

Wage effects of works councils and collective agreements in Germany

First Draft

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1 Introduction

The effects of industrial relations institutions on wages have been analyzed in several studies. Some investigations focus on the impact of collective agreements on wages, whereas others, taking into account the specific German institutional setting, concentrate on the wage effects of works councils. The interactive role of both institutions in the wage determination process is frequently neglected. However, within the framework of a collective contract works councils could be more willing to invest in trust and cooperation and less inclined to use their rights to counteract the decisions of management with the goal to redistribute economic rents and to raise wages. In a noteworthy paper based on a data set of manufacturing plants in Lower Saxony – one of the larger Federal States in Germany – for the years 1994 and 1996 Hübler and Jirjahn (2003) support this hypothesis theoretically and empirically.

In our paper we elaborate on and extend the analysis of Hübler and Jirjahn, using a different data set, a similar model and specification (Hamermesh 2007). There are several reasons for a novel analysis of the nexus of wages and industrial relations institutions. First, Hübler and Jirjahn (2003) based their investigation on data for manufacturing, a sector now less representative of the whole economy. Second, the proportion of plants covered by collective bargaining and endowed with a works council declined substantially in recent years, possibly weakening the bargaining position of the workforce. Third, in 2001 the Works Constitution Act was reformed (effective in 2002) with the political goal to facilitate the creation of works councils, strengthen the access of unions to firms and expand the rights of works councils. A new data base, the IAB Establishment Panel, is available, containing not

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only information on manufacturing, but also on service sectors and covering the period before and after the reform of the Works Constitution Act. Therefore, we use the pooled waves 2000/2001 and 2004/2005 of the Establishment Panel for the Federal State of Lower Saxony.

The plan of the paper is as follows. In Section 2 we briefly describe the two main pillars of the German industrial relation system. Section 3 presents the theoretical background and Section 4 the results of former empirical investigations on the impact of works councils and collective agreements on wages. Section 5 contains the findings of our empirical research and Section 6 concludes.

2 Institutional background

Trade unions and works councils are the main pillars of employee representation in Germany. Unions represent the workforce in collective bargaining and works councils act as their voice at the establishment level. Formally, the two institutions and their activities are independent, de facto, however, mutual dependencies and interactions exist.

Collective agreements are usually negotiated by an industrial union on the one hand and an employers' association of a specific industry or trade on the other hand, i.e. they are multi-employer agreements at the industry and regional level. Additionally, a small number of firms conclude single-employer contracts. The Basic Law ("Grundgesetz", the German Constitution) conveys the right of forming coalitions and concluding collective agreements to employees and employers. Court rulings and legal practice have stipulated that this right encompasses bargaining for wages as well as working conditions, job classifications, and working time without state control or intervention. In case of disagreement industrial actions may be taken by unions (strikes) and employers' associations (lockouts). The negotiated results set minimum standards, which can only be modified in favor of employees. From a juridical perspective the benefits of the bargained agreements only apply to unionized workers whose employer is a member of an employers' association or signed a single-employer contract. Generally wages, working conditions and working times specified in a collective contract benefit all employees within a firm or industry covered by a collective agreement irrespective of their union membership status. Reasons for the extensive application of

collective contracts are the avoidance of threat effects emanating from potential unionization, equity considerations, and the legally questionable procedure of differentiating wages or working conditions between unionized employees and comparable colleagues who are not union members. State authorities can extend collective agreements to all firms and workers in the relevant sector of activity and the region concerned, the quantitative importance of this extension has been negligible, however.

Visser (2007) stresses that among the large economies Germany is the only one with a continued and ongoing history of collective contracts and wage bargaining at the sectoral level. Since the midst of the nineteen nineties this wage setting regime has to confront declining densities of unions and employers' associations as well as a reduced coverage by sectoral collective agreements (Addison et al. 2007). Consequently, unions have to find a new balance between pay rises and the risk of a gradual erosion of bargaining at the sectoral level and of membership losses. In the same vein, within the employers' associations tensions apparently have increased between large and smaller firms and firms with divergent capabilities to match the sectoral wage hikes (Visser 2007). Applying and enforcing industry-wide agreements can lead to rising costs of inflexibility if the heterogeneity of firms related to size and ability-to-pay increases, more heterogeneous groups of employees with divergent productivities are covered by the contract (Freeman/Rogers 1995), and the economy suffers from unacceptably high and persistent unemployment (Ulman/Gerlach 2003).

Several not mutually exclusive reactions to this development are feasible:

- Coverage of collective contracts continues to decrease as firms with above-average cost levels and/or low profitability have a strong incentive to quit the employers' associations or refrain from becoming members, and to employ labor at substandard rates (Ulman/Gerlach 2003).
- Unions act with more restraint concerning short-term wage gains in order to stabilize the sectoral wage setting regime.
- Sectoral collective contracts provide opportunities for the management and works councils of firms with an endangered competitive position to renegotiate wages and working conditions at the firm-level on the basis of opt-out clauses ("opening clauses").

- Higher qualified employees dissatisfied with the more moderate pay rises in encompassing collective contracts are tempted to organize professional associations or to defect from umbrella unions in order to attain a stronger and more disruptive bargaining power. Doctors, pilots, air traffic controllers, and recently train drivers have chosen this alternative and their probability of success has improved as labor courts in recent years are more willing to grant recognition to unions organizing an influential, albeit small group of employees with substantial bargaining power. Evidently, this development impinges on the hitherto legally protected monopoly position of sectoral unions (Hassel 2007).
- A more moderate wage policy of unions could be combined with the provision of greater latitude for wage setting at the level of firms. Works councils in prosperous firms might get more strongly involved in negotiating wages above contractual wages and supplementary benefits (Addison et al. 2001). There is evidence that starting in the mid nineties of the last century firms play a more important role as the locus of regulating wages and working conditions (Biebeler/Lesch 2007).

Summarizing, most reactions to the eroding tendencies of sectoral bargaining, unions, employers' associations and their near monopoly in matters of wage setting might be conducive to a declining role of the impact of sectoral collective contracts and might strengthen the effects of works councils on wages. At this time, it is hard to forecast the wage impact emanating from the fragmentation of collective bargaining which is associated with the growing importance of professional associations and unions.

Works councils as the employees' voice at establishment level may be elected in firms with at least five permanent employees at the request of a small quorum of workers or an official of a union represented at the plant. Works councillors are elected for a term of four years in a secret ballot and represent the entire workforce. Most councillors are members of a union, although the share of unionized councillors has declined from about 90 percent (1965) to about 68 percent in 2002 and to 57 percent in the most recent election in 2006 (Goerke/Pannenberg 2007, Niedenhoff 2006). Works councils are obliged to work together with the employer „in a spirit of mutual trust and for the benefit of the plant and the workforce“ and, therefore, they are not allowed to strike. Accordingly, works councils are expected to be productivity oriented, to focus on production issues and individual grievances

and to implement collective contracts at the firm level. The Works Constitution Act endows works councils with substantial rights of information and consultation in matters such as manpower planning, the working environment, changes of work processes, and job content. Works councils are provided with codetermination rights on „social matters“. They comprise the beginning and termination of working hours, overtime and reduced working hours, wage setting and wage payment systems, holiday arrangement, and health and safety issues. In addition, works councils have „consent rights“ in matters such as hiring and firing and the sorting of workers into wage or job groups. Generally, the rights and the number of councillors (including full-time councillors) increase with the plant's workforce.

Works councils are generally not allowed to conclude plant agreements with management on issues that are usually covered by collective agreements between unions and employers' associations. Hence, collective wage contracts, for example, restrict the legal applicability of wage agreements between works councils and management. Collective contracts may, however, authorize works councils to negotiate about matters such as working times and wages, and these authorizations became much more frequent in recent years. Even without opening clauses the widened leeway of works councils and the power derived from their codetermination rights can be used in wage setting, de facto. The sorting of workers into wage groups or the determination of the wage payment system are feasible routes of influence.

After the Second World War the first Works Constitution Act was enacted in 1952 in West Germany, followed by two major revisions in 1972 and 2001, when the Social Democratic Party (SPD) was the leading party in a coalition government at the Federal level. In the course of these revisions the rights of works councils were widened and strengthened, the access of unions to plants was improved and the collaboration between works councils and unions was fostered. Subsequently, the more significant details of the most recent revision are pointed out, because in addition to the elaboration on the study of Hübler and Jirjahn (2003) our empirical analysis will focus on a comparison of the effects of works councils on wages in the two periods 2000/2001 (prior to the implementation of the revision) and 2004/2005 (two years and longer after the revision).

The basic objective of the most recent legislation was the stimulation of works council formation. First, divisional works councils for special product or business units as well as joint works councils for several establishments of a firm can be set up. Second, the voting procedure for the introduction of works councils in plants with 5 to 50 employees (optionally up to 100 employees) is simplified. Third, employment thresholds determining the number of councillors and full-time councillors are lowered and plants are obliged to occupy a first full-time councillor in establishments with 200 and more employees instead of 300 employees as before. Fourth, the rights of works councils concerning employment protection, further training and procedures of team working arrangements are extended. Fifth, the employer has to provide the works council with modern information and communication equipment. Sixth, the legislation mandates that the minority gender is represented on the works council at least in a ratio proportional to its employment share. Seventh, the law conveys rights to the works council in matters of environmental protection and racial discrimination.

In sum, the reform of the Works Constitution Act can be expected to stimulate directly or indirectly the formation of works councils. In conjunction with the erosion of sectoral bargaining we anticipate an increasing impact of works councils on wages in the period after the revision of the Works Constitution Act.

3 Theoretical Background

Institutions representing employees in the labor market have two faces (Freeman/Medoff 1979). As a voice institution they are productivity oriented and facilitate rent creating, while as a monopoly institution they seek to redistribute the rents in favor of the workforce. The monopoly face is usually analyzed in the framework of the right-to-manage model in Germany. Wages are set by collective bargaining and employment is determined by firms. Labor demand, the fall-back positions and the relative bargaining power of the collective bargainers are the central parameters determining the bargaining outcome. Compared with competitive market solutions, wages are higher and employment is reduced. Feasible mutual gains by simultaneous bargaining over wages and employment, as analyzed by the efficient bargaining model, are usually not considered. With prevailing multi-employer contracts it is difficult to conclude explicit binding agreements specifying the size of the workforce and

consequently the members of an employers' association have an incentive to behave opportunistically and employ less workers than the collective contract mandates. With an ongoing deregulation of wage setting, however, efficient bargaining will gain in importance, as at the firm level opportunistic behavior is more easily identified and renegeing firms will face a loss of reputation. Additionally, for a single firm the wage-employment nexus can be more easily incorporated in the collective contract by profit sharing schemes or opening clauses.

The voice face focuses on the rent creating effects of employee representation. Voice as an alternative to quits serves as an instrument to reduce the gap between actual and desired conditions at the workplace. Articulated collectively, it can improve the functioning of internal labor markets. Cooperation between the workers' representatives and management, however, is a necessary condition for the productivity enhancing impact of collective voice. In cases of conflict, both sides can lose (Freeman/Medoff 1984). Freeman and Medoff attribute the two faces to trade union activities. Taking into consideration the institutional background in Germany, Freeman and Lazear (1995) show that a works council can be interpreted analogously. Their model predicts that the joint surplus increases in the introductory phase of codetermination rights and decrease subsequently when too much power is granted to works councils and the codetermination rights are extended beyond a threshold. In this phase the power of the works council is too strong and is used for augmenting the workers' share of the rent. The model implies that usually the employers will grant the works council less codetermination rights than is socially optimal. With substantial fixed costs of employee representation the firm may be not interested in establishing a works council. Conversely, employees will always demand too many codetermination rights. However, if a sharing coefficient is fixed by an external institution both bargaining sides in the firm might be interested in establishing the social optimum of codetermination rights.

In the model of Freeman and Lazear (1995) the two basic variables – joint surplus and workers' share of the rent – depend to some degree on bargaining coverage. In an innovative analysis Hübler and Jirjahn (2003) elaborate on this insight by introducing covered and non-covered firms. In their paper the two faces of employee representation are incorporated in a three-stage model of an establishment with identical employees. In the first stage, the firm

chooses its membership in an employers' association. This decision depends on the cost of being covered² and on the impact of coverage on the outcome of bargaining at the firm level. In the second stage, employees make a choice about the election of a works council, and in the third stage, bargaining over firm specific wage increases and productivity enhancing work practices takes place if a works council is established. Finally, output is produced and sold.

Concerning wages four different results may occur depending on the institutional structure.³ If no works council exists and the firm is not covered by collective bargaining the firm may pay the reservation wage. In case of coverage the wage negotiated by the union and the employers' association must be paid. However, Hübler and Jirjahn (2003, 475) expect the difference between these two constellations to be small or even non existent due to spillover effects of wages between firms with and without a collective contract. In fact, many uncovered firms pay the negotiated rates voluntarily in Germany. If a works council is established bargaining at the firm level raises wages above the contractual level because productivity enhancing work practices are introduced, and the difference in wages between firms with and without a works council depends on the firm's fall back position in case of conflict. The crucial assumption is that the opportunities of works councils to impede management decisions are restricted in the case of coverage and, therefore, the wage is lower than in the case of no coverage. With respect to productivity, the results are reversed. Summarizing the findings it is evident that with coverage - the distributional conflicts are resolved or at least reduced by an outside institution - works council and management are more likely to concentrate on maximizing the joint rent. Therefore, the interaction between coverage by a collective contract and works councils is theoretically and empirically significant for wage effects.

² The employer has to pay a membership fee and may suffer from restrictions established by the collective contract. Further, the contract wage may be higher than the reservation wage creating additional costs.

³ Hübler and Jirjahn analyze also the productivity consequences of the interaction of works councils and collective bargaining (2003).

4 Works councils, collective agreements and wages: Empirical findings

Generally one would expect that firms covered by collective contracts pay higher wages than uncovered firms (Booth 1995). A study by Stephan and Gerlach (2005) using matched employer-employee data for 1990, 1995 and 2001 finds sizable wage premiums for employees covered by collective contracts. This paper, however, is based on plants with more than 100 employees and cannot control for the existence of works councils, although they are set up in most firms of this size class. Recent studies use data from the IAB Establishment Panel, the Employer-Employee Panel which combined employment statistics of the Federal Employment Agency with the establishment-level data from the Establishment Panel or the German Structure of Earnings Survey (Gürtzgen 2005, 2005a, 2006, Fitzenberger/Kohn/Lembcke 2006). The periods investigated are 1995 to 2001/2002 or the year 2001.

Gürtzgen (2005) using data from the IAB Establishment Panel and accounting for unobserved heterogeneity and endogeneity of rents finds that in centralized collective agreements wages do not rise with firm-specific profitability. In two companion papers (2005a, 2006) on the basis of the Employer-Employee Panel Gürtzgen obtains again the result that centralized bargaining subdues any positive reactions to varying profitability conditions of firms. Fitzenberger et al. (2006) use the linked employer-employee data of the German Structure of Earnings Survey for the year 2001 and differentiate between the effect of union power, measured by net union density (NUD), and the effect of collective bargaining coverage on wages. NUD is estimated on the basis of data from the German Socio-Economic panel (GSOEP) and imputed. It is calculated for 5841 bargaining cells. This innovative analytic procedure assumes a very strong differentiation of union power, however. The bottom-line result is that higher wages are associated with a higher share of workers covered by collective contracts; bargaining coverage as well as NUD, however, have a negative impact on individual wages. In sum, for the period before the reform of the Works Constitution Act most studies suggest that collective agreements and unions have only small, even zero effects on wages.

Recent studies of the impact of works councils on wages use the Hannover Firm Panel covering about 1000 manufacturing firms (1994 to 1997) in the Federal State of Lower

Saxony. Addison et al. (2001) find in OLS wage regressions that wages are approximately 14 to 17 percent higher in establishments with works councils. The effect is even stronger in plants with 21 – 100 employees. While Addison et al. (2001) emphasize establishment size as the most important firm characteristic mediating the impact of works councils, as noted above Hübler and Jirjahn (2003) differentiate between the effects of works councils in plants covered by collective contracts and uncovered firms. Their basic hypothesis is: As distributional conflicts are resolved or at least reduced by bargaining agreements external to the firm, works councils in covered establishments are more likely to be productivity oriented, management and works councils do not have to concentrate on the distribution of the joint surplus and can maximize the joint rent. Using two pooled waves (1994 and 1996) of the Hannover Firm Panel Hübler and Jirjahn (2003) show that works councils have a positive influence on wages, this outcome, however, is stronger for the uncovered regime. Interestingly, they have a positive effect on productivity only in the covered sector. The most recent study investigating the works councils-wage nexus uses data from the 2001 wave from the Federal Employment Agency which combines information on employees and establishments (Addison et al., 2006). They obtain the result that in covered as well as uncovered establishments works councils increase wages by approximately 10 percent. An interpretation cannot be discarded a priori that a wage premium of this magnitude reduces the proportion of the joint surplus appropriated by the employer to a level attainable without codetermination, even if works councils augment productivity. On balance, the evidence on the wage effects of works councils shows that they raise wages, probably more so in medium-sized firms and less in firms covered by collective contracts. Studies on the impact of the new legislation on the works council-wage nexus are missing, however.

5 Empirical Investigation

Our empirical investigation is based on the IAB Establishment Panel of the Institute of Employment Research of the Federal Labor Agency (Kölling 2000). For each year since 1993 (1996) the IAB Panel has collected data in face to face interviews with owners or top officials in West (East) Germany. It is based on a stratified random sample – 17 industries and 10 size classes – from the population of all establishments with at least one employee covered by social insurance. The questionnaire focuses on employment-related matters as the panel is

created for the needs of the Federal Employment Agency. We use two pooled waves for the years 2000/2001 and 2004/2005 and restrict the analysis to the Federal State of Lower Saxony. This restriction serves the purpose to compare our findings with results obtained by Hübler and Jirjahn (2003) who conducted a comparable study for the years 1994 and 1996 using the Hannover Firm Panel for Lower Saxony. Lower Saxony is one of the larger Federal States in northwest Germany and covers approximately 11 percent of all West German employees. Additionally, we exclude industries dominated by public employment since wage setting and employee representation differ from the private sector.

We analyze the impact of works councils and collective contracts on wages. As the wage variable we use wages and salaries in the month of June in the respective year per employee in an establishment. The variables for works councils (WOCO) and collective contracts (COLLECT) are available for each year. Descriptive statistics at the establishment level for the entire sample are given in the Appendix (Table A1). Table 1 presents the empirical distribution of plants across industrial relations regimes for the two periods (2000/2001 and 2004/2005). The percentages of establishments covered by a collective contract and with a works council are comparably high, because of over-sampling of large companies in both periods. However, they declined substantially. The percentages of plants with both a collective contract and a works council shrank from 48.6 to 39.1, while the percentages of establishments without the two main industrial relations institutions increased from 18.7 to 26.2.

Table 1: Empirical distribution of establishments across industrial relations regimes, per cent of establishments

	Sample 2000/2001 (N = 1327)			Sample 2004/2005 (N = 1256)		
	COLLECT = 1	COLLECT = 0	Sum	COLLECT = 1	COLLECT = 0	Sum
WOCO = 1	48.6	5.9	54.5	39.1	7.2	46.3
WOCO = 0	26.8	18.7	45.5	27.5	26.2	53.7
Sum	75.4	24.6	100.0	66.6	33.4	100.0

Uni- and bivariate probit estimates of the existence of works councils and collective contracts are documented in the Appendix (Tables A2a and A2b). The differences between the uni- and bivariate estimates in each period are small. The results of the univariate probit estimates are used for the determination of the artificial regressors λ -WOCO and λ -COLLECT in the wage equations of Tables 2, 3a and 3b (Heckman 1979). As the estimated correlation coefficients between the error terms of both bivariate estimates (first period: $\rho = 0.4744$; second period: $\rho = 0.4204$) are significant, it could be argued that the bivariate approach should be preferred to determine the artificial regressors.

Table 2: Wage estimates with respect to works councils and coverage by collective bargaining agreement effects in all establishments, robust t-statistics in parentheses

	Sample 2000/2001		Sample 2004/2005	
	OLS	OLS with selectivity correction	OLS	OLS with selectivity correction
Works council (WOCO)	0.1767 (3.67)	0.1375 (2.62)	0.2285 (4.03)	0.1499 (2.34)
Coverage by a collective agreement (COLLECT)	0.0705 (1.46)	0.0409 (0.73)	-0.0136 (-0.27)	-0.0847 (-1.55)
λ -WOCO		0.1758 (1.18)		0.2731 (2.17)
λ -COLLECT		0.1861 (0.86)		0.3071 (2.13)
R ²	0.3657	0.3677	0.4643	0.4708
N	1198	1193	1102	1101

Control variables: All other variables listed in Table 3a and 3b are included in the wage regression.

Table 2 presents the estimates of works councils and coverage by collective contracts on wages for all plants using OLS regressions with and without a selectivity correction for works councils and collective contracts. A caveat is in order: The results should be interpreted as statistical relationships, not as causal effects. For example, without longitudinal data we cannot control for self-selection or sorting of employees into wage-setting regimes. In both periods works councils have a strong positive and significant effect on wages, the effect, however, is stronger in the years 2004/2005. The impact of coverage by a collective contract

on wages is positive and insignificant in the first period and turns negative and insignificant in the later period. At this point of our paper the results on works councils are consonant with findings of Hübler and Jirjahn (2003) for the second half of the nineties and of Addison et al. (2006) for 2001. Concerning the effects of collective agreements Hübler and Jirjahn also find no evidence of an effect on wages per employee in establishments. As noted they interpret the result by the institutional fact that in Germany usually the outcomes of collective bargaining agreements are extended to all firms in an industrial sector. Conversely, Addison et al. (2006) detect a positive and significant impact of approximately 6 percent at the sectoral level which is in line with the right-to-manage model. Addison et al. (2006) emphasize that the finding of union wage premiums is supported by a recent study using matched employer-employee data (Stephan/Gerlach 2005). As noted above this study is based on plants larger than 100 employees. If we separate our data according to firm size we obtain the striking result that coverage by collective contracts significantly increased wages in plants with more than 100 employees in the first period, while this effect is negative and insignificant in the years 2004/2005.⁴

First, our results indicate that works councils are successful in redistributing economic rents at the establishment level, although we cannot rule out the interpretation that efficiency wages might play a more important role in firms with works councils. In these firms dismissals are restricted due to the codetermination rights of works councils and this might induce firms to use efficiency wages as an incentive device. Second, the findings imply that in the period under investigation some elements of the interaction between unions and works councils might have changed. Works councils apparently play a stronger role in wage bargaining whereas the coefficients of collective agreements are statistically insignificant in both periods. This development could be considered as an indication of the growing decentralization of industrial relations as well as of the increasing strength of works councils.

According to the results of Hübler and Jirjahn (2003) wage councils in covered establishments might be more reluctant to be involved in rent-sharing activities. The impact on wages by works councils that was demonstrated in the Table 2 could be the result of aggressive rent-sharing activities of works councils in uncovered plants. Thus, we follow the

⁴ These findings are available from the authors on request.

procedure of Hübler and Jirjahn and run separate regressions for covered and uncovered establishments. A simple interaction variable between works councils and collective agreements would be an alternative strategy, this, however, precludes the effects of other explanatory variables from varying between the two wage-setting regimes. The results for the two periods without and with a selectivity correction for works councils are presented in Tables 3a and 3b.

For covered establishments ($COLLECT = 1$) the findings of Table 2 are basically confirmed. Wage councils succeed in raising wages and this result holds for the wage equations with and with out selectivity corrections. The estimated effects are statistically significant in both periods. In uncovered plants ($COLLECT = 0$) the comparable effects are much smaller and insignificant. This result does not corroborate the findings of Hübler and Jirjahn (2003). Admittedly, the specifications of the studies are similar, but not identical. If we restrict our analysis to manufacturing, our results are basically unchanged. According to the theoretical model of Hübler and Jirjahn (2003), a strong impact of works councils on wages in covered firms ($COLLECT = 1$) would be expected, if their bargaining power is strengthened in case of coverage and if the introduction of productivity enhancing work practices is more easily accepted. When a firm is covered by collective agreements and a works council is established, trade unions and works councils cooperate more closely and the councillors may gain expertise in bargaining. Additionally, in a regime with a union and a works council job satisfaction is usually comparatively low (Hammer/Avgar 2005) which might lead to a more aggressive climate in firm-specific bargaining. The acceptance of new and productivity increasing work practices may be easier when collective agreements formulate binding standards for the firms.

Table 3a: Wage estimates with respect to works councils in firms with and without coverage by collective bargaining agreements, robust t-statistics in parentheses, sample 2000/2001

	COLLECT = 1		COLLECT = 0	
	OLS	OLS with selectivity correction	OLS	OLS with selectivity correction
Constant	2.2100 (10.21)	2.5342 (7.52)	2.1780 (8.99)	1.4620 (3.51)
Firm size (number of employees)	0.00004 (1.73)	0.00004 (1.44)	0.0007 (1.60)	0.0010 (2.11)
Single firm (no subsidiaries)	-0.1264 (-2.35)	-0.0829 (-1.23)	-0.1055 (-0.86)	-0.1014 (-0.70)
Use of newest production technique	0.1807 (2.83)	0.1859 (2.92)	-0.0245 (-0.24)	-0.0240 (-0.24)
Proportion of women	-0.6727 (-4.63)	-0.6406 (-4.33)	-0.7508 (-3.81)	-0.6444 (-2.99)
Proportion of part-time workers	-0.9787 (-4.44)	-1.0453 (-4.81)	-0.4422 (-1.48)	-0.3564 (-1.17)
Proportion of white collar employees for highly qualified jobs	0.8733 (5.95)	0.8656 (5.81)	0.8500 (4.58)	0.8632 (4.81)
Proportion of secondary workers	-0.8035 (-2.36)	-0.6443 (-1.83)	-1.3616 (-4.67)	-1.545 (-4.29)
Proportion of apprentices	-1.600 (-3.65)	-1.549 (-3.57)	-2.4333 (-4.43)	-2.3955 (-4.44)
Employer provided further training	0.0995 (1.97)	0.0476 (0.80)	0.1549 (2.03)	0.2086 (2.20)
Year 2001	-0.0471 (-1.01)	-0.0462 (-0.99)	0.0838 (1.13)	0.0830 (1.11)
Works council (WOCO)	0.1958 (3.41)	0.1456 (2.32)	0.0660 (0.72)	0.0896 (0.98)
λ -WOCO		-0.2973 (-1.74)		-0.6384 (-1.72)
λ -COLLECT		-0.1926 (-0.64)		0.9730 (3.04)
9 sector dummies	yes	Yes	yes	Yes
R ²	0.3464	0.3480	0.4229	0.4449
N	898	897	300	296

Table 3b: Wage estimates with respect to works councils in firms with and without coverage by collective bargaining agreements, robust t-statistics in parentheses, sample 2004/2005

	COLLECT = 1		COLLECT = 0	
	OLS	OLS with selectivity correction	OLS	OLS with selectivity correction
Constant	1.7406 (10.33)	1.5642 (7.19)	2.4822 (3.53)	1.6780 (2.28)
Firm size (number of employees)	0.00003 (2.79)	0.00002 (3.05)	0.0009 (5.40)	0.0007 (3.57)
Single firm (no subsidiaries)	-0.1181 (-2.31)	-0.0249 (-0.44)	-0.2069 (-1.51)	-0.1001 (-0.64)
Use of newest production technique	-0.0013 (-0.02)	0.0095 (0.17)	0.1293 (1.22)	0.1661 (1.53)
Proportion of women	-0.7030 (-5.03)	-0.6413 (-4.56)	-1.0882 (-5.37)	-1.0395 (-5.17)
Proportion of part-time workers	-0.6376 (-4.06)	-0.6724 (-4.26)	-0.6650 (-2.69)	-0.6358 (-2.64)
Proportion of white collar employees for highly qualified jobs	1.0342 (8.79)	1.0311 (8.77)	0.7903 (4.29)	0.8563 (4.68)
Proportion of secondary workers	-1.3549 (-6.63)	-1.1730 (-5.08)	-1.4488 (-4.59)	-1.4091 (-3.60)
Proportion of apprentices	-1.2662 (-2.86)	-1.1970 (-2.71)	-2.3931 (-4.46)	-2.5154 (-4.78)
Employer provided further training	0.1791 (2.66)	0.1430 (2.10)	0.1901 (1.91)	0.1849 (1.73)
Year 2005	-0.0192 (-0.39)	-0.0202 (-0.41)	0.0207 (0.24)	0.0987 (1.15)
Works council (WOCO)	0.2434 (3.81)	0.1755 (2.45)	0.1046 (0.94)	0.0914 (0.73)
λ -WOCO		0.2385 (1.72)		-0.0214 (-0.07)
λ -COLLECT		0.2145 (1.45)		0.7320 (2.23)
9 sector dummies	yes	Yes	Yes	Yes
R ²	0.5000	0.5045	0.4460	4554
N	721	720	381	381

Comparing the two periods the results show an increasing impact of works councils on wages, although the effect remains insignificant in uncovered plants. On the one hand this may be due to the legal reform which improved the position of the council. On the other hand, this may be a result of interaction with collective bargaining. As unions moderated their wage demands in collective bargaining in part due to the very high and persisting unemployment, works councils in prosperous firms can exploit an increasing margin in negotiations at the firm level. This result can be interpreted as an additional indication of the changing and more fragmented state of the German system of industrial relations (Addison et al. 2007).

A glance at the other explanatory variables indicates some interesting findings comparing covered and uncovered establishment separately. In both periods the negative effect on wages of the proportions of female employees, secondary workers and apprentices is weaker in covered plants. The standardization and compression of wages in collective contracts restrict opportunities for wage differentiation (Freeman 1982, Card et al. 2003) and the rights of works councils in matters of discrimination and training might explain these findings. Establishments in the uncovered regime, however, exhibit stronger positive wage reactions to training, possibly in order to match the market induced wage premiums for highly qualified employees.

Differences-in-differences of wages in industrial relations regimes for the two periods are computed in Table 4, using the distinction between pre- and post-program effects (Hübler 2001). The post-program effects refer to the period after the implementation of the revised Works Constitution Act (2002). Evidently, it would be an oversimplification to attribute the computed effects merely to the novel legislation as additional macro- and microeconomic changes will have played a role between the two periods. In spite of this caveat the results again show that in the industrial regimes ($COLLECT = 1, WOCO = 1$) versus ($COLLECT = 1, WOCO = 0$) WOCO has a positive impact on the estimated wages, and this effect increased in the four year period (0.011). A noticeable reduction of $COLLECT = 1$ and $COLLECT = 0$ on wages, while holding constant the existence of WOCO, can also be observed (-0.058). This result, however, is tarnished by the fact that the impact of WOCO on wages is not well determined in the underlying regressions. In sum, we find that in the post-program period (2004/2005) the percentage of establishments with works councils declined whereas the

differences-in-differences estimates show an ascending impact of works councils on wages and declining effects of collective agreements.

Table 4: Differences-in-differences of wages in industrial relations regimes for the years 2000/2001 and 2004/2005

COLLECT = 1	(1)		WOCO = 1	(2)	
	Wage 2000/2001	Wage 2004/2005		Wage 2000/2001	Wage 2004/2005
WOCO = 1	2.216	2.312	COLLECT = 1	2.216	2.312
WOCO = 0	2.124	2.209	COLLECT = 0	1.955	2.109
Differences	0.092	0.103	Differences	0.261	0.203
Difference-in-differences	0.011		Difference-in-differences	-0.058	

The computations use the OLS regression results with selectivity corrections of Tables 3a and 3b. They are not very persuasive in (2) as WOCO is not a statistically significant determinant in the industrial relations regime (COLLECT = 0, WOCO = 1).

6 Conclusions

This paper has looked at the combined impacts of works councils and collective contracts and analyzed the interaction effects of the two institutional pillars on wages in Germany. It focuses on two issues: First, we elaborate on and expand an innovative study by Hübler and Jirjahn (2003) introducing the interaction methodology and testing it empirically for the years 1994 and 1996. Second, taking into account the reform of the Works Constitution Act in 2001, effective in 2002, and the political goal to promote the establishment of works councils and to strengthen their rights, we investigate the interaction effects on wages prior to and after the reform.

Our study partially corroborates the results of Hübler and Jirjahn (2003). Both studies find a weak impact of collective agreements on wages, in our analysis, however, the impact of works councils on wages is stronger for firms covered by a collective contract and weaker for uncovered establishment than the previous results suggest. An explanation of the divergent findings is thorny. We argue that the slow and enduring erosion of sectoral bargaining in an

economy with high and persistent unemployment and the associated strengthening of works councils and firm-specific bargaining accounts for the changed impact of works councils on wages.

If this interpretation, for which we adduce empirical evidence from the literature, is valid, it is at first glance surprising that the reform of the Works Constitution Act has not stimulated the creation of works councils. In spite of facilitating their establishment and extending their rights the proportion of firms with a works council declines. In a first and recent analysis of the determinants of establishing a works council Bellmann and Ellguth (2006) show that the dummy variable for the period after the reform is negative and significant. However, if works councils exist and firms are covered by a collective agreement the impact of works councils on wages increases. Our comparison of the periods before and after the reform and the differences-in-differences analysis demonstrate this effect. The bottom-line of our argument is that although incentives for establishing works councils have increased, this pillar of the German system of industrial relations is not expanding. The shrinking wage-setting regime characterized by works councils and collective contracts continues to benefit the incumbent employees, albeit with empowered works councils and less stamina of unions. An increasingly segmented labor market might be one of the consequences of this development.

Appendix

Table A1: Descriptive statistics of variables used in estimates

	Sample 2000/2001		Sample 2004/2005	
	Mean	Standard Deviation	Mean	Standard Deviation
Wage	2.1469	0.8286	2.2427	0.9382
Firm size (number of employees)	259.059	1553.374	286.121	2111.060
Single firm (no subsidiaries)	0.6919	0.4618	0.6559	0.4752
Firm created before 1990	0.8815	0.3233	0.8013	0.3992
Use of newest production technique	0.1937	0.3953	0.2753	0.4468
Proportion of women	0.3007	0.2481	0.3268	0.2584
Proportion of part-time workers	0.1062	0.1615	0.1610	0.2178
Proportion of white collar employees for highly qualified jobs	0.2882	0.2561	0.3787	0.2880
Proportion of apprentices	0.0517	0.0650	0.0490	0.0631
Proportion of skilled workers	0.3339	0.2576	0.2762	0.2665
Proportion of secondary workers	0.0604	0.1198	0.0906	0.1490
Wages above industry agreement	0.5785	0.4940	0.4137	0.4927
Employer provided further training	0.6642	0.4724	0.7009	0.3934
Works council (WOCO)	0.5455	0.4981	0.4634	0.4989
Coverage by a collective agreement (COLLECT)	0.7536	0.4310	0.6651	0.4722

Table A2a: Probit ML estimates of works councils and coverage by collective bargaining agreement, robust z-statistics in parentheses, sample 2000/2001

	WOCO		COLLECT	
	Univariate	Bivariate	Univariate	Bivariate
Constant	0.2414 (0.71)	-0.4028 (-1.51)	0.8587 (2.40)	0.0653 (0.24)
Firm size (number of employees)	0.0069 (6.05)	0.0068 (5.98)	0.0013 (2.95)	0.0013 (2.87)
Firm created before 1990	0.2270 (1.78)	0.2119 (1.65)	0.4436 (3.57)	0.4586 (3.72)
Single firm (no subsidiaries)	-0.7074 (-6.01)	-0.7278 (-6.28)	-0.4552 (-4.23)	-0.4768 (-4.33)
Wages above industry agreement	0.2017 (2.13)	0.2065 (2.21)	0.7328 (8.38)	0.6822 (7.74)
Proportion of women	-0.7603 (-3.22)	-0.6999 (-3.01)	-0.3892 (-1.77)	-0.3775 (-1.73)
Use of newest production technique	-0.1581 (-1.41)	-0.1611 (-1.44)	-0.0688 (-0.66)	-0.0786 (-0.75)
Proportion of skilled workers			0.2349 (1.09)	0.2783 (1.32)
Proportion of part-time workers	1.1546 (2.96)	0.9852 (2.73)		
Proportion of secondary workers	-3.3658 (-4.17)	-2.9982 (-4.20)		
Employer provided further training	0.3865 (4.05)	0.3387 (3.64)		
ρ		0.4744 (9.10)		
9 sector dummies	yes	yes	yes	yes
Wald- χ^2	240.49	451.45	235.50	
Log-likelihood	-552.95	-1099.40	-596.16	
Pseudo R ²	0.3866		0.2054	
N	1308	1307	1344	1307

Table A2b: Probit ML estimates of works councils and coverage by collective bargaining agreement, robust z-statistics in parentheses, sample 2004/2005

	WOCO		COLLECT	
	Univariate	Bivariate	Univariate	Bivariate
Constant	0.3720 (1.12)	0.3745 (1.10)	-0.3156 (-1.26)	0.7943 (2.29)
Firm size (number of employees)	0.0069 (6.06)	0.0067 (5.83)	0.0012 (2.75)	0.0013 (2.77)
Firm created before 1990	-0.0228 (-0.19)	-0.0180 (-0.15)	0.3733 (3.60)	0.3791 (3.66)
Single firm (no subsidiaries)	-1.0434 (-8.67)	-1.0238 (-8.58)	-0.4441 (-4.31)	-0.4361 (-4.25)
Wages above industry agreement	0.4331 (4.31)	0.4089 (4.08)	1.1090 (11.37)	1.1084 (11.42)
Proportion of women	-0.5339 (-1.94)	-0.4250 (-1.59)	-0.0886 (-0.43)	-0.1031 (-0.51)
Use of newest production technique	-0.2509 (-2.22)	-0.2598 (-2.33)	-0.2043 (-2.10)	-0.1956 (-2.01)
Proportion of skilled workers			0.3417 (1.71)	0.3052 (1.55)
Proportion of part-time workers	1.0552 (3.00)	0.8217 (2.43)		
Proportion of secondary workers	-3.3749 (-7.07)	-3.3284 (-7.15)		
Employer provided further training	0.3974 (3.26)	0.3905 (3.29)		
ρ		0.4204 (5.83)		
9 sector dummies	yes	yes	yes	yes
Wald- χ^2	331.08	532.72	242.98	
Log-likelihood	-453.13	-1011.56	-578.55	
Pseudo R ²	0.4570		0.2526	
N	1209	1208	1210	1208

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