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Research on Trade Unions and Collective Bargaining in Germany: The Contribution of Labor Economics

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Abstract: This chapter provides a survey of econometric studies on trade unions and collective bargaining in Germany. Traditionally, these studies have examined the determinants of trade union membership and collective bargaining coverage. Recent research has a strong focus on the implications of collective bargaining for wages, flexibility and the performance of firms. Specific attention is paid to opening clauses and company-level pacts for employment and competitiveness.

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1. Introduction

The topic of industrial relations is a highly interdisciplinary research area. At first glance, it may seem that this topic is primarily examined by industrial sociologists. On a closer look, however, it becomes clear that contributions by labor economics play a key role in the analysis of industrial relations. This chapter highlights this role through an overview of econometric studies on trade unions and collective bargaining in Germany.

1.1 Some general remarks

Before moving on to the topic itself, let us first discuss some fundamental principles and methods used in economic analyses. This not only helps assessing the studies discussed in this survey. It also helps when taking into account that labor economics finds itself both in competition and exchange with other disciplines in the interdisciplinary field of industrial relations. We should bear in mind that the economic approach is easily misunderstood and ascribed attributes which are inaccurate. A short discussion of fundamental principles of economics may help in guarding against such misunderstandings.[1]

The theoretical approach of economics is characterized by a consequent application of mathematically formulated models in the analysis of a variety of social phenomena. The applicability of the economic approach is not limited to the analysis

[1] One misunderstanding would be that economic analyses lead to an economic reductionism, whereby labor relations are taken to be nothing more than economic exchanges and subordinated to the profit motive of capitalists (Jirjahn 2009). This position is inaccurate for two reasons: First, recent economic research highlights the role of social motives such as fairness and reciprocity in human relations. Second, economic analyses consider the interests of all actors involved, including workers and consumers. The analytical framework is even applied in radical economic approaches (Bowles 1985).

of markets. Institutions as well as structures and processes within organizations are an important field of economic research. Even power relations can be analyzed by using bargaining models.

Economic models are based on methodological individualism. Individuals, groups, and organizations make decisions with limited resources as to best satisfy their wants and needs. Social phenomena result from the interactions among the decisions people make. Economics not only analyzes the intended, but also the unintended consequences of these decisions. This is important as individual maximization of utility can result in socially suboptimal outcomes. One example is the free rider problem, which may explain low rates of unionization. The focus on utility maximization does not imply that only economic motives are considered. Social motives can clearly be integrated in economic models. For example, motives such as fairness and reciprocity play a central role in contemporary research (Bowles and Gintis 2011).

Empirical research in economics is characterized by the econometric analysis of mass data. The basic idea is that the role of individual factors of influence can only be disentangled by using multivariate estimation methods. A particular outcome is potentially the result of a variety of factors of influence. For example, the unionization rate of a firm's workforce may be influenced by the presence of a works council. However, works councils are more likely to be present in larger firms. This gives rise to the question whether a higher unionization rate is in fact the result of a works council or simply reflects a size effect. This question can only be answered by a multivariate regression analysis that accounts for both works council presence and firm size.

Econometric analyses not only help disentangle the roles of the various

influence factors. They also allow examining the interaction of influence factors. This can be done by including interaction variables in the estimations or running separate regressions for specific subsamples. For example, it can be examined whether or not the relationship between a firm's economic situation and workers' wages depends on the coverage by a collective bargaining agreement.

Of course, economic analyses are always work in progress. Data sets rarely provide complete information on all relevant influence factors, leading to a situation where estimations may be biased due to the omission of relevant explanatory variables. It may also be the case that the variables in a data set are ambiguous so that they leave scope for more than one theoretical interpretation. In this case, it may be not clear which theory is confirmed or rejected by the regression results. Thus, economic research is not only concerned with the search for better theories and new research topics, but also with the search for better data sets and new estimation methods.

The basic point is that the analytical framework of economics is so flexible that it is possible to integrate insights from other disciplines without theoretical extensions turning ad hoc. The insights are integrated in the general framework of utility maximization in such way that testable predictions can be derived. This is also relevant for the field of industrial relations. For example, recent research examines the role of reciprocity in workers' taste for nonunion representation (Jirjahn and Lange 2015) or the role of social factors in the decision to become a union member (Goerke and Pannenberg 2004). The tendency to integrate the findings of other disciplines is sometimes labeled as economic imperialism (Lazear 2000). From the viewpoint of the other disciplines, this may be perceived as a threat. However, the methodological advantage is that the diverse phenomena of social life can be analyzed by using a

standardized comprehensive framework. This analytical framework facilitates the derivation of systematically testable hypotheses.

1.2 Labor economics and industrial relations

Returning to our main theme, this article reviews econometric studies on trade unions and collective bargaining in Germany. Section 2 addresses the determinants of trade union membership. This is the classic topic labor economists have examined in the field of industrial relations. It still plays an important role in recent research. Of particular interest are the factors that influence the workers' incentive to free ride with respect to trade union membership. Moreover, the factors that have resulted in a sharp decline in unionization play an important role in recent research.

In section 3, we discuss the determinants of collective bargaining coverage. There has also been a decline in collective bargaining coverage in the last decades. Thus, it is crucial to understand the factors that influence whether or not a firm is covered by a collective bargaining agreement. Recent research on collective bargaining coverage also provides insights into the implications of globalization for industrial relations in Germany.

Section 4 deals with the effects of collective bargaining on wages. Early studies examined the determinants of contract wages and the determinants of the wage cushion. Recent studies focus on the role collective bargaining agreements play in the wage structure within firms. Specific attention is paid to the question as to what extent collective bargaining agreements impose restrictions on the flexibility of firms. Furthermore, recent research examines the effects of collective bargaining coverage on internal labor markets within firms.

In section 5, we discuss the effects of collective bargaining on various

dimensions of economic performance such productivity, profitability and innovativeness. Econometric studies have shown that the coverage by a collective bargaining agreement has both a direct effect and a moderating effect. The moderating effect is that collective bargaining coverage influences the effects works councils have on the performance of firms. This has an important implication for the public debate on the future of centralized collective bargaining in Germany. This debate often neglects that collective bargaining is part of a broader industrial relations system with dual employee representation through both unions and works councils.

Section 6 deals with opening clauses and company-level pacts for employment and competitiveness. Opening clauses and company-level pacts aim at providing more flexibility to adjust working hours and wages. A small but growing number of recent studies examine their determinants and consequences.

Finally, section 7 concludes. This section summarizes the main insights and makes suggestions for future research.

2. Trade union membership

2.1 General determinants

Early studies on the determinants of union membership used aggregated data to explain the unionization rate of workers by macroeconomic factors such as strike activity, inflation rate, unemployment rate and unemployment benefits (Armingeon 1988; Carruth and Schnabel 1990; Schnabel 1987, 1989a, 1989b). With the availability of data sets such as SOEP and ALLBUS, the focus has shifted to the individual determinants of union membership (Fitzenberger et al. 1999; Lorenz and Wagner 1991; Schnabel and Wagner 2003, 2005, 2006, 2012). All in all, the results suggest that women, part-timers, white-collar employees and university graduates

have a lower probability of union membership while employees in larger firms and in the public sector have a higher probability. Political attitudes and social background also play a role. A left-wing political orientation and a working-class parental background are positive determinants of trade union membership. Rather heterogeneous results have been found as to the role of employee age. Fitzenberger et al. (1999) obtain an inverse U-shaped relationship between age and trade union membership. Schnabel and Wagner (2012) find no evidence of an inverse U-shaped relationship.

2.2 The free rider problem

From a theoretical point of view, the decision whether or not to become a union member can entail a free rider problem. Employers pay the collectively agreed wage rates not only to union members, but also to non-union members. In this sense, collectively agreed wage rates are like public goods. Thus, employees have little incentive to join a union. There are two possible mechanisms that may help overcome this problem. First, there is a positive incentive to join a union if the union provides specific services only to its members (Olson 1965). For example, unions provide their members with expertise in case that there are lawsuits. Second, there is a positive incentive if union membership is rewarded with social recognition. This analyzed in social custom models (Booth 1985).

The finding that political attitudes and social background influence trade union membership provides first evidence of the role of social factors. Moreover, Goerke and Pannenberg (2004) conduct a systematic examination of the social custom approach. The basic idea is that the effectiveness of social recognition as an incentive requires two factors. First, social recognition must be strong enough. The authors

argue that the recognition a worker receives for his or her trade union membership is stronger if a high share of workers in the industry is unionized. Second, the worker must value the recognition. This aspect is operationalized through the worker's social background. A person whose father was not self-employed should value more the recognition resulting from union membership. The authors' results show that the two factors interact as expected. The positive influence of the share of unionized workers on the individual probability of trade union membership is more pronounced for workers whose fathers were not self-employed.

Recent research not only examines the role of social factors, but also the role of selective incentives. Goerke and Pannenberg (2012a) show that risk-averse persons are more likely to be a trade union member. This suggests that unions provide exclusive insurance services to their members. Risk-averse workers have a higher demand for such insurance services. Findings by Berger and Neugart (2011) also indicate that unions provide selective services. Trade union members are more likely to be successful in labor dispute processes than non-members. Relatedly, Goerke and Pannenberg (2011) show that union members are less likely to be dismissed. Morever, in case of a dismissal, union member have a higher probability of receiving severance pay (Goerke and Pannenberg 2010). These findings indicate that union members are better protected legally than non-members. Goerke and Pannenberg (2015) emphasize another implication of this improved protection. Union members tend to have higher rates of absenteeism.

2.3 The decline in unionization

Altogether, econometric studies have shown that unions in Germany not only provide public goods for all employees but also private goods which are only accessible for

their members. In addition, social recognition can contribute to the workers' propensity toward union membership. Nevertheless, there has been a clear decline in unionization in the last decades. Upon reunification of East and West Germany there was a temporary increase in the number of union members, but this was followed by an even stronger slump. Studies addressing the reasons for the decline in unionization have come to diverse conclusions.

Using data from the ALLBUS, Schnabel and Wagner (2007a) find that the decline in unionization cannot primarily be explained by changes in the structure of the workforce. It has much more to do with shifts in the effects of the specific factors. The authors obtain the result that today it no longer matters whether somebody is employed part-time or politically inclined to the left. However, a previous study by Schnabel and Wagner (2005) shows no shift in the effects of part-time work and political attitude.

Studies based on the SOEP also obtain mixed results. While Beck and Fitzenberger (2004) view changes in workforce structure as the main source of declining unionization, Fitzenberger et al. (2011) emphasize the role of a general negative trend over time and changes in the effects of specific factors such as firm size.

2.4 Working conditions and firm charcteristics

Changes in workplace characteristics and employer-employee relationships may also have contributed to the decline in unionization. Employee data provide only limited information to analyze these changes. Nonetheless, even employee data to some extent allow taking into account workplace characteristics. An internationally comparative study by Schnabel and Wagner (2007b) shows that the individual

worker's probability of union membership is higher if unions are represented in the firm he or she works for.

In Germany, works councils are often viewed as representing the interests of unions at the firm level. Specifically, they may help recruit union members. However, this presupposes close relationships between works councils and unions. Indeed, Goerke and Pannenberg (2007) find that the mere presence of a works council has no influence on the individual worker's probability of being a union member. Only works councils in industries with a high share of unionized works councilors have an influence on the workers' propensity to join a union. This is an important result as the share of works councilors who are union members has been declining over time.

Up to now, there is almost no econometric research that is based on firm data to analyze the influence of workplace characteristics on unionization in Germany. Notable exceptions are two older studies by FitzRoy and Kraft (1985) and Klodt and Meyer (1998). Using data from manufacturing firms, the estimates show that firm size, the presence of a works council and collective bargaining coverage are positive determinants of the share of the workforce that is unionized.

Moreover, the proportion of shift workers is positively associated with unionization (Klodt and Meyer 1998). Shift work can be seen as an indicator of less favorable working conditions and a standardized mass production (Jirjahn 2008). Thus, specifically a Tayloristic organization of work appears to entail a higher level of unionization. By contrast, two indicators of a more flexible and holistic production, namely profit sharing and a state-of-the-art production technology, are negative determinants of the share of unionized workers. These findings suggest that the shift from a Tayloristic organization of work toward a more holistic organization may have contributed to the decline in unionization.

The two studies provide no evidence that a decline in unionization can be explained by increased globalization. Quite the contrary, export activities of the firm are positively associated with the unionization of the workforce. This finding supports theoretical considerations by Agell (2002). Increased globalization entails higher insecurity for workers. As a consequence, they have a higher demand for representation in order to protect their interests. Thus, globalization might even strengthen the role of unions. However, we will see that globalization has also an impact on the decision of employers to join an employers' association. This is important as usually the members of employers' associations are covered by industry-level collective bargaining agreements. The available evidence suggests that globalization has weakened employers' interest in collective bargaining coverage.

3. Collective bargaining coverage

3.1 General determinants

Not only union membership of workers but also collective bargaining coverage of firms has dropped in the last decades (Addison et al. 2007; Addison et al. 2010). While there has been a sharp decline in the coverage by industry-level agreements, the coverage by firm-level agreements has increased only moderately. Thus, in total the share of firms covered by collective bargaining agreements has declined.

This gives rise to the question as to which factors determine collective bargaining coverage. This question can only be answered by analyzing firm data such as the Hannover Firm Panel or the IAB Establishment Panel. A series of econometric studies have used these data to examine the determinants of collective bargaining coverage and the factors influencing the withdrawal from collective bargaining coverage. (Addison et al. 2013; Bellmann et al. 1999; Gerlach et al. 1998; Hübler and

Jirjahn 2003; Kohaut and Bellmann 1997; Kohaut and Schnabel 2003a, 2003b; Schnabel and Wagner 1996; Schnabel et al. 2006). All in all, the findings of these studies suggest that firm size, firm age, works council incidence and the share of skilled workers are positive determinants of collective bargaining coverage and negative determinants of withdrawal from collective bargaining coverage.

Of particular interest is the finding that firms paying wages above the level specified in collective agreements are more likely to be covered and are less likely to withdraw from collective bargaining coverage. This suggests that employers are more willing to accept collective bargaining agreements if the minimum standard defined by the agreements are not binding to them. Employers tend to withdraw from collective bargaining coverage if they prefer to pay wages below the standards.

3.2 The role of globalization

Another noteworthy finding is on the role of the firm's export activities (e.g., Schnabel and Wagner 1996). Even though the results are not always statistically significant, there is some evidence that export-oriented firms are more likely to be covered and are less likely to withdraw from collective bargaining coverage. Thus, taking the evidence discussed in section 2 into account, export activities have an opposing effect on union membership and collective bargaining coverage. While they increase workers' propensity to be union members, they decrease the employers' willingness to be covered by collective bargaining. One possible explanation for the negative link between export activities and collective bargaining coverage may be that those activities require increased flexibility. Specifically industry-level agreements may impose restriction on the firms' flexibility.

Globalization is not only characterized by increased international trade but

also by increased activities of multinational firms (MNCs). Schnabel et al. (2006) takes into account this aspect. They examine the influence of foreign owners on collective bargaining coverage in West and East Germany. For West Germany, their estimations show that foreign-owned firms are less likely to be covered by industry-level agreements but are more likely to be covered by firm-level agreements than domestic-owned firms. One explanation for this finding could be that MNCs have company-wide standards and, thus, tend to implement unified management practices in their subsidiaries. Adopting the management practices of a foreign parent company can entail tensions with the industrial relations system of the host country (Kostova and Roth 2002). Specifically, industry-level agreements may provide too little flexibility to adopt the practices. Thus, foreign-owned firms may prefer firm-level agreements. However, the pattern of results does not hold for East Germany. In this part of Germany, there appears to be a positive link between foreign ownership and coverage by an industry-level agreement. Reconciling the opposing findings for East and West Germany stands as future research.

Addison et al. (2013) examine the dynamics of collective bargaining coverage in more detail. They take into account both export activities and foreign ownership. Export-oriented firms are less likely to be covered by industry-level agreements and more likely to be covered by firm-level agreements. Among the firms covered by industry-level bargaining, exporters are more likely to withdraw from it. Uncovered firms with export activities are less likely to switch to the industry-level bargaining regime. Foreign ownership plays also a role. Foreign-owned firms have a lower probability of being covered by industry-level agreements. Altogether, Addison et al. (2013) provide clear indications that globalization has a negative influence on industry-level collective bargaining in Germany.

The results fit into a broader picture suggesting that globalization provides a challenge for the German labor relations system. Works councils are the second pillar of worker representation in Germany. Recent research provides evidence that they are less effective in creating trust and cooperation if the firm is foreign-owned (Dill and Jirjahn 2015; Heywood and Jirjahn 2014; Jirjahn and Müller 2014). Furthermore, foreign ownership appears to be associated with a stronger focus on short-term profitability (Dill et al. 2015) and an increase in perceived job insecurity (Dill and Jirjahn 2014).

3.3 Reorganization of work

A widely held view is that the reorganization of work plays also a role in the decline in collective bargaining coverage. Lindbeck and Snower (2001) argue that the switch from Tayloristic production to a more holistic production is not compatible with centralized collective bargaining as centralized collective bargaining is not flexible enough to address the issue of multitasking. Unfortunately, this aspect has received little attention in empirical studies. One exception is a study by Gerlach et al. (1998). They use team production as an indicator of a holistic and more flexible production. Their estimates provide some weak evidence that firms with team production are more likely to withdraw from industry-level agreements.

4. Collective bargaining and wages

4.1 Contract wages

Labor economists not only examine the determinants of unionization and collective bargaining coverage, they also pay close attention to the consequences of collective bargaining for employers and employees. Of particular interest is the relationship

between collective bargaining and wages.

Traditionally, labor economists have examined the factors that influence the collectively negotiated wages (Carruth and Schnabel 1993; Meyer 1995a). Early studies examined the role of macroeconomic factors such as inflation, productivity and unemployment as well as the link between wage leaders and wage followers. Of particular relevance for the current discussion is an older examination by Meyer (1992). He differentiates between industry-level and firm-level agreements. The estimates show that the dynamics of wages specified in firm-level agreements tends to reflect the dynamics of wages specified in industry-level agreements. Thus, wages negotiated at the firm level are generally not more flexible than the wages negotiated at the industry level. This might provide a potential explanation as to why some firms tend to completely withdraw from collective bargaining instead of switching from industry-level to firm-level agreements.

Examining the results in wage setting is also interesting as it provides insights into the bargaining strength of unions. A recent study by Hirsch and Schnabel (2014) pursues this approach. They find that union power was relatively stable in the 1990s but fell substantially from 1999 to 2007, but has somewhat recovered since.

4.2 The wage cushion

The availability of firm data has shifted the focus on the wage policy of firms. Firms often pay wages above the level specified in collective bargaining agreements. The difference between the actual wage level and the collectively agreed-upon wage level is called wage cushion. A series of studies have examined the factors influencing the wage cushion (Bellmann and Kohaut 1995; Jung and Schnabel 2011; Kohaut and Schnabel 2003c; Meyer 1995b, 1997). All in all, the available evidence suggests that

the proportion of part-time workers and women are negative determinants of paying wages above the level specified in collective agreements. High profits and a modern production technology are positive determinants. Moreover, labor shortages play a role. Specifically, firms facing difficulties in filling vacancies for qualified workers tend to pay wages higher than the collectively agreed-upon wages.

There is also evidence that the wage cushion has an incentive function. If management views paying higher wages as a suitable incentive to motivate workers, this has a positive influence on the wage cushion. The regional unemployment rate has a negative influence. This finding can be explained by efficiency wage theory (Shapiro and Stiglitz, 1984; Blanchflower and Oswald 2005). A high regional unemployment disciplines workers so that employers do not need to pay high wages in order to induce effort.

Turning to worker representation at the firm level, most studies find no significant influence of works councils on the wage cushion. This may seem surprising at first glance as research on works councils has found a positive relationship between works council incidence the wages paid by the employer (see Jirjahn 2011 for a survey). One possible explanation may be that studies on the wage cushion usually focus only on firms that are covered by collective bargaining agreements. Works councils in covered firms are less likely to be involved in the redistribution of economic rents than works councils in uncovered firms (Hübler and Jirjahn 2003). Thus, one should not necessarily expect that works council are associated with an increased wage cushion. A finding by Addison et al. (2001) supports this view. They show that works councils only have an effect on the wage cushion if they are involved in the wage setting within the firm.

Finally, Jung and Schnabel (2011) show that the wage cushion depends on the

type of collective bargaining agreement. They show that the wage cushion is smaller in firms covered by firm-level agreements than in establishments covered by industry-level agreements. One possible explanation could be that firm-level agreements, to a larger degree, take into account the specific situation of the respective firm. This would reduce the necessity to implement the preferred wage structure through a high wage cushion. Thus, in contrast to Meyer's (1992) study discussed in section 4.1, Jung and Schnabel's (2011) finding indicates that firm-level agreements provide more flexibility at the firm level. Of course, both studies may be reconciled if firm-level agreements provide more flexibility today than before. However, this gives rise to the question as to why there has been only a very moderate increase in the share of firms with firm-level agreements. Employers dissatisfied with industry-level agreements tend to completely withdraw from collective bargaining coverage. One reason might be that firm-level bargaining entails increased transaction costs.

4.3 The intra-firm wage structure

In the last ten years, there have been an increasing number of studies examining the influence of collective bargaining agreements on the intra-firm wage structure. These studies are usually based on linked employer-employee data such as LIAB or GLS. They consider the actual wages (including the wage cushion) paid by employers.

The results of the studies show that collective bargaining coverage has a positive influence on the wage level and a negative influence on intra-firm wage inequality (Addison et al. 2010; Addison et al. 2014; Dustmann and Schönberg 2009; Gerlach and Stephan 2006a, 2006b; Gürtzgen 2015; Stephan and Gerlach 2005). The negative influence on intra-firm wage inequality has multiple dimensions. One aspect is that less qualified workers disproportionately benefit from collective bargaining

coverage. Another aspect is that that the gender wage gap is smaller in covered firms (Gartner and Stephan 2004; Heinze and Wolf 2010; Jirjahn and Stephan 2006).

Taking into account that the studies consider actual wages, the results imply that collective bargaining coverage changes the wage structure within firms even though a subsequent adjustment at the firm level is possible by paying wages higher than the collectively agreed-upon level. A study by Gerlach and Stephan (2006c) confirms that covered firms face difficulties in adjusting their wage policy. They show that it is difficult for covered firms to pursue a coherent wage policy towards different occupational groups. Relatedly, Jirjahn and Kraft (2007) find that productivity gains from a higher differentiation of wages among skilled and unskilled workers are smaller in covered than in uncovered firms. Thus, the two studies suggest that collective bargaining agreements impose restrictions on the wage policy of firms. These restrictions can negatively affect firm performance.

4.4 Increasing inequality

Like in many other developed countries, wage inequality has increased sharply over the past decades in Germany (Antonczyk et al. 2011). While there were only changes at the top of the wage distribution in the 1980s, a rise also in lower tail inequality has happened since the 1990s. The rise in wage inequality has been driven by wage increases at the top of the distribution and real wage losses below the median.

Taking into account that collective bargaining agreements are associated with reduced wage inequality, the question arises as to what extent the decline in collective bargaining coverage has contributed to the rising wage inequality. Dustmann et al. (2009) show that the decline in collective bargaining coverage has indeed played a role. The decline has specifically contributed to rising inequality at the bottom of the

distribution and to a lesser degree to the rise in upper-tail inequality. Antonczyk et al. (2010) also find a link between declining collective bargaining coverage and rising wage inequality. However, their results suggest that the drop in collective bargaining coverage is not the main force driving increasing wage inequality in Germany.

Skill-biased technological change and reorganization of work are often viewed as a further factor contributing to higher inequality (see Machin 2008 for a survey). While most studies on wage inequality consider this as a factor independent of collective bargaining, Jirjahn and Kraft (2007) show that deeper insights can be obtained by taking into account interaction effects. They examine the influence of the adoption of autonomous production teams (an indicator of a holistic and flexible production) on intra-firm wage inequality between skilled and unskilled workers. Production teams are associated with increased wage inequality with the influence being much stronger in uncovered than covered firms. Skill-biased team production may not only require higher skilled wages, but also lower unskilled wages. As collective agreements prevent employers from cutting unskilled wages, team production has only a small influence on wage inequality in covered firms and a strong influence in uncovered firms. Thus, Jirjahn and Kraft's (2007) findings suggest that specifically the interaction of skill-biased reorganization of work and declining collective bargaining coverage has contributed to rising wage inequality.

4.5 Does collective bargaining inhibit flexibility?

A series of studies have examined the question as to what extent collective bargaining imposes restrictions on the flexibility of firms. Franz and Pfeiffer (2006) analyze subjective assessments by managers. Managers tend to view collective bargaining agreements as a restriction on downward wage flexibility specifically for low

qualified workers.

Using linked employer-employee data, Dustmann and Schönberg (2009) also provide evidence of an increased inflexibility of firms covered by collective bargaining. They find that that the probability of a wage cut is lower in covered than in uncovered firms. The negative link between collective bargaining coverage and wage cuts holds for qualified and less qualified workers whereby it is particularly strong for low qualified workers.

Applying a rent sharing approach, Gürtzgen (2009a, 2010) examines if wages depend on the firm's profitability. Her estimates show that profitability has an influence on wages only in uncovered firms and in firms covered by firm-level agreements, but not in firms covered by industry-level agreements. This indicates that particularly industry-level agreements impose restrictions on the flexibility of firms.

Nonetheless there appear to be mechanisms in the German system of collective bargaining which partially offset the disadvantages of reduced flexibility. Specifically low-productivity firms may have a high probability of mortality if they cannot cut wages in bad times. This problem can be mitigated by moderate wage agreements which lower the likelihood of getting into financial trouble. Gürtzgen (2009b) provides evidence for this offsetting mechanism. Analyzing firms covered by industry-level agreements, she finds that wages are lower in industries with high productivity dispersion among firms. High productivity dispersion implies that some firms in the industry have a comparatively very poor economic performance. Gürtzgen's (2009b) result indicates that this poor performance is taken into account by moderate wage agreements.

If moderate wage agreements can only partially offset the additional costs imposed by collective bargaining coverage, employers will take further steps in order

to compensate for the disadvantage of downward rigid wages. One step is to increase productivity and, hence, competitiveness by investing in the qualification of the workforce. Dustmann and Schönberg (2009) and Gerlach and Jirjahn (2001) provide evidence for this adjustment mechanism. Firms covered by collective bargaining engage more in apprenticeship training and employer provided further training than uncovered firms.

Employers may also make employment adjustments. Dustmann and Schönberg (2009) show that covered firms are more likely to dismiss workers. Jirjahn (2010) finds a negative link between collective bargaining coverage and employment growth. These findings conform to the view that collective bargaining has negative consequences for employment. However, the negative employment consequences may not necessarily be due to a general inflexibility of centralized collective bargaining. In may be rather the results of a specific policy of German unions. In the 1980s, German unions have started to reduce standard weekly hours. As shown by Hunt (1999), this has lead to employment reductions.

Moreover, prudence is called for in the welfare-economic assessment of the potential inflexibility of collective agreements. If an employer is covered by a collective bargaining agreement, this has a commitment value. The employer is committed to specific minimum standards for wages and working conditions. This fosters workers' trust in the firm's personnel policy and, hence, increases their cooperativeness.

One particular aspect of the commitment value may be that collective bargaining coverage allows employers to insure their risk-averse workers against wage fluctuations (Agell 2002). Gürtzgen (2014) provides evidence for this hypothesis. She distinguishes between transitory and permanent productivity shocks

to the firm. An insurance against wage fluctuations should be rather feasible if the shocks are only transitory. Gürtzgen (2014) shows that the collective bargaining agreements in fact have such an insurance function whereby the insurance function appears to depend on the size of the firm.

Not only firm performance, but also the external labor market can play a role in the wages paid by a firm. Blien et al. (2013) examine the influence of the regional unemployment rate. Efficiency wage theory suggests that high unemployment reduces the necessity to pay high wages in order to motivate workers (Shapiro and Stiglitz 1984; Blanchflower and Oswald 2005). For firms covered by firm-level agreements, Blien et al. (2013) find that there is indeed a negative relationship between regional unemployment and wages (with the relationship being particularly strong if no works council is present). For firms covered by industry-level agreements, they find no significant relationship. This might indicate that firm-level agreements provide more flexibility than industry-level agreements. However, a surprising result is that for uncovered firms there appears to be also no relationship between unemployment and wages.

Gartner et al. (2013) do not consider level but changes in unemployment and wages. Moreover, they take into account that wages may respond asymmetrically to a decrease or increase of the regional unemployment rate. However, the results of their study are also somewhat mixed and show no clear pattern as to inflexibility of industry-level agreements. A decrease in the unemployment rate is associated with an increased wage growth. This holds for uncovered and covered firms with the effect being weaker for firms covered by industry-level agreements. However, a decrease in unemployment is associated with reduced wage growth only for firms covered by industry-level agreements. The authors find no relationship between decreasing

unemployment and wage growth for uncovered firms or firms with firm-level agreements.

To summarize, there is evidence that industry-level agreements impose restrictions on the flexibility of firms. However, the studies are not always conclusive. Thus, further research is certainly warranted. Future research should take into account that circumstances and type of firm may play a role so that there are no uniform relationships. Moreover, the welfare-economic implications of the restrictions imposed by collective bargaining should be viewed in a more differentiated light. Collective bargaining coverage has also a commitment value. This can help build trustful and cooperative employer-employee relationships. Empirical studies show that collective bargaining coverage can foster training and has an insurance function. Finally, one must bear in mind that some empirical findings leave scope for interpretation. A negative link between collective bargaining coverage and employment growth might be due to the restrictions collective bargaining imposes on the flexibility of firms. Alternatively, it might simply reflect a particular policy of unions such as the reduction of standard weekly hours.

4.6 Tenure and seniority wages

While collective bargaining may increase the employer's incentive to terminate employment relationships, it increases workers' propensity to continue their employment relationships. Workers in covered firms are less likely to quit than workers in uncovered firms (Dustmann and Schönberg 2009; Pfeifer 2011). This may be explained by higher wages, improved working conditions and the more cooperative employer-employee relations fostered by the commitment value of collective agreements.

If collective bargaining involves both an increased probability of dismissal and a reduced probability of quitting, then the influence on the tenure of employees is ambiguous from a theoretical viewpoint. Empirical studies indicate that the latter effect dominates, i.e. workers in covered firms have higher tenure (Gerlach and Stephan 2008; Kaiser and Pfeiffer 2001). This suggests that for covered firms internal labor markets play a more important role. The positive link between collective bargaining coverage and training found by Dustmann and Schönberg (2009) and Gerlach and Jirjahn (2001) fits this hypothesis.

Moreover, there is evidence that seniority wage are more pronounced in covered firms (Zwick 2011), i.e. covered firms have steeper tenure-wage profiles. The profiles are even steeper if additionally a works council is present (Zwick 2012a). Seniority wages can be viewed as a specific incentive scheme to motivate workers. (Lazear 1981, 1990). The effectiveness of this incentive scheme requires that workers expect long-term employment relationships. This requirement is more likely to be met in covered firms as workers in these firms have longer tenure. Thus, covered employers have a higher propensity to use this incentive scheme.

Seniority wages, in turn, appear to influence the employment policy of firms (Heywood et al. 2010; Heywood and Jirjahn 2015; Zwick 2012b). Firms paying seniority wages employ a higher share of older workers but are reluctant to hire older workers. The reason is that seniority wages cannot motivate newly hired older workers (Hutchens 1986). All in all, collective bargaining also has an indirect influence on the employment decisions of firms by fostering the use of seniority wages.

5. Collective bargaining coverage and firm performance

5.1 Direct effects on firm performance

Collective bargaining can also have an effect on productivity and innovation. From a theoretical point of view, the effect may be positive or negative. On the one hand, collective agreements impose restrictions on the flexibility of firms and, thus, may harm firm performance. Moreover, higher labor costs may reduce the incentive to invest in research and development. On the other hand, improved working conditions and the commitment value of collective bargaining may increase workers' motivation and cooperation resulting in increased performance. Only empirical research can answer the question as to which effect dominates. Empirical studies on the economic consequences of industrial relations in Germany usually have their focus on works councils. However, these studies often control for collective bargaining coverage so that they provide some insights.

Askildsen et al. (2006) obtain almost no significant influence of collective bargaining coverage on process and product innovations. By contrast, Jirjahn and Kraft (2011) find significantly negative effects on various types of product innovations. Collective bargaining coverage is associated with a reduced probability of patent application and drastic product innovations. It also reduces the probability of specific incremental product innovations. Furthermore, Jirjahn (2012) shows that covered firms have a lower percentage of sales generated by new products. The percentage sales generated by new products can be seen as an indicator of innovation success. There is also some evidence of a negative association between collective bargaining coverage and productivity. Hübler and Jirjahn (2003) find that covered firms have lower productivity. Jirjahn and Müller (2014) show that this specifically holds for firms covered by industry-level agreements. Finally, Pfeifer (2014) examines the influence of industrial relations on HRM problems of firms. Managers

in covered firms are more likely to report problems with low worker motivation, high absenteeism and the age structure of the workforce.

Altogether, there is some evidence that collective bargaining coverage is associated with lower firm performance. This gives rise to the question of how severe the negative influence is. If collective bargaining negatively affects firm performance to a substantial degree, one should expect that covered firms shift parts of their production abroad. Against this background, a study by Peters (2000) examines the link between collective bargaining coverage and direct investment abroad. Coverage by an industry-level agreement has no significant influence on the firms' propensity to invest abroad. Thus, the study finds no evidence that the restrictions imposed by centralized collective bargaining lead firms to shift production abroad. Interestingly, employers covered by firm-level agreements have a higher probability of investing abroad. One possible explanation is that employers directly negotiating with unions invest abroad to strengthen their bargaining position. Relatedly, a comparative study by Peters and Schneider (2000) shows that countries with more decentralized collective bargaining systems have a higher outflow of foreign direct investment.

5.2 The moderating role of collective bargaining coverage

The discussion on the future of centralized collective bargaining often considers only the direct effects and does not take into account that it may interact with the other pillars of the industrial relations system in Germany. The German system of industrial relations is characterized by dual employee representation through both unions and works councils. Works councils provide a highly developed mechanism for codetermination at the firm level. A series of studies has shown that collective bargaining coverage plays a crucial moderating role in the functioning of works

councils (see Jirjahn 2014 for a survey). Works councils are more likely to have a positive influence on firm performance if firms are covered by collective bargaining agreements.

From a theoretical point of view, the economic effects of works councils are ambiguous. On the one hand, works councils can contribute to increased firm performance by helping build cooperation and trust between employer and employees (Freeman and Lazear 1995; Smith 1991). On the other hand, works councils may use their codetermination rights for counter-productive redistribution activities in favor of the workers.

Hübler and Jirjahn (2003) argue that collective bargaining coverage reduces distributional conflicts within firms, allowing works councils to play a more productive role and engage in less rent seeking. Their empirical results provide supporting evidence. Works councils exert a positive effect on productivity in covered but not in uncovered firms. The positive interaction effect of works councils and collective bargaining coverage on productivity is confirmed by several other studies (Jirjahn 2003a; Jirjahn and Müller 2014, Renaud 2008; Wagner 2008; Wagner et al. 2006). The interaction effect plays also a role in several other dimensions of firm performance. Works councils are more effective in reducing personnel turnover in covered firms (Frick and Möller 2003; Pfeifer 2011). They appear to be better able to negotiate performance pay arrangements and family friendly practices when the firm is covered by collective bargaining (Heywood et al. 1998; Heywood and Jirjahn, 2002, 2009). There is even evidence that works councils and collective bargaining coverage have a positive interaction effect on innovations (Addison et al. 2013; Jirjahn 2012) and profitability (Hübler 2003; Müller 2011).

However, as to the interaction effect on wages, empirical results appear to be

mixed. While some studies find a weaker wage effect of works councils in covered firms (Hübler and Jirjahn 2003; Jirjahn 2003b), other studies obtain the result that the wage effect is stronger in these firms (Addison et al. 2010; Gartner et al. 2013). Yet, even if the wage effect of codetermination is stronger in case of coverage, this would not necessarily contradict the hypothesis that collective bargaining coverage reduces redistribution activities of works councils (Jirjahn 2014). To the extent the productivity effect of works councils is higher in covered firms, there is a larger joint surplus that can be divided between employer and employees. Thus, the wage effect of works councils may be stronger in covered firms not because of increased redistribution activities, but because of a larger joint surplus shared by employer and employees.

6. Opening clauses and company-level pacts

6.1 Determinants and consequences of using opening clauses

The decline in collective bargaining coverage leads to the question of whether opening clauses provide more flexibility and reduce the propensity of employers to withdraw from collective bargaining agreements. Opening clauses have played a role in collective bargaining agreements since the mid-1980s. Initially, collective bargaining agreements primarily included opening clauses in order to provide more flexibility of working hours. Later opening clauses have been negotiated also for wages. Econometric studies on opening clauses have been conducted only in recent years.

Ellguth and Kohaut (2010) examine the characteristics of firms that use opening clauses. Firm size, works council incidence, a poor sales situation and high labor costs are positive determinants of using opening clauses. The shares of

temporary agency workers and low-skilled workers are negative determinants.

Kohaut and Schnabel (2007) distinguish between opening clauses for wages and opening clauses for working time arrangements. Firms with a good sales situation are less likely to use both types of opening clauses. West German firms are more likely to use opening clauses for working time arrangements while East German firms are more likely to use opening clauses for wages. A modern production technology and foreign ownership are negative determinants of using opening clauses for wages. Firm size plays no significant role and works council incidence is even a negative determinant of using opening clauses for working time arrangements. Kohaut and Schnabel's (2007) results on firm size and works councils differ from the findings by Ellguth and Kohaut (2010). This calls for future research in order to reconcile the conflicting findings.

A recent study by Ellguth and Kohaut (2014) also distinguishes between the two types of opening clauses. The results suggest that firms under financial pressure use opening clauses for a flexibilization of wages. By contrast, opening clauses for working time arrangements are used to increase the general competitiveness of the firm.

Studies examining the consequences of using opening clauses usually focus on the implications for wages. Ellguth et al. (2014) find that the use is associated with reduced wages in firms without a works council but not in firms with a works council. This finding calls for future research to examine the causes that lead to the differences between firms with and without works councils.

Garlof and Gürtzgen (2012) examine if the link between profitability and wages depends on opening clauses. Their estimates show that in low-performing firms wages are more responsive to the profit situation if there is an opening clause. The

opposite holds true for high-performing firms. Thus, the results of the study suggest that opening clauses specifically enable more flexibility for low-performing firms.

All in all, the available research indicates that opening clauses – not always but under certain circumstances – provide more flexibility for firms. However, this does not appear to dampen the decline in collective bargaining coverage. Ellguth and Kohaut (2010) find no evidence that the use of opening clauses has a significant influence on the firms' propensity to withdraw from industry-level collective bargaining. Also this finding calls for future research. On the one hand, the flexibility provided by opening clauses may not match that required by firms or cannot be fully used because of restrictions due to firm-specific conditions. On the other hand, the use of opening clauses may even harm firm performance if it undermines workers' trust and cooperation. In what follows we will discuss studies on company-level pacts which point into this direction.

6.2 Determinants and consequences of company-level pacts

While research on opening clauses focuses on firms covered by collective bargaining agreements, studies on company-level pacts take a broader approach. Covered as well as uncovered firms are included. For covered firms, an opening clause is a precondition for a company-level pact. In uncovered firms, works councils may negotiate with management over company-level pacts. The pacts are characterized by worker concessions on working time or wages in exchange for employment, investment or location assurances from the employer (Bellmann 2014). Company-level pacts can be negotiated to overcome an actual crisis of the firm or to preemptively strengthen its competitiveness.

Ellguth and Kohaut (2008) analyze the determinants of company-level pacts.

They find that firm size and a combination of works council incidence and firm-level bargaining are positive determinants, while weekly hours are a negative determinant of the use of both crisis and competitiveness pacts. Apart from these similarities, the determinants of each type of pact tend to diverge. Poor profitability, low sales and failed innovations increase the probability of crisis pacts. Research and development, a high wage level and the incidence of a works council (with or without collective bargaining coverage) are positive determinants of competitiveness pacts.

Several studies have examined the effects of company-level pacts on firm performance (Bellmann et al. 2008; Bellmann et al. 2014a, 2014b; Bellmann/Gerner 2012; Hübler 2005a, 2005b, 2006). The results of these studies point toward rather complex relationships. Overall, company-level pacts appear to have a negative influence on employment. However, the effect crucially depends on which measures are included in the pact. Wage cuts or a shorter work week tend to contribute to a negative employment effect while training and a longer work week improve job security. Moreover, it plays a role whether the pact is negotiated in a poor or good economic situation. Positive employment effects of a company-level pact appear to be less likely in a poor economic situation. However, there is evidence that company-level pacts have contributed to employment stability in the crisis years of 2008/2009. With respect to profitability, company-level pacts appear to have a short-term positive and a long-term negative effect. The effects on investment also seem to be mixed. Thus, further research is clearly warranted in this area.

7. Conclusions

The aim of this article is to highlight the broad spectrum of questions addressed by econometric studies in the field of trade unions and collective bargaining. This broad

spectrum of questions illustrates the high analytical potential of economics.

Nonetheless, economic analyses are always work in progress. Recent changes in industrial relations pose a challenge for further research. The central challenges are without doubt the drop of unionization and the decline in collective bargaining coverage. Even though recent studies have gained valuable insights, there is definitely need for further research.

Studies on the determinants of trade union membership have identified a series of individual worker characteristics that influence the decision to become a union member. These studies also systematically analyze the factors that help mitigate the free rider problem. Specifically, they examine the role of selective incentives and social factors. However, those studies explicitly addressing the decline in unionization obtain very mixed results. One reason may be that the recent insights into the role of selective incentives and social factors are not always fully taken into account. Another reason may be that the role of working conditions is often ignored. This specifically holds true for technological change and reorganization of work.

Econometric research on collective bargaining coverage provides some indications that globalization poses a challenge for the industrial relations system in Germany. Recent studies also show that collective bargaining agreements impose restrictions on the flexibility of firms and appear to have a direct negative effect on economic performance. Nonetheless, the concrete transmission mechanisms involved are yet to be researched in much more detail. It is an open question as to whether the empirical findings reflect a quasi-inherent inflexibility of centralized collective bargaining or the implementation of specific union programs – for example the reduction of standard weekly hours. Of particular interest is that measures supposed to improve flexibility such as opening clauses and company-level pacts appear to have

little positive impact on firm performance.

Furthermore, recent research shows that the supposed inflexibility associated with collective bargaining coverage must be assessed in a much more differentiated manner. There is evidence that collective bargaining coverage has an insurance function. More generally, collective bargaining coverage has a commitment value that may help build trust and cooperation within firms.

Finally, one has to take into account that collective bargaining is part of a broader system of industrial relations. Germany is characterized by a dual system of worker representation through both unions and works councils. A series of studies show that collective bargaining coverage has also an important indirect effect on firm performance by strengthening the productive role of works councils.

Overall, there appears to be a highly complex set of cause-effect relationships which is yet sufficiently untangled. Future research should specifically pay attention to technological and organizational changes within firms.

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