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Impact of Opening Clauses on Bargained Wages

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Impact of Opening Clauses on Bargained Wages

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December 2005

Abstract

This paper is an analysis of the impact of different bargaining regimes on firm-specific wages and wage dispersion. In recent years, firms in Germany favored more flexible than collective bargained wages. Opening clauses were introduced to combine collective bargaining and flexible adaptation of e.g. wages to firm-specific needs. In an own survey, it was evaluated whether central collective agreements contain these opening clauses. Then, the gathered information about opening clauses were linked to the Salary and Wage Structure Survey 2001.

Focussing on central bargaining agreements, it has been tested whether bargained wages and wage dispersion differ under opened central bargaining coverage from that of non-opened central bargaining regimes. While wages with collective bargaining regimes tend to be higher, it could be found that wage dispersion under opened central collective bargaining coverage is slightly wider compared to non-opened central bargaining regime.

Keywords: wages and wage dispersion, opening clauses, collective bargaining
JEL Code: J31, J51

1 Introduction

An ongoing debate on decentralizing collective bargaining in Germany has prompted a lot of research on central collective bargaining coverage (cf. e.g. Lehmann 2002; Kohaut and Schnabel 2003; Fitzenberger and Franz 1999a,b, 2001). Nevertheless, earlier empirical studies (cf. e.g. Gerlach and Stephan 2002, 2005; Bechtel et al. 2004; Guertzgen 2005) distinguish only three regimes of bargaining coverage. So far, the existence of opening clauses within central bargaining agreements has not been considered about. As official data does neither provide information about the existence of opening clauses within a central bargaining agreement nor if a firm pays wages according to an opening clause, in an own survey it was examined if central collective bargaining agreements contain opening clauses. So, one is able to differ between firms under opened and non-opened central collective bargaining coverage.

Since the 1990's the system of collective bargaining has been criticized to be insufficiently flexible towards international competition and technological change (cf. Artus 2001). Throughout the political discussion, employers have postulated a shift towards a decentralized bargaining system (cf. Bispinck 2003). In recent years, a lot of firms abolished central collective agreements and bargained either at firm-level or with each employee individually. In consequence, the bargaining parties developed flexible elements called opening or hardship clauses allowing wage or working-time adaptations at the firm-level. Different types and different ways of regulation exist. Anyway, the application of an opening clause decentralizes the central collective bargaining regime. According to Fitzenberger and Franz (2001) there is no need to shift from central to firm-specific bargaining system, but collective agreements should generally implement flexible elements. So far, opening clauses have been introduced to numerous collective bargaining agreements. In their studies on opening clauses Bispinck and WSI-Tarifarchiv (1999, 2003, 2004) report of more than 100 collective agreements containing flexible elements. A common element of most flexible provisions are employment guarantees on firm level when introducing opening clauses.

More flexible collective agreements do not ensure a reduction of unemployment, but might help to secure existing employment (cf. Fitzenberger and Franz 1999a, 2001). The establishment survey developed by Franz et al. (2000) emphasizes this hypothesis from an employee's point of view. The majority of workers would accept wage reduction only to safeguard their own jobs and not to create new jobs. Hence, flexible elements within central collective bargaining agreements are accepted by employees if firms guarantee existing employment.

As already mentioned above, empirical studies distinguish only between three bargaining regimes. Besides, central collective bargaining having a very heterogenous structure is neglected and central agreements are regarded as a whole. Due to the fact that central agreements can be more or less flexible, the first step of research was to identify central agreements with and without

opening clauses. In this survey, information on every opening clause was gathered through a text evaluation[1] that is based on more than 90 central collective agreements which were kindly provided by the Ministry of Labor and Social Affairs Baden-Wuerttemberg. For the first time, it is possible to enrich common official data with information on flexible provisions. Here, evaluation data is linked to the Salary and Wage Structure Survey. My attention is focussed on the analysis of wages and their dispersion using additional information about central agreements to get a deeper understanding of the effects of more or less flexible bargaining agreements.

Some studies for Germany analyzing the effects of the bargaining regime on wages and their dispersion already exist(cf. Gerlach and Stephan 2002; Bechtel et al. 2004). These studies found significant results: generally speaking, determining wages more flexibly leads on average to a lower wage level but wage dispersion increases. Now, with additional information about opening clauses within a collective agreement it is possible to separate central collective agreements into two subgroups. Each establishment under central collective agreements is assigned either to the flexible group (with opening clauses) or to the inflexible group (without opening clauses). The analyze of the impact bargaining regimes have, now uses four subgroups: firms under individual, firm-specific or collective bargaining coverage with or without opening clauses.

In section 2 a short overview of the German bargaining system is given focussing on flexible components in collective agreements. In section 3 the theoretical background will be introduced. Section 4 gives a description of the data and then section 5 will present the empirical findings. In section 6 conclusions as well as suggests on further research in this field are drawn.

2   The German Wage Bargaining System

A main characteristic of the German bargaining system is the right to free collective bargaining, i.e. government-independent regulations of work terms negotiated by employers and employees. This principle is laid down by the German constitution and has been leading to large organizations representing employers and employees respectively.

Two main levels of wage and working-time determination are to be distinguished. At first, wages and working-time can be negotiated at the collective level. More precisely, a collective of employees carries out negotiations with either a single employer or an employers' association. Collective agreements can therefore be firm-specific in the first case or central in the second. The conclusions of those collective agreements are legally valid and binding for all associated

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[1] My survey data contains a large set of variables on opening clauses in different central agreements. In this paper I will only use information whether opening clauses are generally provided or not. Heinbach (2005) presents a short overview on the data.

members, employers as well as employees. At second, it is possible to determine wages and working-time between an single employee and his employer individually.

Until the 1990's, central collective agreements dominated the bargaining system (Kohaut and Schnabel 2003; Schnabel et al. 2005). By majority, these were and still are negotiated regionally between an industry-wide union and its corresponding employers' association. These collective agreements are only binding for union members, but employers apply them to non-union employees as well. There are exceptions of this rule. In case the Federal Ministry of Labor declares a central agreement to be generally binding, all firms even the non-associated firms have to apply it to all employees.

The need of a flexible adjustment of working-time and wages to firm-specific particularities has led to a rise of firm-specific collective agreements (Kohaut and Schnabel 2003; Ochel 2005). In response, many central collective agreements were incorporated with the so-called opening or hardship clauses (cf. Bispinck 2003). Opening clauses allow firm-specific adjustments of working-time and payment modalities. Usually, these are negotiated between the employer and the work council. Hardship clauses are normally negotiated between the collective bargaining parties e.g. in situations in which firms are close to bankruptcy (cf. Guertzgen 2005).

Especially wage-setting is no longer restricted only to the centralized level. In fact, there are some possibilities to adjust wages firm-specifically. So far, each firm under central collective wage coverage has been able to pay higher wages compared to the bargained wages due to the legal principle allowing deviations in favor of employees. Within lately developments, adjusting wages account of employees is to be more and more permitted also.

Firms are often forced to lay off workers when threatened with certain circumstances such as impeding bankruptcy or though competition. However, firms are capable of improving their situation by the possibility to cut their workers wages and thus they can guarantee existing employment at least temporarily. The cut of wages is possible by postponing the point of vacation or Christmas bonuses payments by several months. This is a more flexible adaptation on the firm level than cutting down bonuses altogether since that would cause an actual reduction of the wage level. In some cases, opening clauses permit to postpone pay rates increases by several months or even withdraw from a former rise. Therefore, the overall wage level within an establishment can decrease. Nevertheless, there are central collective bargaining agreements not allowing such flexible adjustments.

3   Theoretical Background

Until now, there is a lack of theoretical models describing the German bargaining framework as a whole (cf. Pfeiffer 2003, p. 63). Therefore, this section collects some arguments why unions want to rise wages and reduce wage dispersion at the same time (Freeman 1982). However, some studies find out that the unions wage effects are weaken due to recent developments such as e.g. reorganization of work (Lindbeck and Snower 2001) or skill-biased technical change (Acemolgu et al. 2001). Besides, there is already a theoretical framework to describe the effects of opening clauses on central bargained wages integrating insider-outsider aspects (Fitzenberger and Franz 1999a,b).

The bargained wage unions behavior has a first increasing effect, as unions collect management-relevant informations among their members a lot more easily than employers can do on their own. Consequently, compared to individual workers, unions have a more powerfull position in bargaining negotiations. Thus, unions improve their members living conditions demanding higher wages. In particular, low-skilled workers do profit more from their union membership regarding their wage increase compared to that of high skilled workers (Card 1996; Lemieux 1998). But especially those high skilled workers are likely to cancel union membership, when wage dispersion gets too small (Acemolgu et al. 2001).

To strengthen union members' solidarity and their organizational unity, a uniform wage structure within and across firms is favored by unions. Demanding "equal pay for equal work", unions want to attach wages to jobs, while withdrawing supervisors influence on wage-setting. Therefore, the inequality between workers in the same occupational group nearly disappears. Furthermore, wage dispersion within a firm decreases.

Assuming that the unions' policy refers to the median worker, it is feasible that the median wage is equal to the mean wage to circumvent the wage redistribution demanded by workers. To reach an equality of mean and median wage, the wage gain for lower paid workers might be relatively higher, so that the wage distribution compresses. As future wages are uncertain, risk-avers workers prefer a more compressed wage structure. So, union behavior and preferences lead to higher wages and to a compression of the wage distribution.

The central question in this paper is how wages react when introducing flexible elements such as opening or hardship clauses. In their theoretical study Fitzenberger and Franz (1999a) have analyzed the effects of an introduction of opening clauses on wages and employment within a model regarding insider-outsider aspects. The overall wage effect after the introduction is not clear, as union will demand higher wages from all firms, although some of the firms will apply the opening clauses immediately causing decreasing wages then.

Following Fitzenberger and Franz (1999a), the introduction of an opening clause allowing firm-specific adaptation of wages, could increasce the collective bargained wage. Afterwards some firms will apply the opening clause and therefore reduce wages firm-specifically. This will affect the overall wage level and wage dispersion. At first the overall wage level decreases, but the new wage level could be less or more than the wage level before the introduction. Wage dispersion will increase if only some firms will lower their wages and others will pay the higher bargained wages. But in a situation where almost every firm will adapt opening clauses e.g. in a overall economic crisis, wage dispersion will not increase.

This paper focuses on following hypotheses. At first, wages under opened central bargaining coverage are lower than under non-opened central bargaining coverage. At second, wage dispersion of central bargaining agreements with opening clauses is wider than of central agreements without opening clauses. Last but not least, individually agreed wages compared to collective bargained are lower, whereas their wage dispersion is wider.

4 Data

This paper uses a representative cross-section survey of firms in the German state of Baden-Wuerttemberg, the Salary and Wage Structure Survey ("Verdienststrukturerhebung"). It contains representative information about firms and their workers. A random sample stratified by industry, firm size and region is drawn by the Baden-Wuerttemberg Statistical Office covering every firm with at least 10 employees in the manufacturing sector and in parts of the services sector.

In 2002, about 3,000 firms reported data wiht approximately 110,000 employees. These data contain information about individual workers' characteristics like gross and net compensation in October 2001, annual compensation, working-time, gender, age, tenure, education and occupation. Unfortunately, information about firm characteristics are rare: only firm size, number of male and female workers and number of blue-collar workers are available. Due to the fact that the Salary and Wage Structure Survey[2] is a Linked-Employer-Employee-Dataset (LEE)[3], it is possible to control for both individual and firm-specific effects.

It is focused on detailed information about collective bargaining agreements. For each worker,

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[2] Detailed information about method, organization and empirical results can be found in Frank-Bosch (2003) for Germany or Mödinger (2003) and Statistisches Landesamt Baden-Württemberg (2004) for Baden-Wuerttemberg. A detailed data description including data access for the Salary and Wage Structure Survey 1995 in Lower Saxony is given by Stephan (2001). Her remarks are also valid for the used data.

[3] For a more detailed survey of this kind of data see Abowd and Kramarz (1999).

the individually binding collective bargaining agreement is reported[4]. Besides the type of bargaining regime (i.e. firm-specific or collective agreement), it is possible to identify the precise collective bargaining agreement.

In addition, it is possible to enrich the Salary and Wage Structure Survey with information taken out of the collective bargaining agreements. Since there are many different collective bargaining agreements[5], The sample is composed of the manufacturing sector. Only full-time employees (at least 30 working-hours a week) in firms from 100 to 10,000 workers are considered. Thus, data contain 19,100 blue-collar and more than 9,900 white-collar workers. There are around 660 firms in the manufacturing, energy and construction sector. All firms consist of at least 5 observations in the sample. Every firm pays wages either according to a central collective bargaining, a firm-specific or an individual agreement. Members of executive staff as well as apprentices and part-time workers were dropped out of the data to obtain a more homogenous sample.

In preparation to this study, central collective bargaining agreements[6]were evaluated with regard to opening and hardship clauses. Detailed information about different types and designs of opening clauses were gathered. These opening clauses deal with wages and working time respectively . In addition to the year of introduction of each opening clause, data provide information on how firms are able to implement them (Heinbach 2005).

Throughout the study, four groups of wage determination are distinguished:

- individually bargained agreements,

- firm-specific agreements,

- collective bargaining agreements without opening clauses and

- collective bargaining agreements with opening clauses.

The first two groups have been taken out of the Salary and Wage Structure Survey, while the others could only be identified as central collective bargaining agreement. Information about

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[4] The according agreement to which an employee is hired is reported in the manual of collective bargaining agreements ("Tarifleitband"), which was kindly provided by the Statistical Office.

[5] The Federal Ministry of Labor reports a number of 34,437 collective agreements available for the year 2001. However, the number of bargaining areas tends to be around 1,100 (cf. Bundesministerium für Arbeit und Sozialordnung 2002).

[6] Central collective agreements texts were kindly provided by the Ministry of Labor and Social Affairs Baden-Wuerttemberg. A further source has been Bispinck and WSI-Tarifarchiv (2004), that give a detailed survey of opening clauses in selected branches. Additionally, I analyzed agreements without any flexible elements. More detailed information about the survey can be found in Heinbach (2005).

opening clauses is exactly matched to the official data using the identifier of the collective agreement and own evaluation data. In the following, a collective bargaining agreement is called "without opening clauses" (non-opened) if there are no employer-side possibilities to adjust wages, vacation or the Christmas bonuses. If a collective bargaining agreement allows a firm-specific adjustment such as lowering or cutting the payment of vacation or the Christmas bonuses or lowering or cutting a pay increases, such a collective agreement is called "with opening clauses" (opened).

Unfortunately, there is no information about firms paying its wages by using an opening clause. Thus, information only reports if the firm is able to apply an agreement with or without opening clauses. A company applying an opening clause is said to pay a lower wage c.p. than one not applying. However, when interpreting the results, it is to account for the fact that we do not know if an establishment actually pays lower wages. Nevertheless, the distinction between agreements with and without opening clauses is helpful to get a deeper understanding on the impact of opening clauses.

5 Empirical Findings

5.1 Central Collective Bargaining Agreements

At the beginning of the empirical analysis, some descriptive details about the collective bargaining agreements are presented. The importance of collective bargaining declined remarkably over the time period 1995 to 2001 (cf. table 1). In the manufacturing sector the share of full-time workers under a collective bargaining regime decreased from 72 % to 61 % over that period. However, there are some branches with a lower decrease like the energy and water supply industry. Actually, in the chemical industry the collective bargaining coverage of full-time workers increased in that period.

Table 2 presents an overview on selected central collective bargaining agreements by industry, separated in groups with and without opening clauses. There are still relevant industries in which the central agreements are not yet flexible adapted. Comparing these industries in table 2 and the decline in collective bargaining (table 1), one cannot assume an obvious relationsship between the openness of the central bargaining agreement in an industry and the decline in bargaining coverage.

Besides this, the central agreement landscape is not homogenous. There are numerous firms within the same industry not applying the industry level bargaining agreement. From a historical point of view, those companies used to belong to another industry sector. In the meantime,

they changed their industry sector, but not their membership in the employers association. So they apply another bargaining agreement as their competitors. As complete information about the applied collective agreement within each firm is available, this fact is interesting but not relevant for the present study.

5.2   Descriptive Statistics

In table 3, mean and standard deviation of the log gross hourly wages under four different bargaining regimes are presented, separate for blue-collar and white-collar workers respectively. In the following analyses, this separation is maintained as there are differences comparing the payment of wages and qualification groups. Blue-collar workers are paid regarding their labor-time. Often, they earn bonuses or piecework wage, too. Contrary, white-collar workers earn a monthly wage. Their overall wages are often higher than those of blue-collar workers.

The mean of the log gross hourly wages of blue-collar as well as that of white-collar workers is lower if central collective bargaining regimes do have opening clauses. Wages under collective bargaining coverage are higher than individual agreed wages. The variation coefficient reports the relative dispersion of the distribution. Relative and absolute dispersion in the blue-collar workers group are higher if the central collective bargaining regime allows opening clauses, but are not higher in the white-collar workers' group. The means in the different bargaining regimes are quite equal, but differ highly significant besides those between firm-specific agreement and opened central agreement in the white-collar group.

The empirical distribution of the log gross hourly wages is presented as a kernel density plot[7] in figure 1. Again, four different bargaining regimes are separated, for blue-collar and white-collar workers respectively. Figure 1a) shows the wage level of the blue-collar workers group with individual agreements being lower than with collective regimes and wage dispersion being wider. The wage levels of the three collective regimes are quite equal, but wage dispersion grows in central agreements with opening clauses. In the group of white-collar workers (figure 1b), the wage levels do not differ much. Wage dispersion is almost equal as well, except for firm-specific agreements. Corresponding to the blue-collar workers wage distribution, the wage dispersion with firm-specific agreements is lower than with other central collective regimes in the white-collar workers group.

An alternative way to present the wage distribution are box-plots (figure 2). The plots are once again separated into four bargaining regimes, blue and white-collar workers respectively.

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[7] Kernel density is estimated using an Epanechnikov-kernel and following the recommendation of Silverman (1986) for optimal width.

The line in the middle of the box represents the median wage, whereas 50% of the observations have a wage less and 50% have a wage higher than that value. The medians of individual agreements are lowest within each the blue- and white-collar workers group. Blue-collar workers as well as white-collar workers with central collective agreements without opening clauses have therefore the highest median wages. The median wages of central agreements with opening clauses tend to be lower than the median wages of firm-specific agreements.

Comparing the inter-quartile-range, as the wage difference of the central 50 % in its regime, evidence that individually agreed wages tend to have a wider dispersion is found. Furthermore, the inter-quartile-ranges of opened central agreements are larger than of firm-specific collective agreements. Other remarkable points are the outliers appearing in all boxes. One will have to account to them, when computing multivariate statistics in the next section.

Descriptive statistics report the general effects of collective bargaining regimes. Wage levels tend to be higher with lower dispersion. Distinguishing three types of collective bargaining, the effects are not that clear. Comparing central collective agreements with and without opening clauses, it can be found that the level of wages in the opened regime tend to be higher, but the dispersion remains ambiguous. At the beginning, opened and non-opened branches were presented. Therefore, the results for wages under opened or non-opened central bargaining coverage may be influenced strongly . However, as opening clauses are characteristic for the central bargaining agreement and not for the industry as a whole, there is no strong endogeneity problem between central bargaining agreement and industry. Furthermore, there are industries with firms applying agreements with opening clauses and other firms within the same industry applying agreements without opening clauses at the same time. To get deeper understanding of the effects of opening clauses, multivariate analyses explaining the level and the dispersion of the log gross hourly wages are presented in the next section.

5.3 Multivariate Statistics

5.3.1 Model and Variables

The mean of the firm-specific log gross hourly wages is explained through a set of exogenous variables:

$$\ln w_i = x_i'\beta + \varepsilon_i \tag{1}$$

The vector x_i represents exogenous variables in firm i, β is the vector of coefficients to be estimated and ε_i is an identically independently normal-distributed error containing all impacts which are not explicitly in the model. Ordinary least squares are used while accounting for

heteroscedasticity estimating heteroscedasticity-consistent standard errors (cf. White 1980). Furthermore, robust and median regressions are done to check whether the results are robust or influenced by the outliers found in the descriptive analysis (cf. figure 2).

In a second step, the firm-specific wage dispersion $\sigma_{i,\ln w_i}$ is explained, through a analogous set of exogenous variables:

$$\sigma_{i,\ln w_i} = z_i'\beta + \varepsilon_i. \tag{2}$$

Exogenous variables are represented by z_i, whereas β is the vector of coefficients to be estimated. Ordinary least squares as well as robust and median regression are computed to check robustness of the estimates.

In the models, a large set of variables is used, which is described shortly . The human capital within each firm is expressed through the mean of years of schooling. Shares of different qualification levels account for qualification structure within each firm. The mean of tenure is an indicator for firm-specific accumulated human capital (cf. Becker 1975). Positive signs are expected for all human capital coefficients, as far as an increasing human capital should affect wages in a positive way.

To control for seniority effects, the firm-specific mean of the age of the workers and the age squared are used. As gross hourly wages include premia and bonuses for working time on sundays or during night, shares of workers working at that time are used. As the payment-type of the wage, i.e. piecework or bonus wage or a mixture, influences the amount of the wage, the share of people being payed are taken to control for these effects. Positive effects of these individual variables are expected, whereas the coefficients of the squared variables should be negative.

To control for gender wage discrimination, the share of female workers within each firm is computed. Another important explaining variable is the firm size. To account for this, dummy-variables for each category of firm size are used. As productivity might grow with firm size, a positive sign for the coefficients are expected. The industrial branch in which a firm is situated has an impact on wages. Using a two-digit sector classification, general effects in different industrial branches are taken into account.

Last but not least, dummy-variables for the four bargaining regimes were assigned. By this, the effects of opened central wage agreements can be identified. Individual agreements will be the reference category. For the collective bargaining regime coefficients, a positive sign is expected, as union power should increase wages. In a second specification, only workers under central collective bargaining coverage are being used. So, it can be identified whether opened

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or non-opened central collective agreements have a different impact on wages and the wage dispersion.

In the following, the estimates of regression analysis for the firm-specific mean of log hourly wages (equation 1) as well as the wage dispersion (equation 2) in the manufacturing sector in Baden-Wuerttemberg are presented. Again, blue and white-collar workers are separated, because some variables like qualification group or wage regime differ in the two groups.

5.3.2   Analysis of the Determinants of the Wage Level

Table 4 presents the estimates for blue-collar workers, table 5 for white-collar workers. In all models, industry effects are controlled for, but these estimates are left out in the tables.

Blue-collar workers' firm-specific wages under opened central collective bargaining coverage are significantly negative influenced. Whereas the effect of the other collective bargaining regimes remains insignificant. Compared to their colleagues with individually agreed wages, blue-collar workers with opened central collective agreements earn c.p. 2.9% less on average. Turning to the estimates for the white-collar workers, the coefficients for collective bargaining are all positive and significant. White-collar workers under collective bargaining coverage earn c.p. 3.9 % to 5.1% higher wages than their colleagues with individually agreed wages.

To focus on the hypothesis, whether opened and non-opened central bargaining regimes differ, estimates for workers under central bargaining coverage are presented in table 6 and 7. In all models the influence of opening clauses is negative. For the blue-collar workers group the influence is highly significant. firm-specific wages under an opened collective bargaining agreement are about 6.9% to 7.7% less than under a non-opened collective agreement. This effect is less with the white-collar group and in the most models insignificant. Reffering to the robust regression the effect is about 2.7% average wage reduction.

In principle, the coefficients of the other variables have the expected signs. A higher qualification leads to significantly higher wages. Furthermore, wages increase if qualification arises from group to group. Workers' tenure has a positive impact on the wage, which looses strength while increasing, as the coefficient of squared tenure is significant negative. More years of schooling will increase wages too. Age increases the wage only for the white-collar workers. The strength of a wage increase decreases as the coefficient of the squared age is negative. Blue-collar workers' age has no significant impact on the wage[8]. Although there are only full-time workers within the data and all other variables are kept constant, firms with a higher share of female workers pay a lower wage. Compared to a time wage, wages increase while the share

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[8] Mödinger (2003) reports analogous findings in descriptive statistics with the same data.

of workers with incentive wages arise. Working on Sundays or during night has positive but not significant impact on the wage. Firm-size is another significant factor determining the wage level. Obviously, wages are higher the larger the firm. Distinguishing two subgroups out of the firms with 100 to 499 workers, the coefficient of the firms with 500 to 999 workers becomes significant. Probably the wages within the smallest firms are too heterogenous compared to the other groups. Industry effects are heterogenous, too. Compared to the manufacturing of transport equipment, which is a high wage industry and deals as the reference category, all coefficients are negative. So, the industry branches have an influence on the wage level.

5.3.3 Analysis of the Determinants of the Wage Dispersion

The analysis of the wage dispersion takes two steps. In section 5.2, a higher dispersion with individually agreed wages can be found. Consequently, the dispersion is lower with collective bargained wages which can be caused by lower dispersion within a single firm or a lower dispersion between the firms. Both can be a result of the collective bargaining principal "equal pay for equal work".

In an onefactorial analysis of variance, internal and external variance under different bargaining regimes are distinguished. Afterwards, the wage dispersion will be explained using ordinary least squares as mentioned above (equation 2).

Figure 3 presents an onefactorial analysis of variance. It can be shown dispersion within the firms to be a big share of total dispersion. However, within-dispersion with opened central agreements is significantly higher than with non-opened central agreements. Obviously, within-dispersion is a lot higher for white-collar workers than for the blue-collar workers. The lower dispersion under collective bargaining coverage can be explained mainly through the lower dispersion between the firms. Within the blue-collar group, between-dispersion with opened and non-opened central bargaining agreements differs significant.

The estimates of the wage dispersion are reported in table 4 and 5. For the impact of the bargaining regime, negative signs would be expected, as collective bargaining leads to a wage compression. The blue-collar workers estimates are significant negative. Furthermore, the coefficients for the regime without opening clauses is smaller than that of the regime with opening clauses. Consequently wage dispersion under collective bargaining regime is not that wide as with individually agreed wages. Estimates for the white-collar workers group are all positive, but also insignificant. That means, that collective agreed wages tend to wider the wage dispersion.

Comparing blue-collar workers under central bargaining coverage, the coefficient for the opened regime is negative but insignificant.

To focus on the hypothesis, whether opened and non-opened central bargaining regimes differ regarding the wage dispersion, estimates for workers under central bargaining coverage are presented in table 6 and 7. The coefficients of opened bargaining regime are insignificant and positive with the white-collar workers' group but negative with teh blue-collar workers' group.

The other coefficients have mainly the expected sign. A lot of variables have no significant influence on the wage dispersion. Increasing human capital will wider the dispersion of blue-collar workers. Positive signs can be found with age and tenure. This means, if the workers mean age within a single firm increases, wage and wage within-dispersion increases too.

It seems, that it is the same with the firm size effect. A slightly negative sign is found, but insignificant coefficients. So, in larger firms, wages tend to be higher, but this does not affect the within wage dispersion, all other variable kept constant.

Summing up, a large number of significant variables could not be found to explain the wage dispersion. The bargaining regime in the blue-collar workers' group is one main determinant of the wage dispersion, as descriptive statistics and the onefactorial analysis pointed out. Besides this, the wage dispersion with central collective bargaining agreements with opening clauses does not differ from that of central agreements without opening clauses.

6 Conclusions and Outlook

In this analysis, four different regimes of bargaining were distinguished. Using German linked-employer-employee data and focussing on central collective agreements, this paper analyzed if opening clauses affect the wages and wage dispersion remarkably.

Empirical results point out that wages under collective bargaining coverage tend to be higher and less dispersed. Compared to other studies using the same or analogous data (Bechtel et al. 2004; Gerlach and Stephan 2002, 2005), similar effects of the bargaining regime could be found. Furthermore, this paper concentrates on whether wages under central collective coverage with opening clauses differ from those without opening clauses. In a first approach, it could be found that the wage level under opened central agreements is lower than under non-opened central ones. Considering the theoretical effects of the introduction of an opening clause (Fitzenberger and Franz 1999a), the results could be interpreted that a bunch of firms apply negotiated opening clauses without knowing exactly if specific firms do so. So it can be concluded that opening clauses are likely to be applied at the firm-level, lowering the wage level.

In this paper, central collective agreements are distinguished in only two groups, however, evaluation data would provide more detailed information about opening clauses of central collective

bargaining agreements. Thus, a "degree of opening" could be created, differentiating a more detailed intensity of opening clauses. In fact, opening clauses are very heterogenous as negotiations on implementing them can take place either on firm-level or on industry-level. In an additional analysis it could be analyzed if the more detailed information about the intensity of opening clauses will improve the findings.

Unfortunately, we do not know if a specific firm applies an opening clause or not. Thus, the analysis focuses on industries with opened central agreements. Consequently, the estimates for the different regimes are not that clear. It can be presumed, that there are a number of firms within opened collective agreement group, paying wages above the originally bargained wage. More precise estimates would be obtained, if data would contain information on teh application on opening clauses.

Until now, there is a big lack of knowledge within the political discussion concerning the effects of opening clauses. This paper on opening clauses is a first step to get a deeper understanding of the effects of such flexible clauses. Results imply that more wage flexibility within industry-level bargaining combines both the advantages of collective bargaining and firm-specific circumstances, so that now a decentralized but still collective bargaining regime is said to adapt better towards future challenges.

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A Appendix: Tables and Figures

Table 1: Development of collective bargaining agreements (central and firm-specific) from 1995 to 2001 in selected industries in Baden-Wuerttemberg - full-time workers (Source: Salary and Wage Structure Survey 1995, 2001)

Branch of economic activity	Commitment to centralised wage bargaining agreement		
	Proportion of employees committed to wage agreement		
	1995	2001	Change in
	in %		percentage points
Manufacturing industry	72.1	61.0	-11.1
Containing			
All key industries*)	75.8	63.9	-11.9
Manufacture of basic metals and fabricated metals	61.4	44.5	-16.9
Manufacture of machinery and equipments	79.8	67.6	-12.2
Manufacture of office machinery and computers, electrical machinery, precision and optical instruments	65.8	51.1	-14.7
Manufacture of transport equipment	92.7	87.5	-5.2
Manufacture of textiles and clothes	79.7	68.6	-11.1
Chemical industry	71.8	73.9	2.1
Plastic processing industry	47.3	42.0	-5.3
Energy and water supply	91.9	89.9	-2.0

*) Key industries: manufacture of basic metals and fabricated metals, manufacture of machinery, equipments, office machinery, computers, electrical machinery, precision and optical instruments; manufacture of transport equipment

Table 2: Overview on selected industries and central collective agreements with or without opening clauses in the year 2001 (Source: Own survey)

Branches[9] with central collective agreements	
with opening clauses	without opening clauses
Manufacture of textiles and clothes	Food and alimentation industry
Manufacture of paper and printing industry	Manufacture of transport equipment
Chemical industry	Manufacture of metals, machinery
Plastic processing industry	and equipments, electrical machinery
	Building and construction

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[9] Note, not all firms within a branch apply the industry-level collective bargaining agreement (cf. Heinbach 2005)

Table 3: Descriptive statistics of log gross hourly wages in the manufacturing sector - unweighted[10] obeservations, Baden-Wuerttemberg, October 2001 (Source: Salary and Wage Structure Survey 2001)

log gross hourly wages in EUR	blue-collar workers				white-collar workers			
	CBA[11] w/o opening clauses	CBA w. opening clauses	firm specific agree-ment	individual agree-ment	CBA w/o opening clauses	CBA w. opening clauses	firm specific agree-ment	individual agree-ment
mean	2.76	2.64	2.70	2.54	2.99	2.90	2.92	2.79
standard deviation	0.22	0.23	0.19	0.25	0.26	0.24	0.23	0.30
variation coefficient	0.080	0.088	0.071	0.097	0.088	0.083	0.079	0.108
number of observations	11047	3205	817	4038	5511	1738	358	2305
number of firms	372	103	23	151	366	102	24	182
number of collective bargaining agreements	50	20	-	-	48	15	-	-
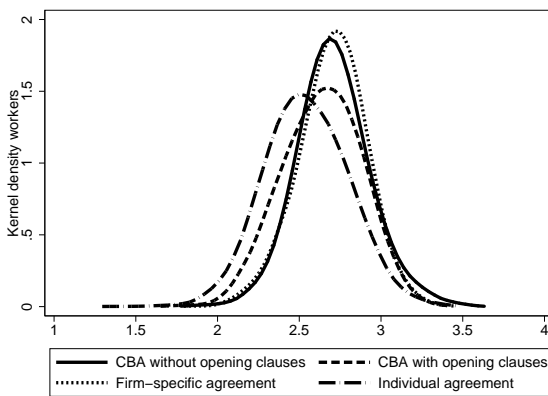
a) blue-collar workers
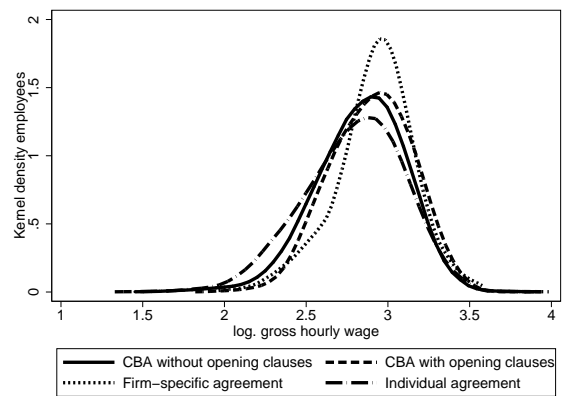
b) white-collar workers

Figure 1: Kernel density of log gross hourly wages in the manufacturing sector in Baden-Wuerttemberg, October 2001 (Source: Salary and Wage Structure Survey 2001)

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[10]Weighted results do only differ slightly from unweighted results.

[11]CBA = central collective bargaining agreement
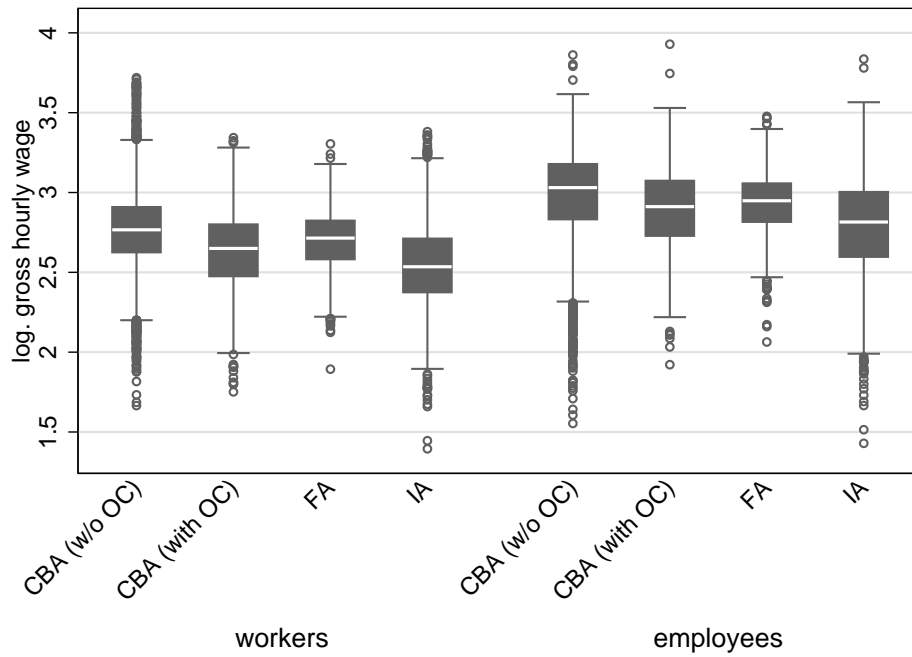
Figure 2: Boxplots of log gross hourly wages in the manufacturing sector in Baden-Wuerttemberg, October 2001 (Source: Salary and Wage Structure Survey 2001)[12]
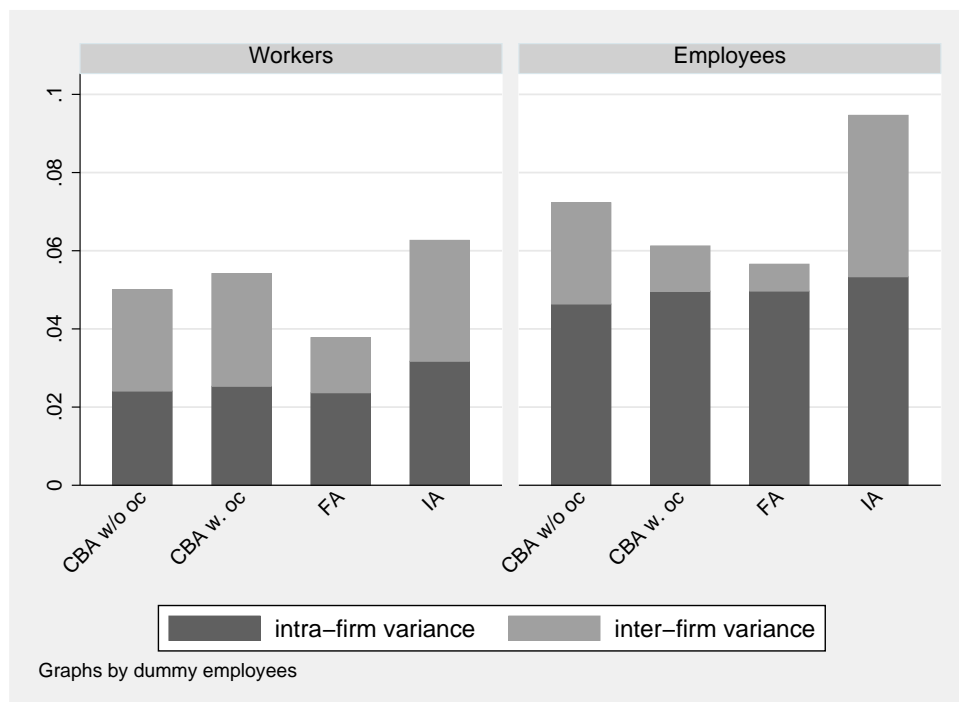
Figure 3: Decomposition of variance by bargaining regime, Baden-Wuerttemberg, October 2001 (Source: Salary and Wage Structure Survey 2001)

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[12]*CBA (w/o OC)*: central collective bargaining agreement without opening clauses

CBA (with OC): central collective bargaining agreement with opening clauses

FA: firm-specific agreement

IA: individual agreement

Table 4: Regression analysis of mean and dispersion of log gross hourly wage in the blue-collar workers' group in the manufacturing sector, Baden-Wuerttemberg, October 2001 (Source: Salary and Wage Structure Survey 2001)

| | mean of log gross hourly wage | | | | | standard deviation of log gross hourly wage | | | | |
| | OLS | | | robust | median | OLS | | | robust | median |
Variables	(1)	(2)	(3)	regression	regression	(1)	(2)	(3)	regression	regression
age / 10	-0.011	-0.008	-0.115	0.067	0.063	0.039	0.039	0.071	0.065	0.086
	(0.577)	(0.669)	(0.427)	(0.537)	(0.576)	(0.010)***	(0.010)***	(0.108)	(0.050)**	(0.038)**
$(age/10)^2$			0.013	-0.007	-0.007			-0.004	-0.004	-0.006
			(0.433)	(0.570)	(0.599)			(0.485)	(0.226)	(0.208)
tenure / 10	0.085	0.083	0.202	0.157	0.171	0.003	0.003	0.006	0.026	0.025
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.740)	(0.734)	(0.797)	(0.162)	(0.279)
$(tenure/10)^2$			-0.039	-0.027	-0.030			-0.000	-0.003	-0.002
			(0.003)***	(0.024)**	(0.014)**			(0.970)	(0.368)	(0.600)
years of education	0.031	0.030	0.033	0.034	0.040	-0.000	-0.000	0.001	0.004	-0.004
	(0.023)**	(0.026)**	(0.014)**	(0.005)***	(0.001)***	(0.993)	(0.998)	(0.935)	(0.531)	(0.615)
share of female workers	-0.157	-0.157	-0.153	-0.173	-0.166	0.041	0.041	0.041	0.051	0.062
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.007)***	(0.007)***	(0.008)***	(0.000)***	(0.000)***
share of high-skilled workers	0.298	0.300	0.295	0.260	0.228	0.023	0.023	0.023	0.025	0.029
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.075)*	(0.075)*	(0.074)*	(0.017)**	(0.025)**
share of skilled workers	0.245	0.250	0.242	0.202	0.188	-0.002	-0.002	-0.002	0.003	0.010
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.872)	(0.884)	(0.889)	(0.742)	(0.441)
share of semi-skilled workers	0.097	0.102	0.096	0.060	0.041	-0.006	-0.005	-0.005	-0.003	-0.004
	(0.001)***	(0.000)***	(0.001)***	(0.010)**	(0.080)*	(0.618)	(0.635)	(0.633)	(0.763)	(0.755)
bonus wage	0.047	0.045	0.044	0.054	0.063	-0.005	-0.005	-0.005	-0.009	-0.004
	(0.034)**	(0.041)**	(0.046)**	(0.008)***	(0.002)***	(0.604)	(0.596)	(0.633)	(0.307)	(0.688)
piecework wage	0.094	0.091	0.090	0.129	0.139	-0.015	-0.015	-0.014	-0.017	-0.004
	(0.011)**	(0.011)**	(0.009)***	(0.000)***	(0.000)***	(0.243)	(0.240)	(0.279)	(0.113)	(0.789)
piece rate plus bonuses	0.140	0.130	0.139	0.123	0.125	0.012	0.012	0.010	0.006	0.060
	(0.000)***	(0.000)***	(0.000)***	(0.152)	(0.005)***	(0.646)	(0.660)	(0.713)	(0.878)	(0.199)
mixed wage	0.012	0.014	0.012	0.020	0.004	-0.001	-0.001	-0.001	-0.003	0.002
	(0.687)	(0.653)	(0.698)	(0.429)	(0.870)	(0.933)	(0.940)	(0.939)	(0.804)	(0.858)
Sunday working	0.095	0.090	0.094	0.062	0.076	0.011	0.011	0.010	0.011	0.006
	(0.001)***	(0.001)***	(0.001)***	(0.002)***	(0.000)***	(0.273)	(0.282)	(0.295)	(0.198)	(0.594)
night work	0.036	0.034	0.036	0.060	0.062	-0.007	-0.008	-0.008	-0.001	-0.004
	(0.090)*	(0.103)	(0.087)*	(0.000)***	(0.000)***	(0.260)	(0.255)	(0.219)	(0.894)	(0.646)
firms with 200 to 499 employees		0.040	0.035	0.032	0.029		0.002	0.002	-0.003	-0.010
		(0.001)***	(0.003)***	(0.004)***	(0.010)**		(0.712)	(0.733)	(0.516)	(0.079)*
firms with 500 to 999 employees	0.026	0.051	0.046	0.047	0.037	-0.004	-0.003	-0.003	-0.010	-0.013
	(0.071)*	(0.001)***	(0.004)***	(0.001)***	(0.011)**	(0.507)	(0.679)	(0.627)	(0.091)*	(0.089)*
firms with more than 1000 employees	0.071	0.097	0.089	0.084	0.074	-0.002	-0.001	-0.002	-0.003	-0.007
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.646)	(0.844)	(0.801)	(0.622)	(0.313)
dummy CBA with opening clauses	-0.024	-0.028	-0.028	-0.029	-0.025	-0.017	-0.017	-0.017	-0.017	-0.021
	(0.156)	(0.098)*	(0.086)*	(0.070)*	(0.112)	(0.030)**	(0.030)**	(0.029)**	(0.013)**	(0.014)**
dummy CBA w/o opening clauses	0.010	0.010	0.010	0.016	0.033	-0.029	-0.029	-0.029	-0.025	-0.025
	(0.594)	(0.597)	(0.581)	(0.332)	(0.047)**	(0.000)***	(0.000)***	(0.000)***	(0.001)***	(0.005)***
firm-specific agreement	0.013	0.010	0.015	0.000	-0.027	-0.011	-0.012	-0.011	-0.012	0.003
	(0.657)	(0.753)	(0.627)	(0.993)	(0.255)	(0.352)	(0.349)	(0.362)	(0.259)	(0.837)
Constant	2.175	2.154	2.280	1.930	1.886	0.100	0.099	0.095	0.094	0.086
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	648	648	648	648	648	644	644	644	644	644
R-squared	0.647	0.653	0.659	0.682		0.167	0.167	0.168	0.185	
Adj R-squared	0.628	0.634	0.639	0.663		0.122	0.121	0.119	0.137	
Pseudo R-squared					0.441					0.102

Robust p values in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Regression analysis of mean and dispersion of log gross hourly wage in the white-collar workers' group in the manufacturing sector, Baden-Wuerttemberg, October 2001
(Source: Salary and Wage Structure Survey 2001)

| | mean of log gross hourly wage | | | | | standard deviation of log gross hourly wage | | | | |
| | OLS | | | robust | median | OLS | | | robust | median |
Variables	(1)	(2)	(3)	regression	regression	(1)	(2)	(3)	regression	regression
age / 10	0.037	0.039	0.293	0.309	0.380	0.058	0.058	0.193	0.243	0.217
	(0.009)***	(0.006)***	(0.002)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
$(age/10)^2$			-0.031	-0.033	-0.042			-0.015	-0.020	-0.018
			(0.008)***	(0.000)***	(0.000)***			(0.003)***	(0.000)***	(0.001)***
tenure / 10	0.041	0.039	0.053	0.046	0.044	-0.003	-0.003	0.010	0.012	0.035
	(0.000)***	(0.001)***	(0.150)	(0.108)	(0.106)	(0.699)	(0.706)	(0.715)	(0.529)	(0.180)
$(tenure/10)^2$			-0.004	0.002	0.003			-0.002	-0.002	-0.007
			(0.756)	(0.771)	(0.687)			(0.770)	(0.636)	(0.211)
years of education	0.031	0.031	0.031	0.029	0.032	0.006	0.006	0.006	0.007	0.008
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.057)*	(0.056)*	(0.066)*	(0.004)***	(0.016)**
share of female workers	-0.233	-0.231	-0.222	-0.234	-0.248	0.026	0.026	0.016	0.016	0.020
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.153)	(0.154)	(0.373)	(0.271)	(0.288)
share of employees with specialized knowledge	0.594	0.602	0.586	0.453	0.485	-0.252	-0.253	-0.236	-0.279	-0.272
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.001)***	(0.001)***	(0.002)***	(0.000)***	(0.000)***
share of employees with self-employed activity	0.679	0.686	0.671	0.537	0.567	-0.288	-0.289	-0.271	-0.315	-0.317
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
share of employees w/o decision-making power	0.402	0.408	0.404	0.284	0.339	-0.216	-0.217	-0.207	-0.259	-0.254
	(0.000)***	(0.000)***	(0.001)***	(0.000)***	(0.000)***	(0.007)***	(0.006)***	(0.008)***	(0.000)***	(0.000)***
remuneration for technical activity	0.018	0.016	0.014	0.028	0.030	0.012	0.012	0.016	0.007	0.008
	(0.367)	(0.416)	(0.477)	(0.114)	(0.084)*	(0.368)	(0.365)	(0.250)	(0.522)	(0.592)
Sunday working	0.049	0.053	0.044	0.046	0.096	0.030	0.030	0.031	0.019	0.028
	(0.232)	(0.194)	(0.260)	(0.340)	(0.025)**	(0.349)	(0.352)	(0.323)	(0.509)	(0.439)
night work	0.055	0.053	0.059	0.050	0.045	-0.031	-0.031	-0.036	-0.029	-0.034
	(0.185)	(0.200)	(0.138)	(0.279)	(0.292)	(0.304)	(0.305)	(0.216)	(0.302)	(0.367)
firms with 200 to 499 employees		0.020	0.021	0.022	0.024		-0.001	-0.003	-0.009	-0.009
		(0.090)*	(0.067)*	(0.034)**	(0.015)**		(0.894)	(0.686)	(0.153)	(0.297)
firms with 500 to 999 employees	0.025	0.038	0.037	0.044	0.041	0.007	0.006	0.003	-0.012	-0.014
	(0.082)*	(0.019)**	(0.023)**	(0.001)***	(0.001)***	(0.412)	(0.511)	(0.771)	(0.122)	(0.196)
firms with more than 1000 employees	0.053	0.066	0.065	0.068	0.067	-0.003	-0.004	-0.006	-0.014	-0.015
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.596)	(0.613)	(0.428)	(0.075)*	(0.165)
dummy CBA with opening clauses	0.044	0.044	0.041	0.021	0.011	0.010	0.010	0.009	0.031	0.019
	(0.015)**	(0.016)**	(0.024)**	(0.177)	(0.439)	(0.431)	(0.429)	(0.466)	(0.001)***	(0.111)
dummy CBA w/o opening clauses	0.044	0.044	0.039	0.047	0.035	0.004	0.004	0.004	0.015	0.007
	(0.026)**	(0.026)**	(0.045)**	(0.003)***	(0.019)**	(0.723)	(0.721)	(0.677)	(0.108)	(0.562)
firm-specific agreement	0.051	0.049	0.043	0.033	0.051	0.014	0.014	0.019	0.025	0.018
	(0.025)**	(0.034)**	(0.063)*	(0.140)	(0.018)**	(0.342)	(0.341)	(0.214)	(0.061)*	(0.331)
Constant	1.869	1.851	1.363	1.493	1.302	0.373	0.374	0.346	0.385	0.388
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	673	673	673	673	673	658	658	658	658	658
R-squared	0.697	0.698	0.704	0.732		0.181	0.182	0.196	0.281	
Adj R-squared	0.683	0.684	0.689	0.718		0.142	0.141	0.154	0.243	
Pseudo R-squared					0.475					0.146

Robust p values in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Blue-collar workers' group under central collective bargaining coverage: Regression analysis of mean and dispersion of logarithmised gross hourly wage in the manufacturing sector, Baden-Wuerttemberg, October 2001 (Source: Salary and Wage Structure Survey 2001)

| | mean of log gross hourly wage | | | | | standard deviation of log gross hourly wage | | | | |
| | OLS | | | robust | median | OLS | | | robust | median |
Variables	(1)	(2)	(3)	regression	regression	(1)	(2)	(3)	regression	regression
age / 10	-0.024	-0.018	-0.223	-0.003	0.004	0.042	0.042	0.062	0.065	0.091
	(0.329)	(0.442)	(0.201)	(0.980)	(0.976)	(0.008)***	(0.008)***	(0.214)	(0.069)*	(0.068)*
$(age/10)^2$			0.025	0.001	-0.003			-0.002	-0.005	-0.006
			(0.205)	(0.961)	(0.818)			(0.678)	(0.226)	(0.287)
tenure / 10	0.073	0.071	0.182	0.127	0.128	0.004	0.004	0.011	0.025	0.028
	(0.000)***	(0.000)***	(0.000)***	(0.002)***	(0.002)***	(0.702)	(0.703)	(0.631)	(0.223)	(0.316)
$(tenure/10)^2$			-0.036	-0.021	-0.018			-0.001	-0.002	-0.002
			(0.008)***	(0.089)*	(0.163)			(0.770)	(0.589)	(0.778)
years of education	0.007	0.006	0.007	0.021	0.013	-0.004	-0.004	-0.004	-0.000	-0.007
	(0.665)	(0.707)	(0.629)	(0.112)	(0.375)	(0.671)	(0.669)	(0.688)	(0.973)	(0.477)
share of female workers	-0.147	-0.147	-0.143	-0.165	-0.138	0.056	0.056	0.055	0.043	0.033
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.001)***	(0.001)***	(0.074)*
share of high-skilled workers	0.278	0.282	0.284	0.235	0.210	0.027	0.027	0.027	0.021	0.020
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.041)**	(0.041)**	(0.044)**	(0.085)*	(0.236)
share of skilled workers	0.212	0.220	0.215	0.181	0.194	-0.000	-0.000	-0.001	-0.003	-0.005
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.983)	(0.985)	(0.969)	(0.835)	(0.778)
share of semi-skilled workers	0.068	0.076	0.080	0.040	0.050	-0.020	-0.020	-0.021	-0.019	-0.010
	(0.066)*	(0.034)**	(0.034)**	(0.185)	(0.118)	(0.177)	(0.181)	(0.160)	(0.164)	(0.594)
bonus wage	0.069	0.065	0.062	0.065	0.078	-0.015	-0.015	-0.014	-0.007	-0.014
	(0.004)***	(0.005)***	(0.007)***	(0.003)***	(0.001)***	(0.103)	(0.106)	(0.123)	(0.436)	(0.306)
piecework wage	0.113	0.109	0.107	0.115	0.124	-0.012	-0.012	-0.012	-0.015	-0.012
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.332)	(0.335)	(0.364)	(0.182)	(0.437)
piece rate plus bonuses	0.092	0.082	0.099	0.075	0.070	-0.052	-0.052	-0.054	-0.059	-0.066
	(0.139)	(0.159)	(0.125)	(0.492)	(0.272)	(0.001)***	(0.001)***	(0.001)***	(0.213)	(0.028)**
mixed wage	0.002	0.010	0.007	0.013	-0.013	-0.020	-0.020	-0.020	-0.021	-0.025
	(0.950)	(0.759)	(0.834)	(0.662)	(0.667)	(0.057)*	(0.058)*	(0.056)*	(0.089)*	(0.148)
Sunday working	0.109	0.105	0.107	0.062	0.101	-0.000	-0.000	-0.001	0.002	-0.002
	(0.001)***	(0.001)***	(0.001)***	(0.003)***	(0.000)***	(0.960)	(0.959)	(0.950)	(0.863)	(0.863)
night work	0.028	0.025	0.028	0.056	0.057	0.006	0.006	0.005	0.005	0.005
	(0.237)	(0.283)	(0.226)	(0.001)***	(0.001)***	(0.387)	(0.388)	(0.419)	(0.461)	(0.602)
firms with 200 to 499 employees		0.050	0.045	0.046	0.038		0.000	-0.000	-0.006	-0.006
		(0.000)***	(0.000)***	(0.000)***	(0.004)***		(0.972)	(0.995)	(0.281)	(0.452)
firms with 500 to 999 employees	0.001	0.034	0.028	0.036	0.017	0.003	0.003	0.003	-0.006	-0.004
	(0.968)	(0.046)**	(0.093)*	(0.015)**	(0.300)	(0.671)	(0.699)	(0.737)	(0.363)	(0.642)
firms with more than 1000 employees	0.054	0.089	0.082	0.085	0.071	0.003	0.003	0.003	0.001	0.004
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.623)	(0.666)	(0.697)	(0.865)	(0.623)
dummy CBA with opening clauses	-0.073	-0.077	-0.077	-0.069	-0.082	-0.008	-0.008	-0.008	-0.009	-0.010
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.358)	(0.361)	(0.360)	(0.232)	(0.343)
Constant	2.529	2.487	2.820	2.250	2.376	0.086	0.086	0.083	0.094	0.077
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.003)***
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	475	475	475	475	475	472	472	472	472	472
R-squared	0.647	0.658	0.663	0.696		0.208	0.208	0.209	0.193	
Adj R-squared	0.622	0.633	0.637	0.673		0.152	0.150	0.147	0.130	
Pseudo R-squared					0.454					0.119

Robust p values in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: White-collar workers under central collective bargaining coverage: Regression analysis of mean and dispersion of logarithmised gross hourly wage in the manufacturing sector, Baden-Wuerttemberg, October 2001 (Source: Salary and Wage Structure Survey 2001)

Variables	mean of log gross hourly wage					standard deviation of log gross hourly wage				
	OLS			robust	median	OLS			robust	median
	(1)	(2)	(3)	regression	regression	(1)	(2)	(3)	regression	regression
age / 10	0.002	0.004	0.281	0.451	0.571	0.068	0.068	0.212	0.263	0.304
	(0.913)	(0.833)	(0.024)**	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
$(age/10)^2$			-0.034	-0.055	-0.069			-0.016	-0.025	-0.027
			(0.018)**	(0.000)***	(0.000)***			(0.005)***	(0.000)***	(0.000)***
tenure / 10	0.044	0.042	0.037	0.002	-0.004	-0.009	-0.009	0.037	0.003	0.021
	(0.000)***	(0.000)***	(0.339)	(0.929)	(0.923)	(0.374)	(0.377)	(0.146)	(0.885)	(0.223)
$(tenure/10)^2$			0.003	0.014	0.015			-0.009	0.001	-0.004
			(0.785)	(0.071)*	(0.169)			(0.123)	(0.802)	(0.233)
years of education	0.027	0.026	0.027	0.025	0.028	0.004	0.004	0.003	0.006	0.005
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.319)	(0.320)	(0.421)	(0.024)**	(0.017)**
share of female workers	-0.170	-0.169	-0.164	-0.170	-0.173	0.019	0.019	0.008	0.017	0.007
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.397)	(0.397)	(0.700)	(0.271)	(0.585)
share of employees with specialized knowledge	0.810	0.824	0.781	0.467	0.473	-0.191	-0.191	-0.174	-0.376	-0.264
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.038)**	(0.037)**	(0.048)**	(0.000)***	(0.000)***
share of employees with self-employed activity	0.820	0.833	0.796	0.465	0.444	-0.246	-0.246	-0.229	-0.424	-0.324
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.006)***	(0.006)***	(0.008)***	(0.000)***	(0.000)***
share of employees w/o decision-making power	0.541	0.555	0.528	0.218	0.215	-0.147	-0.147	-0.142	-0.341	-0.240
	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.012)**	(0.112)	(0.110)	(0.106)	(0.000)***	(0.000)***
remuneration for technical activity	0.027	0.026	0.020	0.030	0.027	0.008	0.008	0.013	0.009	0.007
	(0.182)	(0.204)	(0.316)	(0.070)*	(0.236)	(0.616)	(0.616)	(0.373)	(0.453)	(0.474)
Sunday working	0.131	0.139	0.130	0.119	0.136	0.015	0.015	0.016	0.014	0.012
	(0.001)***	(0.001)***	(0.002)***	(0.012)**	(0.031)**	(0.722)	(0.726)	(0.706)	(0.699)	(0.684)
night work	0.025	0.019	0.026	0.011	-0.014	-0.045	-0.045	-0.053	-0.044	-0.046
	(0.486)	(0.590)	(0.459)	(0.786)	(0.801)	(0.190)	(0.192)	(0.110)	(0.148)	(0.072)*
firms with 200 to 499 employees		0.022	0.023	0.021	0.015		-0.000	-0.002	-0.010	-0.014
		(0.092)*	(0.081)*	(0.039)**	(0.275)		(0.963)	(0.788)	(0.153)	(0.024)**
firms with 500 to 999 employees	0.009	0.024	0.022	0.022	0.008	0.012	0.011	0.006	-0.012	-0.013
	(0.570)	(0.179)	(0.230)	(0.067)*	(0.624)	(0.199)	(0.279)	(0.562)	(0.170)	(0.074)*
firms with more than 1000 employees	0.021	0.037	0.035	0.033	0.035	0.005	0.005	0.003	-0.009	-0.009
	(0.063)*	(0.012)**	(0.013)**	(0.005)***	(0.032)**	(0.443)	(0.581)	(0.773)	(0.298)	(0.230)
dummy CBA with opening clauses	-0.017	-0.017	-0.015	-0.027	-0.026	0.012	0.012	0.012	0.016	0.014
	(0.305)	(0.303)	(0.348)	(0.050)*	(0.179)	(0.337)	(0.338)	(0.335)	(0.111)	(0.085)*
Constant	1.911	1.886	1.378	1.420	1.163	0.320	0.320	0.284	0.490	0.379
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.001)***	(0.001)***	(0.002)***	(0.000)***	(0.000)***
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	468	468	468	468	468	462	462	462	462	462
R-squared	0.701	0.703	0.709	0.783		0.214	0.214	0.240	0.393	
Adj R-squared	0.682	0.683	0.689	0.767		0.163	0.161	0.185	0.349	
Pseudo R-squared					0.535					0.174

Robust p values in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

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