where $y_{jt}$ is either the average wage per employee or the average labour productivity per employee in a plant, respectively measured in natural logarithms. For our independent variables of interest, we use flags which indicate whether in a specific plant a works council exists, or whether it is covered by a collective bargaining agreement with or without (the application of) flexible elements and their interaction terms. We estimate the coefficients $\beta$ using a pooled ordinary least squares estimator. We further include a set of control variables, $X'_{jt}$ outlined in Table 4. We capture the time trend in our data using year dummy variables $\mu_t$, and correct the error term $\epsilon_{jt}$ for correlation within plants over time (cluster-robust standard errors).

Using only this simple model, it is likely that there exist unobserved determinants of $WC$ and $BR$ that are correlated with the error term, which would result in inconsistent estimates of ordinary least squares. Hübler and Jirjahn (2003) tackle this problem by using a bivariate probit selection model comparable to a Heckman selection model (Cameron and Trivedi 2006, p. 547ff.). Another way to control for potential endogeneity would be to use an instrument variable or treatment effects model. Jirjahn (2010), for example, uses the presence of owners as an instrument of works councils' presence. He does not, however, control for joint endogeneity of works councils and collective bargaining agreements. Beckmann and Kräkel (2012) employ an endogenous switching regression model with fixed effects and Mundlak terms. They instrument the work council variable with plant age, a variable that is, contrary to their measurement, time-constant in our data. These articles find that selection matters, and that OLS underestimates positive productivity and wage effects of works councils.[18] Another way to control for potential selection of firms into different bargaining regimes would be to use panel estimators (fixed or random effects) or even dynamic panel models (Arellano and Bond GMM), such as in, for example, Hirsch and Mueller (2012). This is not feasible in our case, as our measures of bargaining decentralisation, opening clauses and employment pacts, are only measured in two waves each and are very stable over time. As regards selection into flexible measures, Brändle and Heinbach (2013) provide an overview for opening clauses suggesting that at most their application could be biased as discussed in the previous section, but not their existence. The same could be stated for CLPs.

[18] Our OLS estimates could be also downward biased if there are unobserved economic factors that increase the probability that a works council exists in a plant, while having a negative influence on establishment performance or wages. So far, in the literature of works councils, this has been ruled out.

To check for potential selectivity of plants into a specific bargaining regime, we have, however, used a selection model similar to Addison et al. (2010). We add two selectivity terms to our basic model, $\lambda^{WC}$ and $\lambda^{BR}$, the estimated inverse Mills' ratio terms obtained in a bivariate probit estimation, where we use a dummy variable if the plant was founded before 1990 and if there are working owners present in the plant as exclusion restrictions, i.e. instruments (comparable to Gürtzgen 2010 for collective bargaining coverage and Jirjahn 2010 for works council existence). In our bivariate probit estimation we model the decision of adopting a works council or of bargaining collectively as interdependent, i.e. with correlated error terms. In fact, we can reject the null hypothesis of uncorrelated errors in the first stage. When looking at the results from the second stage, however, they stay qualitatively the same as the pooled OLS results. Furthermore, a kitchen-sink regression including the possible instrument variables in the second stage usually finds significant correlations with the dependent variables. We therefore present pooled OLS estimates, knowing they might suffer from (upward) bias through an omitted variable, a problem that cannot be reasonably solved for our research questions using state-of-the art econometric methods.

# 6 Empirical Findings

The empirical results section consists of three parts. First, we test whether the moderating role of collective bargaining on works council behaviour found by Hübler and Jirjahn (2003) (still) exists. Second, we test whether flexibility provisions in CBAs change the moderating role of works councils. Third, we provide an overview of a series of robustness checks, which we have performed in order to ensure that our results are universally valid.

The interpretation of our results is as follows. If, according to our hypotheses, works councils act differently depending on the respective bargaining regime of the plant, we would expect significant interaction effects of these variables with the works council dummy variable. Alternatively, we have performed separate regressions in sub-samples with different bargaining regimes producing similar results. We present the variables of interest in the section itself, while the full regression tables can be found in the Appendix.

## 6.1 Works Council Presence and Collective Bargaining Coverage

Table 2 shows results with which we analyse whether the moderating effect of CBAs on works councils behaviour still holds. Our analysis extends the literature by using a more recent time period, a data set which is representative for Germany as a whole and

with more control variables, and an additional analysis of firm-level contracts. Since the work of Hübler and Jirjahn (2003) the German system of industrial relations has changed significantly. It is therefore a priori not clear whether collective contracts still moderate the behaviour of works councils with respect to rent-seeking and rent-generation. Table 2 shows the results for the variables of interest, while Table 5 in the appendix also shows the coefficients and standard errors of all (control) variables. We present the results for different specifications and both dependent variables. Specifications (1) and (4) only contain the variables of interest. Specifications (2) and (5) control for a number of firm-level covariates for which we have information from all plants, and for dummy variables for firm size classes, industries, regions, and years. Finally, specifications (3) and (6) also contain observation-sensitive covariates such as investments, export shares, and especially the capital stock, which reduces the sample size.

Table 2: Wage and Productivity Effects of Works Councils and Collective Bargaining Agreements

| Dep. Variable | Log. Wage Level per Employee | | | Log. Value Added per Employee | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Works Council | 0.4326*** | 0.1286*** | 0.0814*** | 0.4880*** | 0.1804*** | 0.1055*** |
| | (0.0176) | (0.0131) | (0.0140) | (0.0342) | (0.0319) | (0.0330) |
| Collective Barg. Agreement | 0.0233* | 0.0193 | 0.0258* | -0.0231 | -0.0561** | -0.0181 |
| | (0.0138) | (0.0119) | (0.0134) | (0.0234) | (0.0248) | (0.0271) |
| WC * CBA | 0.0794*** | 0.0129 | 0.0040 | 0.3082*** | 0.1410*** | 0.1304*** |
| | (0.0226) | (0.0154) | (0.0170) | (0.0454) | (0.0372) | (0.0393) |
| Firm-Level Contract | 0.0880*** | 0.0428** | 0.0418** | -0.0312 | -0.0962*** | -0.1057*** |
| | (0.0257) | (0.0184) | (0.0200) | (0.0438) | (0.0332) | (0.0377) |
| WC * FLC | -0.0353 | -0.0109 | -0.0059 | 0.0692 | 0.0503 | 0.0723 |
| | (0.0335) | (0.0234) | (0.0255) | (0.0655) | (0.0514) | (0.0561) |
| Firm-Level Control Variables | No | Some | All | No | Some | All |
| Dummy Variables | Yes | Yes | Yes | Yes | Yes | Yes |
| N. of Obs | 21647 | 21647 | 14663 | 21647 | 21647 | 14663 |
| N. of clusters | 8978 | 8978 | 6113 | 8978 | 8978 | 6113 |
| F-Stat. | 438.51 | 292.00 | 191.52 | 199.74 | 155.71 | 121.83 |
| R Squared | 0.17 | 0.60 | 0.62 | 0.12 | 0.47 | 0.54 |
| Akaike- Criterion | 32435.80 | 16440.67 | 9028.47 | 56020.19 | 44952.04 | 27752.66 |

*Cluster-robust standard errors at the plant level shown in parentheses; * p<0.10, ** p<0.05, *** p<0.01.*
*All other variables listed in Table 5. Source: IAB Establishment Panel waves 2005 to 2008, own calculations (controlled remote data access via FDZ).*

The coefficients of our variables of interest in Table 2 can be interpreted in the log linear model such that belonging to a certain bargaining regime or being a plant with a works council is associated with a percentage change in the average wage or the average

value added per employee.[19] Hence, in the simple specifications (1) and (4), in the first row, plants with a works council seem to pay on average 54.1% more and their employees generate about 62.9% more value added than plants without a works council. These are huge coefficients, hence they should be interpreted with care. The coefficients of the bargaining regimes are much smaller, and often insignificant. Both bargaining regimes are associated with higher wages (2.3% for CBAs and 9.1% for FLCs) and (insignificantly) lower productivity.[20] There are significant interaction effects for CBAs (8.2% for wages and 36.1% for productivity), but insignificant interaction effects for FLCs.

The coefficients are significantly reduced when we add a standard-set of covariates in specifications (2) and (5), and – also using observation-sensitive control variables – in specifications (3) and (6).[21] In the following, we will interpret the latter.[22] In uncovered plants the presence of a works council is associated with an 8.4% higher wage level and with an 11.1% higher productivity level. These effects are statistically significant at the 1% level. Hence, it can be argued that, when there is no collective bargaining at the plant, works councils are both correlated with higher rent-seeking and higher rent-generation. The effects of CBAs do not change compared to the previous specifications; FLCs, however, are now associated with only a 4.2% higher wage level, but with a more negative productivity level of 11.1%. However, the latter effect is insignificant in plants with a works council due to a positive (but per se insignificant) interaction effect. CBAs are still associated with a small and marginally significant higher wage level, but with an insignificantly different productivity level, as compared to uncovered plants.[23] As regards the interaction effects, after controlling for observable differences between the plants, works councils are not correlated with a different wage level in plants covered by a CBA anymore; Instead, the productivity level in these plants is 14.3% higher. The interaction effects of works council presence and coverage by a FLC are still insignificant altogether.

[19] This approximation holds for *small* levels of coefficients, i.e. $< 0.1$. More specifically, the coefficient of $\beta$ should be interpreted as a $(e^{\beta} - 1) * 100$ percentage change in the dependent variable, which is larger than the approximation when the $\beta s$ increase. Throughout the text, we calculate the exact numbers.

[20] These coefficients are calculated using the interaction effect of both bargaining regimes with works council status. If there are no interaction effects, plants with CBAs and FLCs pay about 4% higher wages, but plants with CBAs feature an about 6.2% higher productivity, while this coefficient is negative for FLCs at 8.1%.

[21] Estimating a model that solely relies on the inclusion of the dummy variables shows that they explain about half of additional variance explained by specifications (2) and (5) as compared to specifications (1) and (4), respectively.

[22] They are more convincing since we have made sure that the differences between the two models are due to the inclusion of additional variables and not due to the (potentially systematic) exclusion of observations. This has been done by estimating a model containing the variables of specifications (2) and (5) on the sample of specifications (3) and (6), respectively. The differences between the respective specifications only concern the coefficients of bargaining coverage and works council status per se, and not the interaction effects. Results are available upon request.

[23] The coefficients in the wage equation are not statistically significantly different from each other.

Looking at bargaining regime and works council effects combined, the pattern is more pronounced. Works councils have no additional effect on wages when the plant is collectively covered, independently from the bargaining level. Hence, the (insignificantly) larger positive effect of firm-level contracts endures. However, as regards productivity, the large and positive interaction effect of works council presence and CBAs leads to an overall positive effect of both institutions together, while the combined effects of works council presence and FLCs cancel each other out.

These results can be interpreted such that works councils have both a rent-seeking and a rent-generating effect in general, that the latter is magnified if the plant is covered by a CBA, but that the role of works councils does not change if the plant is covered by a FLC. Hence, in addition to the previous literature, we find that the level of bargaining seems to make a difference when looking at the role of collective bargaining on works council behaviour. CBAs seem to be correlated with a higher economic impact of works councils, while this is not the case for FLCs (both compared to uncovered plants). In other words: The presence of a works council seems to increase the wage level independently from the bargaining regime, but its (positive) effect on productivity is larger in plants covered by a CBA. Hence, we have found evidence not for the existence of a moderating effect of collective bargaining agreements on works councils' rent-seeking behaviour, but of an amplifying effect of collective bargaining agreements on works councils' rent-generating behaviour. However, this only applies for industry-level agreements and not for firm-level contracts.

## 6.2 Decentralisation and Works Council Behaviour

In the next step, we extend our analysis by differentiating CBAs into flexible and inflexible ones. We present estimates for the existence of flexible measures and their application (double interaction, see Ellguth et al. 2012). We extend the literature by also analysing the productivity effects of works councils, by analysing both opening clauses and employment pacts, and by using capital stock approximation, which explains a significant part of the variance in our model and challenges the existing results. We argue that the flexibility provisions introduced into CBAs may force works councils to negotiate over working conditions and wages at the firm level, even if plants are collectively covered. This could alter the way CBAs affect works council behaviour. Comparable to above, Table 3 presents the variables of interest of our wage estimation in specifications (1) to (3) and for our productivity estimation in specifications (4) to (6). Table 6 in the Appendix shows the full regression table and Table 7 in the Appendix shows the full regression table for plants covered by a CBA only, comparable to the analysis of Ellguth et al. (2012). We distinguish between plants covered by a CBA for which a measure of flexibility exists and

plants which apply them. Additionally, we control for plants covered by a CBA without flexibility measures and for plants which are covered by a FLC. Uncovered plants are the control group.[24] We again present the models using only the variables of interest in specifications (1) and (4), add some plant-level characteristics and the dummy variables in specifications (2) and (5), and add the full set of covariates in specifications (3) and (6).[25]

Table 3: Wage and Productivity Effects of Works Councils and the Existence of Flexible Measures in CBAs

| Dep. Variable | Log. Wage Level per Employee | | | Log. Value Added per Employee | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Works Council | 0.4146*** | 0.1237*** | 0.0766*** | 0.5390*** | 0.2021*** | 0.1416*** |
| | (0.0134) | (0.0108) | (0.0119) | (0.0273) | (0.0261) | (0.0279) |
| Flexible Measures Exist | 0.1710*** | 0.1007*** | 0.0645** | 0.1181 | 0.0063 | 0.0113 |
| | (0.0393) | (0.0247) | (0.0284) | (0.0764) | (0.0598) | (0.0574) |
| WC * Existence | 0.0097 | -0.0291 | -0.0181 | 0.2725*** | 0.1951** | 0.1683** |
| | (0.0444) | (0.0284) | (0.0324) | (0.0988) | (0.0767) | (0.0781) |
| Flexible Measures Applied | -0.0404 | -0.0741** | -0.0417 | -0.0561 | -0.1038 | -0.0501 |
| | (0.0465) | (0.0292) | (0.0329) | (0.0897) | (0.0649) | (0.0627) |
| WC * Application | 0.0663 | 0.0737** | 0.0515 | 0.0145 | 0.0294 | -0.0267 |
| | (0.0513) | (0.0337) | (0.0377) | (0.1109) | (0.0843) | (0.0861) |
| No Flexible Measures Exist | -0.0262** | 0.0054 | 0.0183 | -0.0320 | -0.0483** | -0.0035 |
| | (0.0130) | (0.0115) | (0.0132) | (0.0235) | (0.0243) | (0.0270) |
| Firm-Level Contract | 0.0739*** | 0.0436*** | 0.0440*** | -0.0119 | -0.0663** | -0.0731** |
| | (0.0163) | (0.0133) | (0.0148) | (0.0335) | (0.0301) | (0.0330) |
| Firm-Level Control Variables | No | Some | All | No | Some | All |
| Dummy Variables | Yes | Yes | Yes | Yes | Yes | Yes |
| N. of Obs | 21647 | 21647 | 14663 | 21647 | 21647 | 14663 |
| N. of clusters | 8978 | 8978 | 6113 | 8978 | 8978 | 6113 |
| F-Stat. | 395.34 | 285.61 | 185.50 | 163.80 | 151.64 | 118.38 |
| R Squared | 0.18 | 0.60 | 0.62 | 0.12 | 0.47 | 0.54 |
| Akaike- Criterion | 32147.23 | 16381.07 | 9018.67 | 55876.63 | 44880.56 | 27739.29 |

*Cluster robust standard errors on the plant level in parentheses; * p<0.10, ** p<0.05, *** p<0.01. All other variables listed in Table 6. Source: IAB Establishment Panel waves 2005 to 2008, own calculations (controlled remote data access via FDZ).*

Throughout the specifications, the correlations between works councils and wages or productivity, per se, are very similar to the situation where we do not control for flexible measures in CBAs. In our final specifications (3) and (6), plants with a works council pay, on average, 8.0% higher wages and are 15% more productive. When looking at plants covered by a CBA with flexible measures, there is an astonishing difference compared to

[24]The covered plants without flexible measures are the control group in the estimations only using plants covered by a CBA, while uncovered plants and plants covered by a FLC are dropped. The results are qualitatively the same, although the loss of observations reduces statistical power.

[25]Specifications not containing interaction effects, containing only dummy variables, and testing for sample selection bias of the observation-sensitive control variables are discussed in the text and available upon request.

the last table. They pay significantly higher wages (6.6%) than uncovered plants, and also more than plants covered by a CBA without flexible measures. Ellguth et al. (2012) find that these effects are mitigated once an interaction with works council status is introduced. In our specification, however, this is not the case, as this (negative) interaction effect is neither of similar magnitude nor of statistical significance. Hence, we cannot replicate the results from the literature when controlling for the capital stock of the plant. Instead, we conclude that the existence of flexible measures in CBAs does not change the rent-seeking behaviour of works councils. Instead, what we measure here is probably a previously mentioned *price for flexibility*. Firms have to pay higher wages to be able to reduce them in times of a crisis.[26] As regards the relationship between plant-level productivity and flexible measures in CBAs, we find that there is no significant correlation with their existence per se, albeit the coefficient being large when not controlling for covariates. However, when looking at the interaction effect, this picture changes. The existence of a works council is correlated with higher average productivity of a plant by an additional 18.3% if the plant is covered by a CBA with flexible measures. Hence, the existence of flexible measures seems to be correlated with a direct effect on wages, but only an indirect effect on productivity: in plants with a works council. Therefore, we can conclude that the existence of flexible measures may increase the amplifying effect on works councils' rent-generating behaviour found above. In order to protect the (increased) rents of the employees from the introduction of flexible measures, works councils have an incentive to increase the productivity of a plant, such that the flexibility measures do not need to be applied.

When we look at the effects of an application of the flexible measures, we again find only partly similar patterns in comparison to Ellguth et al. (2012). The application of flexible measures per se is associated with a lower wage level, but this is offset by higher wages in plants with a works council. The effects are, however, only (marginally) significant in specification (2) and insignificant everywhere else.[27] As regards the productivity effects of an application, we do not find any significant results at all, neither for the coefficient per se, nor for the interaction effect. Contrary to the existence of flexible measures, however, the effects tend to go in the same direction as the wage effects. The application per se is (insignificantly) negatively correlated with the productivity level in a plant, and the interaction effects are smaller and (insignificantly) positive in two out of three specifications.

[26]The combined effect is statistically different from zero. Note, however, that, as discussed above, we differ in several respects to the study cited before, such that it is not an exact replication. Most notable distinctions are the use of CLPs, a slightly different sample, and some further control variables.

[27]This also holds true when relying on dummy variables only and estimating the model on the reduced sample.

When comparing the results to the theoretical hypotheses, we cannot find evidence that the decentralisation of collective bargaining via flexible measures changes the rent-seeking behaviour of works councils. On the one hand, works councils are not found to increase wages in these plants to a larger degree than they do in other plants. If anything, they tend to decrease the *price for flexibility effect*. On the other hand, works councils are found to be correlated with higher productivity levels in collectively covered plants with flexible measures as compared to uncovered plants. Hence, the amplifying effect of CBAs on works councils' rent-generating behaviour is not diminished by internal decentralisation. In the case of an application of flexible measures, works councils might indeed dampen the negative wage effects, i.e. they protect the rents of the employees. This effect is, however, not very robust. However, we do not find significant results regarding the expected reduction in productivity resulting from concessions in the bargaining process of plant-level agreements. Taking these effects together, the evidence suggests the the role of collective bargaining on works council behaviour is not adversely affected when CBAs are (internally) decentralised via flexible measures. This result stands in contrast to the results for external decentralisation in the case of FLCs (see section above).

## 6.3 Robustness Checks

In this section we discuss robustness checks, some of which have already been addressed in the sections above. The robustness checks can be broadly summarised in the categories of data issues, effect heterogeneity, and causal inference.

Concerning data issues, we have performed all estimations in sub-samples instead of using interaction effects. The results do not change qualitatively. One loses, however, a significant degree of statistical power due to the exclusion of many observations in each sub-sample. We have looked at plants covered by a CBA only when analysing the effects of flexible measures. Also, we have checked for different samples, excluding and including various sectors or different types of firms. Our results are, for example, robust to the exclusion of plants that do not belong to the private sector, for which the mechanisms described in the model above would not apply. These are plants that do not state sales as their business volume, plants that are publicly owned, plants that are public corporations, and plants that employ civil servants (*Beamte*). As regards different measures of our dependent variables, we have performed analyses where we divide the wage sum by full-time equivalents or hours worked in the plant, as compared to, for example, Ellguth et al. (2012). However, for working time we only have information on the standard mandatory working time for full-time employees and the share of part-time employees on a biannual basis. We have therefore extrapolated this information, dropped all establishments where this is not feasible, and computed the wage level per full-time

equivalents or standard hours worked as a robustness check, while relying on the number of employees in our main specifications. As regards our productivity measure, we have also performed robustness checks using full-time equivalents and standard hours worked, as well as using sales per employee instead of value added, as some authors argue that plants which do not supply information on intermediates are non-randomly missing in this context (see, e.g., Beckmann and Kräkel 2012). We have also performed analysis using non-averaged outcome variables and have included the log of employees as a control variable instead (see, e.g. Hirsch and Mueller 2012. Finally, we have used levels instead of logs. The results stay (qualitatively) the same.

As regards effect heterogeneity, we have estimated our models in samples containing plants with 20-200 employees to further reduce the effects of firm size on the works council effect. Also, we have looked at West Germany and the manufacturing sectors only, as works councils especially exert an influence there. Also, we have split the sample into plants with a large fraction of male or female employees. Although the effects differ slightly in size, the conclusions stay the same. Methodologically, we re-estimated our models using the sample weights from the IAB. We have also performed the analysis on a balanced panel using 9,584 (8,312) observations from 2,396 (2,101) plants which can be observed for the whole sample period, losing about 55% of our observations. Our results are quite robust to both alterations, although the effects lose significance in the case of a balanced panel.

Finally, we have tried to tackle the problem of works council endogeneity. Using a Heckman selection model our results stay the same (see Table 8 in the Appendix). However, we fail to find well suited exclusion restrictions: the ones usually employed in the literature show significant correlations with the dependent variables in kitchen-sink regressions (see Tables 5, 6, and 7 in the Appendix). Other potential mechanisms of dealing with endogeneity are also not feasible. The use of panel estimators is not practicable as variation in time is extremely sparse due to the short time span of the panel and little changes over time in our variables of interest. Corresponding models hence fail to identify any significant results. The same holds true for potential difference-in-differences approaches: the number of plants with simultaneous introductions of flexible measures and works councils is close to zero.

# 7 Conclusion

The interaction between collective bargaining and works council behaviour on wages and productivity is an important issue. Previous evidence establishes that the existence of a CBA reduces the opportunities for rent-seeking behaviour of works councils and impels

them to increasingly engage in productivity-enhancing activities. We analyse whether these findings can still be found given recent institutional changes, and extend the analysis by differentiating between the level of bargaining and by including information on the decentralisation of CBAs in the form of opening clauses and employment pacts. We form hypotheses using institutional knowledge as well as by extending the theoretical model of Hübler and Jirjahn (2003). The theoretical considerations would suggest the moderating role of works councils would prevail, but may come at the cost of reduced rents overall. We rely on empirically answering this question using recent waves of the IAB Establishment Panel.

We find that works council presence is associated with a higher wage level independent of the bargaining status of a plant. This suggests no moderating role of CBAs on works councils' rent-seeking behaviour. However, we find an amplifying effect of collective bargaining regarding plant-level productivity. Covered plants with works councils are associated with additionally higher values of value added per employee. This holds for CBAs only while FLCs, on the contrary, seem to be associated mainly with rent-seeking activities in a plant, which are partly dampened by works council existence. When differentiating CBAs by the existence of flexible measures, our empirical findings suggest that works councils can reduce the rent-seeking opportunities by an introduction of flexible measures: they potentially reduce the *price for flexibility effect*.

As the aim of our paper has been to shed some light on the effects of bargaining flexibilisation, we can draw the following conclusions. The literature on industrial relations should be more aware of the interdependence between various institutions. The moderating effect of collective bargaining on works councils' rent-seeking behaviour seems to have shifted into an amplifying effect on works councils' rent-generating behaviour, but only if bargaining is set on a different level, i.e. at the sector and not at the plant. On the contrary, the flexibilisation of CBAs does not reduce this effect, but rather strengthens it.

Therefore, potential policy implications from our research would be the following. When bargaining flexibilisation is a desired policy, this should be performed inside the existing institutions of industry-wide collective bargaining agreements. It should not be performed by shifting collective bargaining to the firm-level, as this would exert an adverse effect on works council behaviour comparable to the case of uncovered plants. Also, the introduction of flexibility provisions should not be able to be vetoed by works councils, as this could be an indication that works councils tend to favour rent-seeking activities. An even more pronounced (and therefore carefully expressed) recommendation would be that union representatives should not be allowed to be works council members. This is because if they are, the sphere of wage disputes is brought to the plant-level, where the works council behaviour could be changed towards rent-seeking.

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# Appendix

Table 4: Operationalisation and Summary Statistics of Covariates

| **Variable** | **Operationalisation** | Obser-vations | Mean | Std. Dev. | Minimum | Maximum |
|---|---|---|---|---|---|---|
| Labour Productivity | Log. (turnover-intermediates) divided by number of employees | 21761 | 16.05994 | .9384191 | 9.119434 | 21.40717 |
| Wage Level | Log. firm wage sum divided by number of employees | 21761 | 7.418183 | .5600417 | 4.409795 | 8.894204 |
| Collective Bargaining | Dummy variable (1 if covered by collective contract, 0 otherwise) | 21761 | .4049446 | .4908926 | 0 | 1 |
| Firm-Level Contract | Dummy variable (1 if covered by firm-level contract, 0 otherwise) | 21761 | .0808786 | .2726549 | 0 | 1 |
| Works Council | Dummy Variable (1 if works council present, 0 otherwise) | 21761 | .3088553 | .4620319 | 0 | 1 |
| Existence | Dummy variable (1 if opening clause employment pact ever existed, 0 otherwise) | 21761 | .1748081 | .3798116 | 0 | 1 |
| Application of Flexible Measures | Dummy variable (1 if opening clause applied or crisis pact in place, 0 otherwise) | 21761 | .1228804 | .3283074 | 0 | 1 |
| Insourcing Activities | Dummy variable (1 if insourcing present, 0 otherwise) | 21761 | .0293185 | .1687016 | 0 | 1 |
| Outsourcing Activities | Dummy variable (1 if outsourcing present, 0 otherwise) | 21761 | .0340977 | .1814843 | 0 | 1 |
| Orientation to CBA | Dummy variable (1 yes, 0 no) | 21761 | .2638666 | .4407379 | 0 | 1 |
| Financing Training Activities | Dummy variable (1 yes, 0 no) | 21761 | .7090667 | .4542033 | 0 | 1 |
| Hiring Activity | Churning rate (hirings and firings over average employment) | 21761 | .0492668 | .1359322 | 0 | 4.945055 |
| Share of open positions | | 21761 | .0159881 | .0548152 | 0 | 1 |
| Share of temporary contracts | | 21761 | .0511156 | .1161739 | 0 | 1 |
| Share of part-time workers | | 21761 | .1803235 | .2255917 | 0 | 1 |
| Share of apprentices and trainees | | 21761 | .0541093 | .0825877 | 0 | 1 |
| Share of skilled employees | | 21761 | .6103484 | .2517111 | 0 | 1 |
| Share of unskilled employees | | 21761 | .183304 | .248865 | 0 | 1 |
| Share of highly skilled employees | | 21761 | .1522137 | .1714058 | 0 | 1 |
| Share of female employees | | 21761 | .3640043 | .2813588 | 0 | 1 |
| Subsidiary | Dummy variable (1 if independent firm, 0 subsidiary) | 21761 | .7738155 | .4183696 | 0 | 1 |
| Capital Intensity | Dummy variable (1 if technical condition of assets good, 0 otherwise) | 21761 | .1816553 | .385569 | 0 | 1 |
| Investment Activity | Dummy variable (1 if investments made, 0 no investments made) | 21761 | .7431644 | .436898 | 0 | 1 |
| Paying more than the bargained wage | Dummy variable (1 yes, 0 no) | 21761 | .2450255 | .4301122 | 0 | 1 |
| Public Ownership | Dummy variable (1 in public ownership, 0 otherwise) | 21761 | .024815 | .1555647 | 0 | 1 |
| Foreign Ownership | Dummy variable (1 in foreign ownership, 0 otherwise) | 21761 | .0660356 | .24835 | 0 | 1 |
| Legal Form | Dummy variable (1 if publicly listed, 0 otherwise) | 21761 | .7717017 | .5010015 | 0 | 2 |
| Firm Age | Firm age in years up to, censored at 20 | 21761 | 15.31933 | 5.852224 | 0 | 20 |
| Turnover Outlook | Index variable (1 risen turnover, 2 stagnated turnover, 3 fallen turnover) | 20682 | 1.883087 | .6855384 | 1 | 3 |
| Employment Outlook | Index variable (1 risen employment, 2 stagnated employment, 3 fallen employment) | 20406 | 1.943252 | .5406434 | 1 | 3 |
| Expansion Investments | Share of Expansion Investments on turnover | 21279 | .2278284 | .3492954 | 0 | 1 |
| Investments | Log. of total Investments | 21625 | 8.729318 | 5.50483 | 0 | 20.98563 |
| Export Share | Share of exports on turnover | 21647 | .1022419 | .2207786 | 0 | 1 |
| Economic Outlook | Dummy variable (1 good economic outlook, 0 otherwise) | 21182 | .298697 | .4576975 | 0 | 1 |
| Employee Involvement | Dummy variable (1 employee involvement present, 0 otherwise) | 21101 | .0816075 | .2737723 | 0 | 1 |
| Working Time | Standard Working-Time for Full-time Employees | 21594 | 39.21995 | 2.06047 | 4 | 60 |
| Capital Stock | Log. of Capital Stock according to Mueller (2008) | 17408 | 10.34815 | 1.592023 | 3.018026 | 16.661 |
| New Firm | Dummy variable (1 younger than 1990, 0 older than 1990) | 21761 | .4966684 | .5000004 | 0 | 1 |
| Owner present in plant | Dummy variable (1 if working owner in plant, 0 otherwise) | 21761 | .8105326 | .3918885 | 0 | 1 |
| Firm Size | Dummy variables for 5 firm-size clases | | | | | |
| Industry | Dummy variables for 9 different industries | | | | | |
| Region | Dummy variables for 16 different regions | | | | | |
| Year | Dummy variables for 4 years | | | | | |

Table 5: Wage and Productivity Effects of Works Councils and Collective Bargaining Agreements

| Dep. Variable | Log. Wage Level per Employee | | | Log. Value Added per Employee | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Works Council | 0.4326*** | 0.1286*** | 0.0814*** | 0.4880*** | 0.1804*** | 0.1055*** |
| | (0.0176) | (0.0131) | (0.0140) | (0.0342) | (0.0319) | (0.0330) |
| Collective Barg. Agreement | 0.0233* | 0.0193 | 0.0258* | -0.0231 | -0.0561** | -0.0181 |
| | (0.0138) | (0.0119) | (0.0134) | (0.0234) | (0.0248) | (0.0271) |
| WC * CBA | 0.0794*** | 0.0129 | 0.0040 | 0.3082*** | 0.1410*** | 0.1304*** |
| | (0.0226) | (0.0154) | (0.0170) | (0.0454) | (0.0372) | (0.0393) |
| Firm-Level Contract | 0.0880*** | 0.0428** | 0.0418** | -0.0312 | -0.0962*** | -0.1057*** |
| | (0.0257) | (0.0184) | (0.0200) | (0.0438) | (0.0332) | (0.0377) |
| WC * FLC | -0.0353 | -0.0109 | -0.0059 | 0.0692 | 0.0503 | 0.0723 |
| | (0.0335) | (0.0234) | (0.0255) | (0.0655) | (0.0514) | (0.0561) |
| Insourcing | | -0.0050 | -0.0126 | | 0.0001 | -0.0015 |
| | | (0.0143) | (0.0159) | | (0.0299) | (0.0323) |
| Outsourcing | | -0.0133 | -0.0233 | | -0.0316 | -0.0225 |
| | | (0.0143) | (0.0160) | | (0.0307) | (0.0329) |
| Orientation to a CBA | | 0.0322*** | 0.0233** | | 0.0120 | -0.0056 |
| | | (0.0090) | (0.0101) | | (0.0176) | (0.0195) |
| Firm Training | | 0.0783*** | 0.0486*** | | 0.1192*** | 0.0553*** |
| | | (0.0079) | (0.0088) | | (0.0151) | (0.0168) |
| Churning Rate | | -0.2116*** | -0.1737*** | | -0.4507*** | -0.3105*** |
| | | (0.0309) | (0.0350) | | (0.0614) | (0.0627) |
| Share of Vacancies | | -0.1582** | -0.2194*** | | -0.5680*** | -0.4530*** |
| | | (0.0626) | (0.0745) | | (0.1140) | (0.1264) |
| Share of Temp. Workers | | -0.0116 | -0.0093 | | -0.2597*** | -0.2069*** |
| | | (0.0326) | (0.0347) | | (0.0650) | (0.0757) |
| Share of Part-Timers | | -0.7942*** | -0.8186*** | | -0.9078*** | -0.7793*** |
| | | (0.0259) | (0.0330) | | (0.0468) | (0.0562) |
| Share of Trainees | | 3.8758 | 4.1522 | | -4.5671 | -1.8683 |
| | | (6.0627) | (6.2139) | | (5.0351) | (4.3954) |
| Share of Low-Skilled | | 4.6874 | 4.8707 | | -3.6769 | -1.2424 |
| | | (6.0626) | (6.2135) | | (5.0371) | (4.3929) |
| Share of Highly-Skilled | | 5.4793 | 5.6041 | | -2.8524 | -0.5891 |
| | | (6.0632) | (6.2144) | | (5.0399) | (4.3946) |
| Share of Skilled | | 5.0856 | 5.1977 | | -3.2914 | -0.9272 |
| | | (6.0625) | (6.2135) | | (5.0368) | (4.3923) |
| Share of Women | | -0.1858*** | -0.1741*** | | -0.2058*** | -0.1188*** |
| | | (0.0198) | (0.0227) | | (0.0405) | (0.0460) |
| Single Firm | | -0.0093 | -0.0174* | | -0.1007*** | -0.1200*** |
| | | (0.0083) | (0.0095) | | (0.0200) | (0.0223) |
| Techn. Condition of Assets | | 0.0533*** | 0.0375*** | | 0.1039*** | 0.0298* |
| | | (0.0079) | (0.0089) | | (0.0164) | (0.0178) |
| Investment Activity | | 0.0394*** | -0.1412*** | | 0.1312*** | -0.5121*** |
| | | (0.0073) | (0.0316) | | (0.0140) | (0.0617) |
| Paying Above CBA | | 0.0197** | 0.0195* | | 0.0773*** | 0.0344 |
| | | (0.0088) | (0.0101) | | (0.0197) | (0.0213) |
| Public Ownership | | 0.1055*** | 0.0934*** | | 0.0352 | -0.0937 |
| | | (0.0233) | (0.0278) | | (0.0631) | (0.0747) |
| Foreign Ownership | | 0.1086*** | 0.0786*** | | 0.2909*** | 0.1978*** |
| | | (0.0124) | (0.0138) | | (0.0323) | (0.0354) |
| Limited Firm | | 0.2557*** | 0.2371*** | | 0.2156*** | 0.2229*** |
| | | (0.0092) | (0.0111) | | (0.0183) | (0.0199) |
| Firm Age | | 0.0044*** | 0.0050*** | | 0.0068*** | 0.0060** |
| | | (0.0010) | (0.0012) | | (0.0021) | (0.0025) |
| New Firm (after 1990) | | 0.0035 | 0.0195 | | 0.0248 | 0.0527* |
| | | (0.0134) | (0.0154) | | (0.0284) | (0.0315) |
| Owner works in Firm | | -0.0583*** | -0.0498*** | | -0.1061*** | -0.1335*** |
| | | (0.0081) | (0.0093) | | (0.0199) | (0.0225) |

... Table 5 continued ...

| | | | | | | |
|---|---|---|---|---|---|---|
| Change in Business Volume | | | -0.0034 | | | -0.0280*** |
| | | | (0.0045) | | | (0.0085) |
| Personnel Outlook | | | 0.0052 | | | -0.0313*** |
| | | | (0.0058) | | | (0.0119) |
| Share of expansion investments | | | 0.0033 | | | 0.0693*** |
| | | | (0.0094) | | | (0.0197) |
| Log. of total investments | | | 0.0134*** | | | 0.0431*** |
| | | | (0.0029) | | | (0.0058) |
| Share of Exports | | | 0.1475*** | | | 0.2922*** |
| | | | (0.0166) | | | (0.0418) |
| Profit or Turnover Sharing Plan exists | | | 0.0728*** | | | 0.0884*** |
| | | | (0.0088) | | | (0.0203) |
| Other Type of Employee Representation | | | -0.0050 | | | 0.0023 |
| | | | (0.0114) | | | (0.0252) |
| Standard Working Time | | | -0.0033 | | | 0.0029 |
| | | | (0.0022) | | | (0.0038) |
| Log. capital stock per Employee | | | 0.0293*** | | | 0.1488*** |
| | | | (0.0033) | | | (0.0069) |
| Constant | 7.2562*** | 2.0529 | 1.5991 | 15.8666*** | 18.7426*** | 14.7984*** |
| | (0.0090) | (6.0620) | (6.2150) | (0.0138) | (5.0344) | (4.3956) |
| Dummy Variables | No | Yes | Yes | No | Yes | Yes |
| N. of Obs | 21647 | 21647 | 14663 | 21647 | 21647 | 14663 |
| N. of clusters | 8978 | 8978 | 6113 | 8978 | 8978 | 6113 |
| F-Stat. | 438.51 | 292.00 | 191.52 | 199.74 | 155.71 | 121.83 |
| R Squared | 0.17 | 0.60 | 0.62 | 0.12 | 0.47 | 0.54 |
| Akaike- Criterion | 32435.80 | 16440.67 | 9028.47 | 56020.19 | 44952.04 | 27752.66 |

*Cluster-robust standard errors on the plant level in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Source: IAB Establishment Panel waves 2005 to 2008, own calculations (controlled remote data access via FDZ).*

Table 6: Wage and Productivity Effects of Works Councils and Flexible Measures in CBAs

| Dep. Variable | Log. Wage Level per Employee | | | Log. Value Added per Employee | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Works Council | 0.4146*** | 0.1237*** | 0.0766*** | 0.5390*** | 0.2021*** | 0.1416*** |
| | (0.0134) | (0.0108) | (0.0119) | (0.0273) | (0.0261) | (0.0279) |
| Flexible Measures Exist | 0.1710*** | 0.1007*** | 0.0645** | 0.1181 | 0.0063 | 0.0113 |
| | (0.0393) | (0.0247) | (0.0284) | (0.0764) | (0.0598) | (0.0574) |
| WC * Existence | 0.0097 | -0.0291 | -0.0181 | 0.2725*** | 0.1951** | 0.1683** |
| | (0.0444) | (0.0284) | (0.0324) | (0.0988) | (0.0767) | (0.0781) |
| Flexible Measures Applied | -0.0404 | -0.0741** | -0.0417 | -0.0561 | -0.1038 | -0.0501 |
| | (0.0465) | (0.0292) | (0.0329) | (0.0897) | (0.0649) | (0.0627) |
| WC * Application | 0.0663 | 0.0737** | 0.0515 | 0.0145 | 0.0294 | -0.0267 |
| | (0.0513) | (0.0337) | (0.0377) | (0.1109) | (0.0843) | (0.0861) |
| No Flexible Measures Exist | -0.0262** | 0.0054 | 0.0183 | -0.0320 | -0.0483** | -0.0035 |
| | (0.0130) | (0.0115) | (0.0132) | (0.0235) | (0.0243) | (0.0270) |
| Firm-Level Contract | 0.0739*** | 0.0436*** | 0.0440*** | -0.0119 | -0.0663** | -0.0731** |
| | (0.0163) | (0.0133) | (0.0148) | (0.0335) | (0.0301) | (0.0330) |
| Insourcing | | -0.0053 | -0.0128 | | 0.0011 | -0.0008 |
| | | (0.0143) | (0.0160) | | (0.0297) | (0.0323) |
| Outsourcing | | -0.0138 | -0.0238 | | -0.0322 | -0.0232 |
| | | (0.0142) | (0.0160) | | (0.0306) | (0.0329) |
| Orientation to a CBA | | 0.0330*** | 0.0239** | | 0.0121 | -0.0068 |
| | | (0.0090) | (0.0101) | | (0.0176) | (0.0194) |
| Firm Training | | 0.0774*** | 0.0483*** | | 0.1170*** | 0.0549*** |
| | | (0.0079) | (0.0088) | | (0.0151) | (0.0168) |
| Churning Rate | | -0.2103*** | -0.1725*** | | -0.4453*** | -0.3099*** |
| | | (0.0308) | (0.0350) | | (0.0608) | (0.0628) |
| Share of Vacancies | | -0.1519** | -0.2170*** | | -0.5570*** | -0.4476*** |
| | | (0.0623) | (0.0743) | | (0.1137) | (0.1268) |
| Share of Temp. Workers | | -0.0103 | -0.0074 | | -0.2561*** | -0.2034*** |
| | | (0.0326) | (0.0346) | | (0.0648) | (0.0755) |
| Share of Part-Timers | | -0.7919*** | -0.8170*** | | -0.9024*** | -0.7742*** |
| | | (0.0258) | (0.0330) | | (0.0466) | (0.0562) |
| Share of Trainees | | 3.9265 | 4.1730 | | -4.7128 | -2.0385 |
| | | (6.0491) | (6.1926) | | (4.8545) | (4.3072) |
| Share of Low-Skilled | | 4.7348 | 4.8870 | | -3.8219 | -1.4080 |
| | | (6.0490) | (6.1923) | | (4.8563) | (4.3045) |
| Share of Highly-Skilled | | 5.5239 | 5.6197 | | -3.0062 | -0.7583 |
| | | (6.0496) | (6.1931) | | (4.8591) | (4.3061) |
| Share of Skilled | | 5.1326 | 5.2145 | | -3.4372 | -1.0935 |
| | | (6.0489) | (6.1922) | | (4.8560) | (4.3039) |
| Share of Women | | -0.1827*** | -0.1725*** | | -0.2001*** | -0.1163** |
| | | (0.0198) | (0.0227) | | (0.0405) | (0.0460) |
| Single Firm | | -0.0095 | -0.0177* | | -0.1025*** | -0.1217*** |
| | | (0.0083) | (0.0094) | | (0.0199) | (0.0223) |
| Techn. Condition of Assets | | 0.0540*** | 0.0378*** | | 0.1060*** | 0.0310* |
| | | (0.0079) | (0.0089) | | (0.0164) | (0.0179) |
| Investment Activity | | 0.0388*** | -0.1399*** | | 0.1304*** | -0.5055*** |
| | | (0.0073) | (0.0316) | | (0.0140) | (0.0617) |
| Paying Above CBA | | 0.0151* | 0.0169* | | 0.0716*** | 0.0317 |
| | | (0.0087) | (0.0100) | | (0.0197) | (0.0214) |
| Public Ownership | | 0.1055*** | 0.0939*** | | 0.0389 | -0.0886 |
| | | (0.0229) | (0.0275) | | (0.0622) | (0.0730) |
| Foreign Ownership | | 0.1057*** | 0.0773*** | | 0.2817*** | 0.1936*** |
| | | (0.0123) | (0.0138) | | (0.0321) | (0.0353) |
| Limited Firm | | 0.2562*** | 0.2378*** | | 0.2183*** | 0.2245*** |
| | | (0.0092) | (0.0111) | | (0.0182) | (0.0198) |
| Firm Age | | 0.0044*** | 0.0050*** | | 0.0069*** | 0.0060** |
| | | (0.0010) | (0.0012) | | (0.0021) | (0.0025) |
| New Firm (after 1990) | | 0.0031 | 0.0194 | | 0.0262 | 0.0546* |
| | | (0.0134) | (0.0154) | | (0.0283) | (0.0315) |
| Owner works in Firm | | -0.0578*** | -0.0495*** | | -0.1061*** | -0.1336*** |
| | | (0.0081) | (0.0093) | | (0.0199) | (0.0225) |

... Table 6 continued ...

| | | | | | | |
|---|---|---|---|---|---|---|
| Change in Business Volume | | | -0.0035 | | | -0.0274*** |
| | | | (0.0045) | | | (0.0085) |
| Personnel Outlook | | | 0.0044 | | | -0.0321*** |
| | | | (0.0058) | | | (0.0119) |
| Share of expansion investments | | | 0.0033 | | | 0.0686*** |
| | | | (0.0094) | | | (0.0196) |
| Log. of total investments | | | 0.0133*** | | | 0.0426*** |
| | | | (0.0028) | | | (0.0058) |
| Share of Exports | | | 0.1463*** | | | 0.2852*** |
| | | | (0.0166) | | | (0.0420) |
| Profit or Turnover Sharing Plan exists | | | 0.0722*** | | | 0.0866*** |
| | | | (0.0087) | | | (0.0204) |
| Other Type of Employee Representation | | | -0.0052 | | | 0.0034 |
| | | | (0.0115) | | | (0.0253) |
| Standard Working Time | | | -0.0030 | | | 0.0032 |
| | | | (0.0022) | | | (0.0038) |
| Log. capital stock per Employee | | | 0.0289*** | | | 0.1481*** |
| | | | (0.0033) | | | (0.0069) |
| Constant | 7.2588*** | 1.9944 | 1.5685 | 15.8593*** | 18.8578*** | 14.9460*** |
| | (0.0086) | (6.0485) | (6.1938) | (0.0136) | (4.8534) | (4.3070) |
| Dummy Variables | Yes | Yes | Yes | Yes | Yes | Yes |
| N. of Obs | 21647 | 21647 | 14663 | 21647 | 21647 | 14663 |
| N. of clusters | 8978 | 8978 | 6113 | 8978 | 8978 | 6113 |
| F-Stat. | 395.34 | 285.61 | 185.50 | 163.80 | 151.64 | 118.38 |
| R Squared | 0.18 | 0.60 | 0.62 | 0.12 | 0.47 | 0.54 |
| Akaike- Criterion | 32147.23 | 16381.07 | 9018.67 | 55876.63 | 44880.56 | 27739.29 |

*Cluster-robust standard errors on the plant level in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Source: IAB Establishment Panel waves 2005 to 2008, own calculations (controlled remote data access via FDZ).*

Table 7: Wage and Productivity Effects of Works Councils and Flexible Measures in Collectively Covered Plants Only

| Dep. Variable | Log. Wage Level per Employee | | | Log. Value Added per Employee | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Works Council | 0.3963*** | 0.1524*** | 0.1024*** | 0.6031*** | 0.2425*** | 0.1797*** |
| | (0.0235) | (0.0173) | (0.0199) | (0.0509) | (0.0432) | (0.0470) |
| Flexible Measures Exist | 0.1923*** | 0.1181*** | 0.0715** | 0.1673** | 0.0848 | 0.0421 |
| | (0.0405) | (0.0239) | (0.0285) | (0.0787) | (0.0531) | (0.0537) |
| WC * Flexible Measures Exist | 0.0280 | -0.0357 | -0.0205 | 0.2084* | 0.1833** | 0.1546* |
| | (0.0486) | (0.0304) | (0.0356) | (0.1079) | (0.0793) | (0.0837) |
| Flexible Measures Applied | -0.0404 | -0.0737*** | -0.0418 | -0.0561 | -0.1048* | -0.0440 |
| | (0.0465) | (0.0283) | (0.0326) | (0.0897) | (0.0602) | (0.0609) |
| WC *Flexible Measures Applied | 0.0663 | 0.0703** | 0.0455 | 0.0145 | 0.0306 | -0.0344 |
| | (0.0513) | (0.0325) | (0.0367) | (0.1109) | (0.0800) | (0.0836) |
| Insourcing | | -0.0192 | 0.0023 | | -0.0463 | 0.0011 |
| | | (0.0195) | (0.0216) | | (0.0434) | (0.0478) |
| Outsourcing | | -0.0101 | -0.0143 | | -0.0538 | -0.0613 |
| | | (0.0180) | (0.0196) | | (0.0407) | (0.0408) |
| Firm Training | | 0.0408*** | 0.0236* | | 0.1020*** | 0.0272 |
| | | (0.0117) | (0.0136) | | (0.0248) | (0.0272) |
| Churning Rate | | -0.1751*** | -0.1071** | | -0.5818*** | -0.3266*** |
| | | (0.0378) | (0.0444) | | (0.0672) | (0.0698) |
| Share of Vacancies | | -0.3603*** | -0.4041*** | | -0.7690*** | -0.4945*** |
| | | (0.0821) | (0.0956) | | (0.1683) | (0.1840) |
| Share of Temp. Workers | | -0.0487 | -0.0213 | | -0.2994*** | -0.0836 |
| | | (0.0498) | (0.0545) | | (0.0884) | (0.0902) |
| Share of Part-Timers | | -0.7054*** | -0.6732*** | | -0.8383*** | -0.6469*** |
| | | (0.0364) | (0.0480) | | (0.0774) | (0.0859) |
| Share of Trainees | | 10.6354 | 10.2665 | | -2.1449 | -0.7045 |
| | | (8.2392) | (8.3642) | | (8.6366) | (7.9165) |
| Share of Low-Skilled | | 11.4432 | 11.0685 | | -1.3255 | 0.1156 |
| | | (8.2397) | (8.3636) | | (8.6414) | (7.9136) |
| Share of Highly-Skilled | | 12.2565 | 11.7967 | | 0.0455 | 1.1245 |
| | | (8.2409) | (8.3643) | | (8.6448) | (7.9109) |
| Share of Skilled | | 11.8016 | 11.3604 | | -0.9602 | 0.4043 |
| | | (8.2395) | (8.3636) | | (8.6407) | (7.9133) |
| Share of Women | | -0.2063*** | -0.2370*** | | -0.0928 | -0.0756 |
| | | (0.0304) | (0.0367) | | (0.0744) | (0.0800) |
| Single Firm | | -0.0053 | -0.0149 | | -0.1087*** | -0.1315*** |
| | | (0.0110) | (0.0124) | | (0.0278) | (0.0300) |
| Techn. Condition of Assets | | 0.0363*** | 0.0160 | | 0.0856*** | 0.0410 |
| | | (0.0113) | (0.0128) | | (0.0263) | (0.0288) |
| Investment Activity | | 0.0282*** | -0.1850*** | | 0.1266*** | -0.5195*** |
| | | (0.0107) | (0.0447) | | (0.0224) | (0.0967) |
| Paying Above CBA | | 0.0365*** | 0.0407*** | | 0.1228*** | 0.0819*** |
| | | (0.0098) | (0.0114) | | (0.0219) | (0.0240) |
| Public Ownership | | 0.1219*** | 0.1232*** | | -0.0386 | -0.1733* |
| | | (0.0248) | (0.0305) | | (0.0757) | (0.0971) |
| Foreign Ownership | | 0.0830*** | 0.0700*** | | 0.2462*** | 0.1545*** |
| | | (0.0155) | (0.0164) | | (0.0431) | (0.0460) |
| Limited Firm | | 0.2363*** | 0.2066*** | | 0.2603*** | 0.2372*** |
| | | (0.0129) | (0.0154) | | (0.0291) | (0.0296) |
| Firm Age | | 0.0033** | 0.0051*** | | 0.0110*** | 0.0097** |
| | | (0.0016) | (0.0018) | | (0.0039) | (0.0043) |
| New Firm (after 1990) | | 0.0039 | 0.0426* | | 0.1035** | 0.1216** |
| | | (0.0206) | (0.0231) | | (0.0524) | (0.0546) |
| Owner works in Firm | | -0.0499*** | -0.0369*** | | -0.1291*** | -0.1312*** |
| | | (0.0109) | (0.0122) | | (0.0286) | (0.0312) |
| Change in Business Volume | | | -0.0031 | | | -0.0179 |
| | | | (0.0065) | | | (0.0130) |
| Personnel Outlook | | | 0.0124 | | | -0.0154 |
| | | | (0.0080) | | | (0.0183) |
| Share of expansion investments | | | 0.0224 | | | 0.0942*** |
| | | | (0.0144) | | | (0.0330) |
| Log. of total investments | | | 0.0156*** | | | 0.0382*** |
| | | | (0.0040) | | | (0.0091) |
| Share of Exports | | | 0.1219*** | | | 0.2253*** |
| | | | (0.0231) | | | (0.0650) |
| Profit or Turnover Sharing Plan exists | | | 0.0488*** | | | 0.0933*** |
| | | | (0.0124) | | | (0.0317) |
| Other Type of Employee Representation | | | -0.0240 | | | -0.0163 |
| | | | (0.0168) | | | (0.0357) |
| Standard Working Time | | | -0.0046 | | | -0.0018 |
| | | | (0.0029) | | | (0.0056) |
| Log. capital stock per Employee | | | 0.0286*** | | | 0.1671*** |
| | | | (0.0046) | | | (0.0101) |
| Constant | 7.2375*** | -4.5940 | -4.4296 | 15.8101*** | 16.0245* | 13.2498* |
| | (0.0128) | (8.2391) | (8.3655) | (0.0227) | (8.6366) | (7.9183) |
| Dummy Variables | Yes | Yes | Yes | Yes | Yes | Yes |
| N. of Obs | 8749 | 8749 | 5974 | 8749 | 8749 | 5974 |
| N. of clusters | 4152 | 4152 | 2900 | 4152 | 4152 | 2900 |
| F-Stat. | 324.51 | 157.67 | 105.13 | 155.67 | 97.21 | 84.83 |
| R Squared | 0.26 | 0.64 | 0.66 | 0.17 | 0.53 | 0.60 |
| Akaike- Criterion | 11326.82 | 5095.31 | 2801.29 | 23266.09 | 18352.58 | 11378.83 |

*Cluster-robust standard errors on the plant level in parentheses; * p<0.10, ** p<0.05, *** p<0.01.*
*Source: IAB Establishment Panel waves 2005 to 2008, Plants covered by a CBA, own calculations (controlled remote data access via FDZ).*

Table 8: Wage and Productivity Effects of Works Councils and CBAs, Heckman Selection Model

| Dep. Variable | Log. Wage Level per Employee | | | Log. Value Added per Employee | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Works Council | 0.4070*** | 0.1286*** | 0.0814*** | 0.4367*** | 0.1805*** | 0.1057*** |
| | (0.0176) | (0.0131) | (0.0140) | (0.0345) | (0.0319) | (0.0330) |
| Collective Barg. Agreement | -0.0006 | 0.0194 | 0.0260* | -0.0633*** | -0.0559** | -0.0178 |
| | (0.0139) | (0.0119) | (0.0134) | (0.0236) | (0.0248) | (0.0271) |
| WC * CBA | 0.0822*** | 0.0127 | 0.0038 | 0.3106*** | 0.1406*** | 0.1299*** |
| | (0.0223) | (0.0154) | (0.0170) | (0.0450) | (0.0372) | (0.0393) |
| Firm-Level Contract | 0.0962*** | 0.0428** | 0.0419** | -0.0184 | -0.0962*** | -0.1056*** |
| | (0.0257) | (0.0184) | (0.0200) | (0.0440) | (0.0332) | (0.0377) |
| WC * FLC | -0.0442 | -0.0110 | -0.0060 | 0.0536 | 0.0501 | 0.0721 |
| | (0.0332) | (0.0234) | (0.0255) | (0.0649) | (0.0514) | (0.0561) |
| $\lambda_{collect}$ | -1.1955*** | 0.4188** | 0.5662*** | -1.6730*** | 0.9978*** | 1.5107*** |
| | (0.1505) | (0.1746) | (0.2011) | (0.2900) | (0.3753) | (0.4171) |
| $\lambda_{wc}$ | 0.1410 | -0.5197*** | -0.5221*** | -0.1858 | -1.0344*** | -1.3926*** |
| | (0.1113) | (0.0931) | (0.1069) | (0.2346) | (0.2158) | (0.2415) |
| Insourcing | | -0.0050 | -0.0126 | | 0.0001 | -0.0016 |
| | | (0.0143) | (0.0159) | | (0.0299) | (0.0323) |
| Outsourcing | | -0.0134 | -0.0234 | | -0.0317 | -0.0225 |
| | | (0.0143) | (0.0160) | | (0.0307) | (0.0329) |
| Orientation to a CBA | | 0.0322*** | 0.0233** | | 0.0120 | -0.0056 |
| | | (0.0090) | (0.0101) | | (0.0176) | (0.0195) |
| Firm Training | | 0.0782*** | 0.0486*** | | 0.1192*** | 0.0552*** |
| | | (0.0079) | (0.0088) | | (0.0151) | (0.0168) |
| Churning Rate | | -0.2115*** | -0.1736*** | | -0.4506*** | -0.3103*** |
| | | (0.0309) | (0.0350) | | (0.0614) | (0.0627) |
| Share of Vacancies | | -0.1581** | -0.2194*** | | -0.5678*** | -0.4529*** |
| | | (0.0626) | (0.0745) | | (0.1140) | (0.1263) |
| Share of Temp. Workers | | -0.0115 | -0.0093 | | -0.2594*** | -0.2069*** |
| | | (0.0326) | (0.0347) | | (0.0650) | (0.0757) |
| Share of Part-Timers | | -0.7943*** | -0.8187*** | | -0.9080*** | -0.7796*** |
| | | (0.0259) | (0.0330) | | (0.0468) | (0.0562) |
| Share of Trainees | | 3.8793 | 4.1545 | | -4.5600 | -1.8625 |
| | | (6.0675) | (6.2195) | | (5.0473) | (4.4114) |
| Share of Low-Skilled | | 4.6907 | 4.8728 | | -3.6701 | -1.2367 |
| | | (6.0674) | (6.2191) | | (5.0492) | (4.4089) |
| Share of Highly-Skilled | | 5.4826 | 5.6063 | | -2.8456 | -0.5835 |
| | | (6.0680) | (6.2200) | | (5.0521) | (4.4106) |
| Share of Skilled | | 5.0889 | 5.1999 | | -3.2846 | -0.9214 |
| | | (6.0673) | (6.2191) | | (5.0490) | (4.4083) |
| Share of Women | | -0.1857*** | -0.1740*** | | -0.2057*** | -0.1185*** |
| | | (0.0198) | (0.0227) | | (0.0405) | (0.0460) |
| Single Firm | | -0.0093 | -0.0173* | | -0.1006*** | -0.1199*** |
| | | (0.0083) | (0.0095) | | (0.0200) | (0.0223) |
| Techn. Condition of Assets | | 0.0533*** | 0.0375*** | | 0.1039*** | 0.0299* |
| | | (0.0079) | (0.0089) | | (0.0164) | (0.0178) |
| Investment Activity | | 0.0393*** | -0.1412*** | | 0.1312*** | -0.5121*** |
| | | (0.0073) | (0.0316) | | (0.0140) | (0.0617) |
| Paying Above CBA | | 0.0197** | 0.0195* | | 0.0773*** | 0.0344 |
| | | (0.0088) | (0.0101) | | (0.0197) | (0.0213) |
| Public Ownership | | 0.1056*** | 0.0933*** | | 0.0354 | -0.0937 |
| | | (0.0233) | (0.0278) | | (0.0631) | (0.0747) |
| Foreign Ownership | | 0.1087*** | 0.0786*** | | 0.2910*** | 0.1978*** |
| | | (0.0124) | (0.0138) | | (0.0323) | (0.0354) |
| Limited Firm | | 0.2557*** | 0.2371*** | | 0.2156*** | 0.2229*** |
| | | (0.0092) | (0.0111) | | (0.0183) | (0.0199) |
| Firm Age | | 0.0044*** | 0.0050*** | | 0.0068*** | 0.0060** |
| | | (0.0010) | (0.0012) | | (0.0021) | (0.0025) |
| Change in Business Volume | | | -0.0034 | | | -0.0280*** |
| | | | (0.0045) | | | (0.0085) |
| Personnel Outlook | | | 0.0052 | | | -0.0313*** |
| | | | (0.0058) | | | (0.0119) |
| Share of expansion investments | | | 0.0032 | | | 0.0691*** |
| | | | (0.0094) | | | (0.0197) |
| Log. of total investments | | | 0.0134*** | | | 0.0431*** |
| | | | (0.0029) | | | (0.0058) |
| Share of Exports | | | 0.1474*** | | | 0.2921*** |
| | | | (0.0166) | | | (0.0418) |
| Profit or Turnover Sharing Plan exists | | | 0.0728*** | | | 0.0885*** |
| | | | (0.0088) | | | (0.0203) |
| Other Type of Employee Representation | | | -0.0050 | | | 0.0022 |
| | | | (0.0114) | | | (0.0252) |
| Standard Working Time | | | -0.0033 | | | 0.0030 |
| | | | (0.0022) | | | (0.0038) |
| Log. capital stock per Employee | | | 0.0293*** | | | 0.1488*** |
| | | | (0.0033) | | | (0.0069) |
| Constant | 7.8573*** | 2.0889 | 1.5693 | 16.9514*** | 18.7384*** | 14.7196*** |
| | (0.0545) | (0.6666) | (6.2207) | (0.0996) | (5.0456) | (4.4123) |
| Dummy Variables | No | Yes | Yes | No | Yes | Yes |
| N. of Obs | 21647 | 21647 | 14663 | 21647 | 21647 | 14663 |
| N. of clusters | 8978 | 8978 | 6113 | 8978 | 8978 | 6113 |
| F-Stat. | 350.02 | 292.00 | 191.55 | 175.17 | 155.71 | 121.84 |
| R Squared | 0.18 | 0.60 | 0.62 | 0.13 | 0.47 | 0.54 |
| Akaike- Criterion | 32136.10 | 16440.57 | 9028.09 | 55706.99 | 44951.58 | 27752.78 |



*Cluster-robust standard errors on the plant level in parentheses; * p<0.10, ** p<0.05, *** p<0.01. Source: IAB Establishment Panel waves 2005 to 2008, own calculations (controlled remote data access via FDZ).*

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