



Institute for Strategy and Business Economics
University of Zurich

Working Paper Series
ISSN 1660-1157

Working Paper No. 116

**Works Councils and Learning:
On the Dynamic Dimension of Codetermination**

Uwe Jirjahn, Jens Mohrenweiser and Uschi Backes-Gellner

November 2010

Published as: "Works Councils and Learning: On the Dynamic Dimension of Codetermination." *Kyklos*, 64(2011)3: 427-447. By Uschi Backes-Gellner, Jens Mohrenweiser and Uwe Jirjahn.

Available at: <http://dx.doi.org/10.1111/j.1467-6435.2011.00514.x>

**Works Councils and Learning:
On the Dynamic Dimension of Codetermination**

Uwe Jirjahn

University of Trier, Department of Economics, Germany

Jens Mohrenweiser

Centre for European Economic Research, Germany

Uschi Backes-Gellner

University of Zurich, Institute for Strategy and Business Economics, Switzerland

Abstract: This study provides the first econometric analysis on the dynamic dimension of establishment-level codetermination in Germany. We hypothesize that learning implies a change in the nature and scope of codetermination over time. Using unique data from small- and medium-sized establishments, our empirical analysis provides strong evidence that learning indeed plays a crucial role in the functioning of works councils. First, the probability of an adversarial relationship between management and works council is decreasing in the age of the council. Second, the council's age is positively associated with the probability that the council has an influence even on decisions where it has no legal powers. Third, productivity is increasing in the age of the council. Fourth, the quit rate is decreasing in the age of the council. However, the estimates also provide evidence of a codetermination life cycle.

JEL Classification: J52, J53, K31, M54

Keywords: Codetermination, Learning, Conflict, Cooperation, Performance.

Corresponding Author: Prof. Dr. Uwe Jirjahn, Universität Trier, Fachbereich IV, Lehrstuhl für Arbeitsmarktökonomik, Universitätsring 15, 54286 Trier, Germany, Email: jirjahn@uni-trier.de.

1. Introduction

Works councils have attracted considerable attention as an alternative form of worker representation to improve both the quality of working life and economic performance. They play an important role in corporate governance in many West European countries (Rogers and Streeck 1995). Specifically German works councils have acquired extensive powers compared to councils in other countries. Those powers have even been strengthened by the actively debated 2001 amendment of the Works Constitution Act (WCA), the law that governs the works council system. Works councils play also a role outside Europe. In Korea, mandated councils deal with productivity concerns, employee training, and health and safety issues (Kleiner and Lee 1997). In Canada, nonunion representation has a long tradition. Mandatory health and safety committees have been introduced in several provinces. Furthermore, committees must be set up in case of layoffs and plant closures. Canada's mandatory committees are similar to European works councils (Adams 1985). In the US, the interest in nonunion representation has been spurred by a sharp decline in union density and the growth of a 'representation gap' (Freeman and Rogers 1999). Much of the political discussion in the US has centered on the idea of mandating German-style works councils.

Economists have also shown strong interest in codetermination. This is documented by a remarkably increasing number of econometric studies on the consequences of German works councils. While earlier studies found rather negative economic effects, recent examinations typically obtain neutral or positive effects on training, employee retention, productivity, innovation, investment, family friendly practices and the use of performance related pay (Addison et al. 2001, 2004, Askildsen et

al. 2006, Frick and Moeller 2003, Heywood and Jirjahn 2002, 2009, Huebler 2003, Huebler and Jirjahn 2003, Jirjahn and Kraft 2010, Kraft and Lang 2008, Mueller 2010, Smith 2006, Wagner 2008). However, most of the econometric studies treat works councils as a single type of organization by using a simple dummy variable for the presence of a council. In contrast, case studies confirm that councils are in practice heterogeneous (Mueller-Jentsch 1995). There is a range of industrial relations regimes characterized by different interactions of works council and management. In some establishments councils have extremely adversarial relationships with management. In other establishments councils play an important role in building cooperative employer-employee relations. While case studies indicate that using a simple dummy variable for the presence of a council may result in misleading estimates, they provide no systematic analysis of the circumstances under which adversarial or cooperative relations between council and management result.

This article provides such systematic analysis. We examine the role of learning in the functioning of works councils.¹ The dynamic dimension of codetermination has been almost completely neglected in the economic literature on works councils. Both theoretical and empirical analyses implicitly assume that a council instantaneously lives up to its potential once it has been created. In contrast, we hypothesize that learning implies a change in the nature and scope of codetermination over time. Even though information rights of works councils help reducing information asymmetries between employer and employees, this does not mean that problems of asymmetric information instantaneously and completely disappear. Particularly a newly created council may face information problems. In order to elicit credible information from the employer, the

inexperienced council is more likely to use its codetermination rights for conflictual negotiations with management. As time goes by, learning enables worker representatives to develop the ability to understand production processes and economic issues in more detail. As an experienced council can more easily verify the information provided by management, conflictual negotiations diminish. Furthermore, to the extent the council improves its competence the influence on decisions is growing. Finally, as experienced worker representatives have a better understanding of the economic situation of the establishment, the employer's incentive to opportunistically manipulate information provided to the employees is reduced. This in turn stimulates workers' effort and cooperativeness. Altogether, codetermination provides a procedural framework fostering learning and trust building. Hence, the positive effect of works councils on cooperative industrial relations and establishment performance should grow over time. However, we also discuss the role of a possible codetermination life cycle. Experiences are typically accumulated within organizational routines. Those routines guide further learning and may contribute to increased inertia and obsolescence. This would imply that the age of the works council may have an inversely u-shaped effect on cooperation and establishment performance.

Using unique data from small- and medium-sized establishments in Germany, our empirical analysis yields four key results. First, the probability of an adversarial relationship between management and council is decreasing in the age of the council. Second, the council's age is positively associated with the probability that the council has an influence even on decisions where it has no legal powers. Third, productivity is increasing in the age of the council. Fourth, the quit rate is decreasing in the age of the

council. These results provide striking evidence that learning indeed plays a role in the functioning of codetermination. However, our analysis also provides some evidence of a codetermination life cycle. After about thirty years the council's influence on decisions and its effect on productivity decrease to some extent. At the same time the probability of an adversarial relationship with management increases.

While the dynamic dimension of codetermination has been completely ignored in previous econometric studies on works councils, our analysis is related to a small number of international studies examining the dynamic effects of HRM practices. Evidence from Japan (Kato 2006) and the US (Freeman and Kleiner 2000) suggests that the scope of employee involvement programs expands as time goes by. Moreover, studies for Denmark (Eriksson 2003), Japan (Kato and Morishima 2002) and the US (Helper 1998) show that it takes time for participatory HRM practices to fully deliver higher performance effects. Similarly, Jones and Kato (1995) find that it takes time for the productivity payoff of employee stock-ownership plans in Japanese firms.

The rest of the paper is organized as follows. Section 2 presents our theoretical background discussion. Section 3 describes the data and variables. Section 4 presents the results. Section 5 concludes.

2. Theoretical Background

2.1 Solving Employers' Commitment Problems by Codetermination

Industrial relations in Germany are characterized by a dual structure of employee representation with both unions and works councils. While unions negotiate over wage rates and general aspects of employment contracts, works councils provide a highly developed mechanism for establishment-level participation. Their rights are defined in

the WCA, which was introduced in 1952 and amended in 1972, 1989 and 2001. Workers in any establishment with five or more employees may elect council members but the creation of the council depends on the initiative of the establishment's employees. Hence, councils are not present in all eligible establishments. Works councils negotiate over a bundle of interrelated establishment policies. On some issues they have the right to information and consultation, on others a veto power over management initiatives and on still others the right to coequal participation in the design and implementation of policy. Works councils are institutionalized bodies of worker representation that have functions that are distinct from those of unions. They do not have the right to strike. If council and management fail to reach an agreement, they may appeal to an internal arbitration board or to the labor court. Moreover, the WCA does not allow wage negotiations. The aim is to restrict distributional conflicts on the establishment level. Rather works councils are designed to increase joint establishment surplus. Council representatives are required by law to cooperate with management "in a spirit of mutual trust . . . for the good of the employees and of the establishment."

The existence of commitment problems is one explanation as to why work councils may play the intended role in fostering cooperative and trustful industrial relations within establishments. There is a variety of situations in which commitment problems of employers can arise. For example, employers can behave opportunistically with respect to the use of information. They may conceal health and safety problems from the workers or may pretend that the economic situation of the firm requires increased worker effort. Moreover, employers may use information obtained from the workers against workers' interest. They may use this information for organizational or

technological change which entails job loss or intensification of work load.

If commitment problems are not solved, inefficiencies within the establishment will result. Employees anticipating employer opportunism are very likely to withhold effort and cooperation. If information about potentially performance-enhancing innovations is in the hands of employees, they may not wish to reveal it for the fear that the employer might use the information to their disadvantage. Furthermore, information asymmetries can cause workers to refuse concessions even when those concessions may be necessary to overcome a crisis of the establishment. If employees do not share the same economic information possessed by management, they may fear that the employer overstates the crisis to demand greater concessions. On the employer's side, low effort and cooperativeness of the workforce imply among others lower productivity and lower innovativeness. On the employees' side, low effort and cooperativeness imply that workers forego the opportunity of higher wages and better working conditions.

Theoretical analyses suggest that worker representation is one way to protect the interests of the workforce and to foster workers' effort and cooperation (Askildsen et al. 2006, Freeman and Lazear 1995, Hogan 2001, Kaufman and Levine 2000, Osterloh and Frey 2006, Smith 2006). Providing a council with information rights helps reducing information asymmetries. This makes it easier to verify the employer's claims. Moreover, providing the council with veto and coequal participation rights helps avoiding that the employer unilaterally takes actions without considering workers' interests. The council's role in building trustful industrial relations is also strengthened by the requirement to cooperate with management. Altogether, the institutional design of works councils suggests that they have the potential to realize mutual gains for employers and employees

by solving commitment problems. Works councils can potentially contribute to increased efficiency by negotiating for performance-enhancing practices that otherwise would not have been possible.

2.2 The Role of Learning

However, from a theoretical point of view, there is no mechanical relationship between codetermination and cooperative employer-employee relations. It is not very likely that once created a works council instantaneously lives up to its potential. Several reasons suggest that learning plays an important role in the functioning of codetermination. Hence, codetermination may change in its nature and scope over time.

Even though information rights of works councils help reducing information asymmetries, this does not mean that the problem of asymmetric information instantaneously and completely disappears once the council has been created. If the establishment opens its books to a newly created works council, this information may be only of limited relevance. Information on the past and recent economic situation of the establishment only partly reveals information on its future prospects (Kennan and Wilson 1993). Hence, the employer may still have private information on predictions of production, demand, and prices of factors and output. Moreover, information on actual costs does not reveal information on opportunity costs. The employer may still have private information on the opportunities to redeploy capital in other locations or industries, or to substitute capital for labor. Altogether, managers still have opportunities to use their remaining information advantages strategically. For example, they may manipulate their predictions about the establishment's future economic situation. Thus, there remain problems of commitment and credibility.

However, the WCA provides the works council also with codetermination rights. These codetermination rights strengthen workers' bargaining power and imply increased scope for negotiations between workforce and management that otherwise would not have been possible. The crucial point is that negotiations can be seen as a learning process (Cross 1977). Thus, both the increased bargaining power and the increased scope for negotiations offer the opportunity for learning. Recent bargaining models show that conflict plays an important role in such learning processes (Cramton and Tracy 2003, Kennan and Wilson 1993). This insight can be applied to codetermination. Works councils can use their codetermination rights to elicit credible information from the employers by delaying decisions. For example, the council may demand extensive consultations when the employer contends that ensuring the establishment's competitiveness requires higher effort of the workforce. The employer is likely to only enter cumbersome negotiations with the works council and to spend a lot of time in meetings when there is really a need for workers' concessions. Hence, the managers' willingness to enter conflictual negotiations serves as a signal of their credibility. Conflict as a method to elicit credible information is particularly important when there are substantial information asymmetries between the employer and the works council. This is more likely to hold true in case of a newly created works council. In that case, worker representatives have little experience and face difficulties in verifying the employer's claims. Hence, they are more likely to rely on conflict in order to ensure that the employer conveys credible information.

This may be reinforced by a further factor. Works councils as an institution to protect workers' quasi-rents are more likely to be introduced by the workforce in

situations where establishments face a crisis or undergo substantial restructuring (Jirjahn 2009, 2010, Kraft and Lang 2008, Mohrenweiser et al. 2009). In those situations, employers are more likely to break implicit contracts and to renege on the promises made to the employees (Bertrand 2004, Idson and Valetta 1996). While councils may help rebuilding trust in those situations, this is not very likely to occur without conflicts. As workers' interests are substantially affected, newly created councils facing information asymmetries will rely on conflictual negotiations to obtain more information on the details of the crisis or the restructuring process.

Codetermination may change in its nature and scope as time goes by. Participation in decision making involves learning by doing. During consultation and negotiation with management, the works council elicits valuable information. This allows accumulating long-term relevant experience. Moreover, participation in training courses can help works councilors to improve their competencies. Altogether, learning enables the council to develop over time the ability to understand the production process, the organizational framework and the economic situation of the establishment in more detail. This implies that information asymmetries between management and works council diminish. As the works council can more easily verify new information provided by management, conflictual negotiations are less likely to occur over time. For example, an experienced works council may be able to make its own predictions about the future economic situation of the establishment. This allows the council a better assessment of the credibility of the employer's predictions even without conflictual bargaining. Diminishing conflicts imply that less time is lost due to delays in decision making.

Of course, the learning process entailed by codetermination is not one-sided. The

employer will also change his attitudes and behavior as time goes by. Because the works council is initially inexperienced, the employer may have a higher incentive to behave opportunistically with respect to a newly created council. The employer's incentive to strategically manipulate information is reduced if he learns that an experienced works council can more easily verify his claims. Or put it differently, to the extent the council gains competence and experience, the probability of employer opportunism diminishes over time. Instead of strategic manipulation and adversarial bargaining, the employer is more likely to rely on building trust and cooperation with the works council. This in turn implies that workers' effort and cooperativeness increase.

Similarly, Lorenz (1999) argues that the WCA provides a procedural framework fostering mutual learning and reciprocal trust building. Employer and employees do not only learn about the surrounding environment but also about each other. Specifically each partner can form better judgements about the trustworthiness of the other partner based on the success of their past cooperation. This learning process may follow a 'step-by-step' rule. Employer and works council start by making small commitments to each other and then increase their commitments depending on the quality of their interactions. This implies that the positive effect of establishment-level codetermination on employer-employee cooperation and establishment performance should grow over time.

Relatedly, mutual learning entails an increasing influence of the works council. While an inexperienced council is likely to rely on conflictual negotiations to obtain credible information, its influence on decision may be limited in the end. As a newly created works council lacks experience and know how, it may face difficulties in providing own solutions that contribute to increased performance and reconcile the

conflicting interests of the employer and the employees. Moreover, if management fears that an inexperienced works council may harm the quality of decisions, it will try to isolate or ignore the council. However, to the extent the council accumulates experience over time, it can come up with own valuable ideas and advice to management. If management recognizes that a competent works council can contribute to increased establishment performance, it will ask the council to participate in a wider range of decisions. Altogether, accumulated competence and experience implies that the influence of the works council should grow over time. This prediction is supported by Japanese evidence showing that well-trained and competent worker representatives have a greater influence on decisions within firms (Kato 2006, Kato and Morishima 2002).

In summary, theoretical considerations suggest that the consultations and negotiations entailed by codetermination provide the framework for a unique mutual learning process. This process has important implications. While codetermination initially may involve increased conflicts, adversarial negotiations between management and works council will diminish in the course of time. Moreover, the influence of the works council on decisions and its positive effect on establishment performance should increase over time. Of course, learning is no guarantee that cooperative and trustful industrial relations within establishments are always achieved. The crucial point is that learning should make those relations more likely. Clearly other factors may have an independent effect on intra-establishment industrial relations as well. Thus, in order to isolate the dynamic effect of codetermination in our empirical analysis, it is important to control for other influences such as unions, workforce structure and establishment size.

2.3 A Possible Codetermination Life Cycle

We will also examine the role of a possible codetermination life cycle. Building on theories of organizational learning (Crossan et al. 1999, Levitt and March 1988, Sorensen and Stuart 2000), it can be argued that routines play a role in the learning process entailed by codetermination. Lessons from past interactions of works council and management are accumulated within routines. Those routines include procedures, conventions, cultures and the structure of beliefs. Inferences drawn from past experiences are recorded in organizational stories and standards of good practices. Management and works council gradually adopt routines that lead to favorable outcomes. Routines form a memory of the firm that is maintained despite the turnover of individual managers and works councilors. New managers and works councilors learn the routines through a process of socialization.

However, routines are not simply the result of accumulated experiences. Once established, they guide further learning. The search for new solutions and practices typically occurs in the neighborhood of already existing routines. The lessons drawn from new experiences depend on accumulated past experiences embedded in established routines. On the one hand, this leads to a refinement and improvement of existing routines. The repeated use of previously successful routines and patterns of interpretation makes them more effective. On the other hand, this repeated use may contribute to increased inertia and obsolescence (Ranger-Moore 1997, Sorensen and Stuart 2000, Thornhill and Amit 2003). Previously successful routines may be relied upon inappropriately in novel situations that require substantial change.

This reasoning may imply a codetermination life cycle (Strauss 2006). Up to a certain point the scope and the performance effects of codetermination are increasing in

the age of the works council. Yet, beyond that point the scope and the performance effects decrease as time goes by. To provide an example, the way how to aggregate and represent workers' preferences is likely to be a very important part of the works council's routines. A codetermination life cycle would imply that the council's established practices of representing worker interests may become less effective beyond a certain point in time. Indeed, studies by Addison et al. (2007) and Jirjahn and Tsertsvadze (2006) indicate that worker organizations in Germany represent the interests of specific types of workers and face difficulties in adjusting to changing workforce structures and new work arrangements. Further, Kato (2006) provides Japanese evidence of a participation life cycle. His estimates suggest an inverse u-shaped relationship between the age of participatory HRM practices and the scope of those practices.

3. Data and Variables

3.1 Data Set

We use data from the IfM Bonn Works Council Survey conducted by the Small and Medium Size Enterprise Research Institute (Institut für Mittelstandsforschung – IfM). The survey provides a data set of small- and medium-sized establishments in Germany (Schloemer et al. 2007). The data were collected in 2005 on the basis of a questionnaire sent to the owner or top manager of the establishment. They are representative of establishments with 20 to 500 employees. Our data set is unique in that it has a strong focus on establishment-level codetermination. Specifically, it contains information on the year the workforce of the establishment has introduced a works council. To analyze the association between the age of the works council and the quality of industrial relations within the establishment, we only consider establishments having a works council.

Previous studies on works councils have typically used the Hanover Panel or the IAB Establishment Panel. However, those data are not helpful in addressing the question of our study. The Hanover Panel contains no information on the age of the works council while the information contained in the IAB Establishment Panel is highly incomplete. Even though the data set to some extent allows calculating the age of works councils introduced after 1993, this is unsatisfactory for several reasons. First, as the question on the presence of a works council is not asked regularly in every wave, it is not possible to calculate the age of every council that has been newly created. Second, given the relatively short time span of the IAB Establishment Panel one could only examine rather young works councils. Our analysis shows that it is very important to also consider older councils. In our data the oldest works council has been created more than 50 years ago. Third, the introduction of a works council is a relatively rare event. The overwhelming majority of establishments do not change their works council status. Hence, focusing on rather young works councils implies that we would only have a handful of observations.

3.2 Dependent Variables

Table 1 shows the definitions of the dependent variables and their descriptive statistics. We use two indicators of the quality of industrial relations. The first variable is a dummy equal to 1 if the works council is involved in decisions even where it has no legal powers. This indicator measures the strength of the council's influence. Our descriptive statistics show that works councils have such strong influence in 36 percent of the establishments. The second variable is a dummy equal to 1 if management views the relationship with the works council as being bad. This indicator measures adversarial industrial relations within the establishment. Bad relationships between management and works councils are

reported by 10 percent of the respondents.

Moreover, we use two indicators of establishment performance. The performance effects of works councils have attracted remarkable interest. Specifically, the link between works councils and indicators of establishment output has been widely examined. The indicators are typically based on sales or value added. We measure the establishment's output by the log of productivity with productivity being defined as sales per employee. The link between worker representation and personnel turnover has also been of great interest. We use the rate of quits by workers as an inverse indicator of performance. A low quit rate indicates high job satisfaction and an increased willingness of employees to provide effort and to invest in their firm-specific human capital.

3.3 Age of the Works Council

The definitions of the explanatory variables and their descriptive statistics are shown in Table 2. Importantly, the survey asks the year in which the works council has been introduced by the workforce. Hence, we can calculate the age of the council. The average age in the sample is 19 years. The age of the works council is our explanatory variable of primary interest. Our theoretical considerations imply that the age of the works council should be negatively associated with personnel turnover and the probability of bad relations between council and management. It should be positively associated with the council's influence on decisions and establishment output. In order to investigate the role of a possible codetermination life cycle, we also include the squared age.

Of course, the learning process associated with the aging of the council is not necessarily the same across all types of establishments. It may depend on specific circumstances such as technology or management strategy. Examining the interaction of

age with those circumstances requires panel data. Panel data would allow not only observing the various circumstances at the beginning (when the council was created), but also taking into account their development over time. While our data set is unique in that it provides information on the age of the works council, a potential limitation might be its cross-sectional nature. Hence, we must leave the role of moderating influences as an important topic for future research. Nonetheless our findings provide very valuable insights as the estimated effects of the age of the works council can be interpreted as average effects across the various circumstances.

3.4 Control Variables

The data provide a rich set of control variables. While our four dependent variables may be influenced by different sets of determinants, we will use almost the same specifications for the estimates. This allows testing if the sets indeed differ. In what follows we develop hypotheses on the determinants.

Establishment size is captured by the number of employees. While theory suggests a positive relationship between the number of employees and the establishment's output, the effect of establishment size on the quality of industrial relations is less clear. On the one hand, a council may mitigate transaction costs in large and complex establishments, where the need for communication is higher. This implies a stronger influence of works councils in larger establishments. On the other hand, larger establishments are more hierarchical. This may limit the influence of the council.

Further, the structure of the workforce is accounted for by variables for the proportion of university graduates, skilled white-collar employees, skilled blue-collar employees, part-time employees, and women.² The qualification of the workforce should

have a positive effect on the establishment's productivity. Moreover, high shares of qualified workers should be associated with reduced personnel fluctuation as establishments typically use internal labor markets to bind highly qualified employees. The workforce is also very likely to play a role in the quality of industrial relations. Specifically, the works council's influence on decisions should depend on the support the council receives by the employees. Thus, we include two dummy variables for a strong support or modest support provided by the workforce. The reference group is composed of establishments where the workforce does not support the works council.

We also take into account that works councils are part of a broader industrial relations system that also involves employee representation through unions. Although codetermination and collective bargaining are formally independent, there are important linkages. While councils often help unions to recruit new members, unions support works councils with expertise and training. The influence of unions is measured by several indicators. First, we include a dummy for the coverage by a collective agreement. Second, two dummy variables for a strong or modest influence of unions on the works council are included. The reference group is composed of establishments where unions have no influence on the works council. While support by unions should increase the council's bargaining strength and its influence on decisions, the implications for the establishment's performance are ambiguous. On the one hand, strong support by unions may stimulate rent-seeking activities of the council resulting in decreased establishment performance (FitzRoy and Kraft 1990). Even though wage negotiations between council and management are not authorized by law, the council may engage in rent seeking. If employer and council fail to reach an agreement in informal wage negotiations, the

council can threaten to be uncooperative in areas where its consent is required by the WCA. On the other hand, the influence of unions may reduce distributional conflicts between works council and management, allowing the council to play a more productive role (Huebler and Jirjahn 2003). Informal wage negotiations between council and management undermine the unions' power and status. Moreover, the interests of German unions transcend those of the workforce in an individual establishment. As industry-wide unions they are likely to be interested in the industry-wide employment level. Hence, unions are likely to prevent rent-seeking activities at the establishment level. They rather provide works councils with expertise to strengthen their position against opportunistic employers. In this sense strengthened bargaining power may increase performance even though it might make life more difficult for managers.

Management is very likely to have a fair share in the outcomes. We include two dummy variables for the presence of active owners to capture the managerial environment. First, an indicator for establishments managed by its founders is included. Second, we include a variable for establishments managed by active owners who are not the founders. The reference group is composed of establishments where no active owners are present. Theoretical models (Singell and Thornton 1997) and empirical findings (Benz and Frey 2004) suggest that active owners gain utility from being the ultimate bosses. Active ownership can be seen as a nonpecuniary good that can only be obtained from within the firm. As codetermination limits their discretionary power, active owners are more likely to restrict the council's influence. This might even entail a positive view toward the works council if the autocratic style of leadership involves a quiet life for the active owners. Active ownership should also have an effect on establishment

performance. On the one hand, it may imply reduced agency problems. On the other, it may imply that owners forego the opportunity to implement a high-ability management (Bennedsen et al. 2007). Moreover, the theory of strategic delegation suggests that the separation of ownership and control has a competitive advantage for the profit-maximizing owners of the firm (Fershtman 1985). Owners can commit to a more aggressive strategy by delegating output decisions to managers who maximize an objective function that compromises between profit and sales maximization. This helps discouraging competitors. Or put differently, active ownership involves a disadvantage as it implies a less credible threat to deter competitors.

For two reasons, we include a dummy for the use of direct forms of worker involvement in decision making. First, there is an ongoing debate on the cost and the performance effect of participatory HRM practices (e.g., Boning et al. 2007, Freeman and Kleiner 2000, Heywood et al. 2008). Second, forms of direct employee involvement are often viewed as substitutes for works councils. If this holds true, direct employee involvement should undermine the council's influence on management decisions. However, from a theoretical view point direct employee involvement and worker representation may be rather complementary. Direct employee involvement does not necessarily solve commitment problems (Baker et al. 1999). While managers may ex ante promise to delegate authority, they may ex post be tempted to overrule employees' decisions. A works council can ensure that promises made are kept.

Further, a dummy for establishments located in East Germany is included. This allows testing if the quality of industrial relations and the performance of establishments still differ between East and West Germany. Five industry dummies account for

variations in the nature of what is being produced. Finally, a dummy for positive employment growth in the last two years is included as a potential determinant of intra-establishment industrial relations. While a council may be important for rebuilding trust in establishments with declining employment (Jirjahn 2009), this is not very likely to occur without cumbersome negotiations. Or put differently, growth should be associated with a lower probability of a bad relationship between council and management.

4. Empirical Results

4.1 Intra-Establishment Industrial Relations

Table 3 provides estimates of the determinants of intra-establishment industrial relations. As both dependent variables are dichotomous, the determinants were estimated with the probit procedure. Many of the control variables take statistically significant coefficients of the expected sign. Establishment size is negatively associated with a strong influence of the works council. As larger establishments are more bureaucratic organizations, opportunities to influence decisions may be more limited in those establishments. Moreover, the estimates confirm that the quality of industrial relations depends on the support the works council receives by the workforce. Support by the workforce is significantly associated with a lower probability of a bad relation between council and management and a higher probability that the council has a strong influence on decisions. Or put it slightly differently, if the employees keep the council grounded, this increases both the council's influence and the cooperation between council and management. Further, the share of skilled white-collar workers is a statistically significant determinant of a bad relationship between council and management. Skilled white-collar workers are often thought to be more individualistic, having a stronger focus on their personal career.

Hence, a high share of skilled white-collar workers indicates a heterogeneous workforce resulting in cumbersome negotiations between council and management.

The broader industrial relations system and the managerial environment also play a role. Collective bargaining coverage is positively associated with a high influence of the works council while strong union support of the council increases the likelihood of a bad relationship with management. These two results suggest that unions strengthen the bargaining power of the works council and make negotiations more cumbersome for managers. Interestingly, one of our variables for active owners shows a reversed pattern of results. The presence of active owners who are not the founders of the establishment is a negative covariate of both a strong influence of the council and a bad relation between council and management. Those types of active owners may gain specifically high utility from being the ultimate bosses within the establishment and, hence, try to limit the council's influence on decisions. Isolating the works council may result in a quiet life for the active owners implying a more positive view of the relation with the council.

Managers in establishments with positive employment growth during the last two years are less likely to report a bad relationship with the works council. This suggests that there is less potential for conflicts in prospering establishments. Interestingly, the variable for direct worker involvement in decision making does not emerge as a statistically significant determinant. The dummy variable for East German establishments is also no significant covariate. This may support the view that the functioning of codetermination in East Germany is developing in a similar way to that in West Germany.

Turning to the explanatory variable of primary interest, the age of the works council is significantly associated with both indicators of the quality of intra-

establishment industrial relations. In the regression on a bad relationship between council and management, the coefficient on the linear term is significantly negative while the coefficient on the squared term is significantly positive. The size of the estimated coefficients implies that the probability of a bad relationship is decreasing in the age of the works council up to 27 years. This supports the view that learning plays a crucial role in the functioning of establishment-level codetermination. Cooperation between works council and management appears to be increasing for a remarkably long time. However, afterwards the probability of a bad relationship is increasing in the age of the works council. This can be seen as evidence of a participation life cycle.

In the regression on the influence of the council, the coefficient on the linear age variable is significantly positive while the coefficient on the squared term is significantly negative. The size of the estimated coefficients implies that the probability of a strong influence is increasing in the age of the works councils up to 32 years. This provides further support for the hypothesis that the dynamic dimension of codetermination plays an important role. The council's influence on decisions appears to be increasing for a very long time. However, afterwards it is decreasing. Hence, also this regression provides evidence of a participation life cycle.

Altogether, for about 30 years both the probability of a cooperative relationship with management and the probability of a strong influence on decisions are increasing in the age of the works council. This indicates that a remarkable learning process is at work. An impression of the magnitude of the effect can be obtained by using the estimated coefficients to project the probabilities of a strong influence and of a bad relationship. Table 4 shows the projections for different ages of the works council. All of the control

variables are assumed to be at their mean level. The projections confirm that the effect of the council's age is not only statistically significant but also economically significant. Initially, the probability of a strong influence of the council is about 16 percent. It increases roughly by two fifth within the first ten years. After thirty years this probability is almost 50 percent. The initial probability of a bad relationship with management is about 5 percent. This probability decreases roughly by two third within the first ten years. After thirty years it is only half a percent.

4.2 Establishment Performance

So far we have examined the effect on subjectively assessed quality of industrial relations. We now use objective indicators of establishment performance to study the role of the council's age. The results are shown in Table 5.³ Column (1) provides OLS estimates of the determinants of the log of productivity. Establishments in East Germany appear to be less productive than establishments in West Germany. Establishment size and a high share of university graduates are positive covariates of productivity. The share of female employees is a negative covariate. Interestingly, both variables for active owners are significantly negative determinants. This confirms the notion that active owners forego the opportunity to implement a high-ability management. Furthermore, the estimates show that support by unions is positively associated with productivity. This is consistent with the view that a strong works council is more effective in increasing establishment performance. However, moderate support by unions has the highest effect.

Returning to our main theme, the estimates show that the dynamic dimension of codetermination plays also a significant role in the establishment's productivity. The linear age variable emerges with a positive coefficient while the squared term takes a

negative coefficient. This implies that the council's age has an inversely u-shaped influence on establishment output. The establishment's productivity is increasing in the council's age up to 35 years, after which it starts to fall. Hence, also this objective measure of establishment performance provides evidence of both the importance of a long-term learning process and the role of a codetermination life cycle. The projections shown in column (1) of Table 6 confirm that the influence of the dynamic dimension of codetermination is also economically significant. On average initial productivity is about 109000 Euros. After a works council has been created, productivity increase by roughly one quarter within the first ten years. Compared to the initial level, a thirty years old council is associated with an increase in productivity by about one half.

Column (2) of Table 5 provides estimates of the determinants of the quit rate. The determinants were estimated with the tobit procedure. Collective bargaining coverage emerges as a negative covariate. Further, the share of university graduates and the share of skilled blue-collar workers are associated with a lower quit rate. This confirms that internal labor markets are specifically used to provide long-term employment relationships for qualified employees. The proportion of female employees is positively associated with the quit rate. This reflects the lower labor force attachment of women.

The age of the works council is a negative determinant of the quit rate. Thus, also this regression provides evidence of the dynamic dimension of codetermination. An experienced works council may be more helpful in implementing an effective personnel management. This in turn results in increased job satisfaction and reduced fluctuation. The squared age variable does not emerge as a statistically significant covariate of the quit rate. Hence, this regression fails to provide evidence of a codetermination life cycle.

The estimated coefficients can be used to project the quit rate. Column (2) of Table 6 shows the projections on the quit rate for different ages of the works council. The control variables are again assumed to be at their mean level. Moreover, as the coefficient on the squared age variable is statistically insignificant, the squared age is also assumed to be at its mean level. After a council has been implemented, the quit rate decreases by roughly one tenth within the first ten years. A thirty years old works council is associated with a decrease in the quit rate by almost two fifth.⁴

4.3 Testing for an (Inversely) U-Shaped Influence

Our estimates indicate that the works council's age has a u-shaped effect on bad industrial relations and an inversely u-shaped effect on productivity and the influence on decisions. However, Lind and Mehlum (2010) argue that the combination of a significant negative (positive) coefficient on a linear term and a significant positive (negative) coefficient on a squared term does not necessarily demonstrate an (inversely) u-shaped effect. They formalize a test for the presence of such effect. Confirmation of the (inversely) u-shaped relationship requires that the implied peak be within the range of observed values and be sufficiently to the center of the range that the implied curvature results in a significant negative (positive) slope left of the peak and a significant positive (negative) slope right of the peak. As it is clear that the implied peaks are within the range of the age variable, we implement Lind and Mehlum's test. It follows from testing the composite null hypothesis that the slope left of the peak is non-negative (non-positive) and/or the slope right of the peak is non-positive (non-negative) against the alternative of a negative (positive) slope to the left and a positive (negative) slope to the right. The estimates based on our data solidly reject the composite null hypothesis. In the

regression on bad industrial relations it is rejected with a p-value of 0.02, in the estimation on a strong influence with a p-value of 0.01, and in the productivity regression with a p-value of 0.08. Thus, the formal test as well as the appearance from the projections indicates the presence of an (inversely) u-shaped effect.

4.4 Age of the Works Council vs. Age of the Establishment

The age of the works council and the age of the establishment are positively correlated. In our data the correlation coefficient is equal to 0.67. To ensure that our results really capture the age of the council and not simply the age of the establishment, we reestimated all regressions by adding establishment age as a further explanatory variable.

Columns (1a) to (2b) of Table 7 show the estimations for the industrial relations climate. In regressions (1a) and (2a), establishment age is included as a linear variable. Regressions (1b) and (2b) additionally include establishment age squared. Comparing the results with those shown in Table 3, it can be seen that that the estimated relationships between the age of the works council and the quality of industrial relations in general remain robust. Only in regression (1b), the coefficient on the linear variable for the age of the council loses statistical significance. Yet, with a value of 1.42 the T-statistic is still relatively high. Moreover, neither establishment age nor its square plays a significant role in any of the regressions. Thus, our robustness checks provide no evidence that the age of the works council simply reflects the age of the establishment.

Columns (3a) to (4b) show the estimates for the variables capturing establishment performance. Again, in regressions (3a) and (4a) only the linear variable for establishment age is added while regressions (3b) and (4b) include both the linear term and establishment age squared. Comparing the estimates with those shown in Table 5, it

can be seen that the estimated effects of the council's age on productivity and quits in general also remain robust. Only in regression (3b) the coefficient on the squared age of the council loses statistical significance. On the one hand, this might cast some doubt on the codetermination life cycle. On the other, there is still a relatively high T-value of 1.53. Moreover, neither establishment age nor its square does emerge with a significant coefficient in any of the regressions. Hence, we remain confident that our findings indeed capture the effects of the council's age.

5. Conclusions

While the number of econometric studies on works councils is remarkably increasing, those studies are essentially silent on the role of learning. This article provides evidence that the dynamic dimension of codetermination plays an important role in the council's influence on decisions, in the relationship between council and management, and in the council's influence on establishment performance. The quality of industrial relations, the influence on decisions and the performance-enhancing effect of codetermination are increasing in the age of the works council for a long period of time. However, our estimates also provide some evidence of a codetermination life cycle. After about thirty years the quality of the relationship with management, the influence on decisions and the effect on establishment performance decrease to some extent.

Our results show the functioning of codetermination in Germany in a fresh and differentiated light. Works councils are dynamically heterogeneous. As stressed in the introduction, recent studies obtain neutral or positive effects of works councils on establishment performance. Neutral effects are typically obtained by studies examining the economic consequences of newly created works councils (Addison et al. 2004, Kraft

and Lang 2008, Schultz 2006). Against the background of our findings this does not come as a surprise. As learning plays a crucial role in the functioning of establishment-level codetermination, it needs time until a works council fully lives up to its potential. If the economic effects of newly created works councils are less strong, studies focusing on newly created councils may fail to find any effect. Our findings suggest that the results of those studies cannot be generalized to the entire population of works councils.

Our analysis may also shed light on the functioning of codetermination in international perspective. Indeed, studies on European works councils (EWCs) suggest that the provision of training for worker representatives is an important issue in negotiating EWC agreements (Gilman and Marginson 2002). This indicates that learning is important also for this type of works council.⁵ Altogether, providing systematic econometric evidence on the dynamic dimension of codetermination in an international perspective stands as important future research.

Finally, we recognize the need for continued research within this theme. Specifically, the role of a codetermination life cycle deserves further attention. Future research could fruitfully build on panel data to examine the dynamic dimension of codetermination in more detail. Panel data would allow observing the circumstances when the council was created. It would be possible to examine if the path of the learning process depends on the initial conditions. Moreover, panel data would allow taking into account the development of moderating influences over time. Most interestingly, the role of structural breaks reinforcing or mitigating a possible codetermination life could be examined. Hence, it would be possible to identify factors that help to revitalize old councils suffering problems of increased obsolescence.

References

- Adams, Roy J. 1985. "Should Works Councils Be Used as Industrial Relations Policy?" *Monthly Labor Review* 108, pp. 25 – 29.
- Addison, J.T., L. Bellmann, C. Schnabel and J. Wagner. 2004. "The Reform of the German Works Constitution Act: A Critical Assessment," *Industrial Relations* 43, pp. 125 – 48.
- Addison, J.T., C. Schnabel and J. Wagner. 2007. "The (Parlous) State of German Unions," *Journal of Labor Research* 27, pp. 3 – 18.
- Addison, J.T., C. Schnabel and J. Wagner. 2001. "Works Councils in Germany: Their Effects on Firm Performance," *Oxford Economic Papers* 53, pp. 659 – 94.
- Askildsen, Jan Erik, Uwe Jirjahn and Stephen C. Smith. 2006. "Works Councils and Environmental Investment: Theory and Evidence from German Panel Data," *Journal of Economic Behavior and Organization* 60, pp. 346 – 72.
- Baker, George, Robert Gibbons and Kevin J. Murphy. 1999. "Informal Authority in Organizations," *Journal of Law, Economics and Organization* 15, pp. 56 – 73.
- Bennedsen, M., K.M. Nielsen, F. Perez-Gonzalez and D. Wolfenzon. 2007. "Inside the Family Firm: The Role of Families in Succession Decisions and Performance," *Quarterly Journal of Economics* 122, pp. 647-91.
- Benz, M. and B.S. Frey. 2004. "Being Independent Raises Happiness at Work," *Swedish Economic Policy Review* 11, pp. 95 – 134.
- Bertrand, M. 2004. "From the Invisible Handshake to the Visible Hand? How Import Competition Changes the Employment Relationship," *Journal of Labor Economics* 22, pp. 723 – 65.
- Boning, Brent, Casey Ichniowski and Kathryn Shaw. 2007. "Opportunity Counts: Teams and the Effectiveness of Production Incentives," *Journal of Labor Economics* 25, pp. 613 – 50.
- Cramton, Peter and Joseph Tracy. 2003. "Unions, Bargaining and Strikes," in *International Handbook of Trade Unions*, edited by John T. Addison and Claus Schnabel, Edward Elgar, pp. 86 – 117.
- Cross, John G. 1977. "Negotiation as a Learning Process," *Journal of Conflict Resolution* 21, pp. 581 – 606.
- Crossan, Mary, Henry Lane and Roderick White. 1999. "An Organizational Learning Framework: From Intuition to Institution," *Academy of Management Review* 24, pp. 522 – 37.
- Doucoulagos, C. and Laroche, P. 2003. "What Do Unions Do to Productivity? A Meta-Analysis," *Industrial Relations* 42, 650 – 91.
- Eriksson, Tor. 2003. "The Effects of New Work Practices: Evidence from Employer-Employee Data," in *Advances in the Economic Analysis of Participatory and Labor-Managed Firms*,

Vol. 7, edited by Takao Kato and Jeff Pliskin, pp. 3 – 30, Amsterdam: Elsevier.

- Fershtman, C. 1985. “Managerial Incentives as a Strategic Variable in a Duopolistic Environment,” *International Journal of Industrial Organization* 3, pp. 245 – 53.
- FitzRoy, Felix and Kornelius Kraft. 1990. “Innovation, Rent Sharing and the Organization of Labour in the Federal Republic of Germany,” *Small Business Economics* 2, pp. 95-103.
- Freeman, Richard B. and Morris M. Kleiner. 2000. “Who Benefits Most from Employee Involvement: Firms or Workers?” *American Economic Review (Papers and Proceedings)* 90, pp. 219 – 23.
- Freeman, Richard B. and Edward P. Lazear. 1995. “An Economic Analysis of Works Councils,” in *Works Councils – Consultation, Representation and Cooperation*, edited by J. Rogers and W. Streeck, Chicago: University of Chicago Press, pp. 27 – 52.
- Freeman, R.B. and J. Rogers. 1999. *What Workers Want*. Cornell University Press ILR Press.
- Frick, Bernd and Iris Moeller. 2003. “Mandated Works Councils and Firm Performance: Labor Productivity and Personnel Turnover in German Establishments,” *Journal of Applied Social Science Studies* 123, pp. 423 – 54.
- Gilman, Mark and Paul Marginson. 2002. “Negotiating European Works Councils: Contours of Constrained Choice,” *Industrial Relations Journal* 33, pp. 36 – 51.
- Helper, Susan. 1998. “Complementarity and Cost Reduction: Evidence from the Auto Supply Industry,” NBER Working Paper No. 6033. Cambridge, MA.
- Heywood, John S. and Uwe Jirjahn. 2009. “Family-Friendly Practices and Worker Representation in Germany,” *Industrial Relations* 48, pp. 121 – 45.
- Heywood, John S. and Uwe Jirjahn. 2002. “Payment Schemes and Gender in Germany,” *Industrial and Labor Relations Review* 56, pp. 44 – 64.
- Heywood, John S., Uwe Jirjahn and Xiandong Wei. 2008. “Teamwork, Monitoring and Absence,” *Journal of Economic Behavior and Organization* 68, pp. 676 – 690.
- Hogan, Chad. 2001. “Enforcement of Implicit Contract through Unions,” *Journal of Labor Economics* 19, pp. 171 – 95.
- Huebler, Olaf. 2003. “Zum Einfluss des Betriebsrats in mittelgroßen Unternehmen auf Investitionen, Löhne, Produktivität und Renten,” in Goldschmidt, N., ed., *Wunderbare Wirtschaftswelt – Die New Economy und ihre Herausforderungen*. Nomos: Baden-Baden, pp. 77 – 94.
- Huebler, O. and U. Jirjahn. 2003. “Works Councils and Collective Bargaining in Germany: The Impact on Productivity and Wages,” *Scottish Journal of Political Economy* 50, pp. 1 – 21.
- Idson, T.L. and Valetta R.G. 1996. “Seniority, Sectoral Decline and Employee Retention: An Analysis of Layoff Unemployment Spells,” *Journal of Labor Economics* 14, pp. 654 – 76.

- Jirjahn, Uwe. 2010. "Works Councils and Employment Growth in German Establishments," *Cambridge Journal of Economics* 34, pp. 475 – 500.
- Jirjahn, Uwe. 2009. "The Introduction of Works Councils in German Establishments – Rent Seeking or Rent Protection?" *British Journal of Industrial Relations* 43, pp 521 – 45.
- Jirjahn, Uwe and Kornelius Kraft. 2010. "Do Spillovers Stimulate Incremental or Drastic Product Innovations? Evidence from German Establishment Data," *Oxford Bulletin of Economics and Statistics*, Forthcoming.
- Jirjahn, Uwe and Stephen C. Smith. 2006. "What Factors Lead Management to Support or Oppose Employee Participation – With and Without Works Councils? Hypotheses and Evidence from Germany" *Industrial Relations* 45, pp. 650 – 80.
- Jirjahn, Uwe and Georgi Tsertsvadze. 2006. "Betriebsraete und Arbeitszufriedenheit," *Jahrbuecher fuer Nationaloekonomie und Statistik* 226, pp. 537 – 61.
- Jones, Derek C. and Takao Kato. 1995. "The Productivity Effects of Employee Stock-Ownership Plans and Bonuses: Evidence from Japanese Panel Data," *American Economic Review* 85, pp. 391 – 414.
- Kato, Takao. 2006. "Determinants of the Extent of Participatory Employment Practices: Evidence from Japan," *Industrial Relations* 45, pp. 579 – 605.
- Kato, Takao and Motohiro Morishima. 2002. "The Productivity Effects of Participatory Employment Practices: Evidence from New Japanese Panel Data," *Industrial Relations* 41, pp. 487 – 520.
- Kaufman, B.E. and D.I. Levine. 2000. "An Economic Analysis of Employee Representation," in Bruce E. Kaufman and David I. Levine, eds., *Nonunion Employee Representation: History, Contemporary Practice, and Policy*. New York: M.E. Sharpe, pp. 149 – 75.
- Kennan, John and Robert Wilson. 1993. "Bargaining with Private Information," *Journal of Economic Literature* 31, pp. 45 – 104.
- Kleiner, Morris M. and Young-Myon Lee. 1997. "Works Councils and Unionization: Lessons from South Korea," *Industrial Relations* 36, pp. 1 – 16.
- Kraft, Kornelius and Julia Lang. 2008. "The Causes and Consequences of Adopting a Works Council," *Jahrbuecher fur Nationaloekonomie und Statistik – Journal of Economics and Statistics* 228, pp. 512 – 32.
- Levitt, Barbara and James G. March. 1988. "Organizational Learning," *Annual Review of Sociology* 14, pp. 319 – 40.
- Lind, J.T. and H. Mehlum. 2010. "With or Without U?" The Appropriate Test for a U-Shaped Relationship," *Oxford Bulletin of Economics and Statistics* 72, pp. 109-118.
- Lorenz, Edward. 1999. "Trust, Contract and Economic Cooperation," *Cambridge Journal of Economics* 23, pp. 301 – 15.

- Mohrenweiser, Jens, Paul Marginson and Uschi Backes-Gellner. 2009. "What Triggers the Establishment of a Works Council," Institute for Strategy and Business Economics, Working Paper No. 101, Zurich.
- Mueller, Steffen. 2010. "Are the Firm Owners Really Worse Off with a Works Council?" *British Journal of Industrial Relations*, Forthcoming.
- Mueller-Jentsch, Walther. 1995. "Germany: From Collective Voice to Co-Management," in J. Rogers and W. Streeck, eds., *Works Councils – Consultation, Representation and Cooperation in Industrial Relations*, Chicago: University of Chicago Press, pp. 53 – 78.
- Osterloh, Margit and Bruno S. Frey. 2006. "Shareholders Should Welcome Knowledge Workers as Directors," *Journal of Management and Governance* 10, pp. 325 – 45.
- Ranger-Moore, James. 1997. "Bigger May Be Better, But Is Older Wiser? Organizational Age and Size in the New York Life Insurance Industry," *American Sociological Review* 62, pp. 903 – 20.
- Rogers, J. and W. Streeck. 1995. *Works Councils – Consultation, Representation and Cooperation*. Chicago: University of Chicago Press.
- Schloemer, N., R. Kay, U. Backes-Gellner, W. Rudolph and W. Wassermann. 2007. *Mittelstand und Mitbestimmung: Unternehmensfuehrung, Mitbestimmung und Beteiligung in mittelstaendischen Unternehmen*. Muenster: Westfaelisches Dampfboot.
- Schultz, B. 2006. "Mikrooekonometrische Evaluation der oekonomischen Wirkungen betrieblicher Mitbestimmung – Moeglichkeiten und Grenzen des Matching-Ansatzes," *Jahrbuecher fuer Nationaloekonomie und Statistik* 226, pp. 519 – 36.
- Singell, L.D. and J. Thornton. 1997. "Nepotism, Discrimination and the Persistence of Utility-Maximization, Owner-Operated Firms," *Southern Economic Journal* 63, pp. 904 – 19.
- Smith, Stephen C. 2006. "Employee Participation Rights in Corporate Governance: Economic Rationale, a Test of a Leading Theory, and Some Modest Policy Proposals," in *Advances in the Economic Analysis of Participatory and Labor Managed Firms*, edited by Panu Kalmi and Mark Klinedinst, Amsterdam: Elsevier, pp. 105 – 46.
- Sorensen, Jesper B. and Toby E. Stuart. 2000 "Aging, Obsolescence and Organizational Innovation," *Administrative Science Quarterly* 45, pp. 81 – 112.
- Strauss, George. 2006. "Worker Participation – Some Under-Considered Issues," *Industrial Relations* 45, pp. 778 – 803.
- Thornhill, Stewart and Raphael Amit. 2003. "Learning About Failure: Bankruptcy, Firm Age and the Resource-Based View," *Organization Science* 14, pp. 497 – 509.
- Wagner, Joachim. 2008. "German Works Councils and Productivity: First Evidence from a Nonparametric Test," *Applied Economics Letters* 15, pp. 727 – 30.

Table 1: Variable Definitions and Descriptive Statistics of the Dependent Variables

<i>Variable</i>	<i>Description</i>	<i>Mean, Std.dev.</i>	<i>N</i>
Bad Relation	Dummy variable equal to 1 if management views the relationship with the works council as being bad.	.0996, .3001	241
Strong Influence	Dummy variable equal to 1 if the works council is involved in decisions even where it has no legal powers.	.3609, .4813	241
LnProductivity	Log of sales (in Euros) per employee.	11.85, 1.034	222
Quit Rate	Number of quits by workers during the last year divided by the number of total employees.	.0196, .0236	236

Table 2: Variable Definitions and Descriptive Statistics of the Explanatory Variables

<i>Variable</i>	<i>Description (Mean, Std.dev.)</i>
Age of works council	Time span between the year 2005 and the year the works council has been introduced by the workforce (19.40, 16.41).
(Age of works council) ²	Squared age of the works council.
Size	Number of total employees in the establishment (185.2, 121.5).
Size ² /1000	Squared number of total employees in the establishment divided by 1000.
LnSize	Log of the number of total employees in the establishment
University graduates	University graduates as a proportion of total employees (.1752, .2228).
Skilled blue-collar employees	Blue-collar employees with an apprenticeship training as a proportion of total employees (.2483, .2440).
Skilled white-collar employees	White-collar employees with an apprenticeship training as a proportion of total employees (.3514, .2267).
Part-time employees	Part-time employees as a proportion of total employees (.2156, .3112).
Female employees	Women as a proportion of total employees (.3492, .2484).
Strong support by workforce	Dummy variable equal to 1 if the workforce strongly supports the works council (.2697, .4447).
Modest support by workforce	Dummy variable equal to 1 if the workforce modestly supports the works council (.6639, .4733).
Direct participation	Dummy variable equal to 1 if there exist direct forms of worker involvement in decision making (.4191, .4944).
Managed by successor	Dummy variable equal to 1 if the establishment is managed by an active owner who is not the founder of the establishment (.2075, .4063).
Managed by founder	Dummy variable equal to 1 if the establishment is not managed by an active owner who founded the establishment (.1618, .3691).
Collective agreement	Dummy variable equal to 1 if the establishment is covered by a collective bargaining agreement (.5975, .4914).
Strong influence of unions	Dummy variable equal to 1 if unions have strong influence on the works council (.4357, .4969).
Modest influence of unions	Dummy variable equal to 1 if unions have a modest influence on the works council (.1950, .3970).
Employment growth	Dummy variable equal to 1 if the establishment experienced a positive employment growth during the last three years (.2905, .4549).
East Germany	Dummy variable equal to 1 if the establishment is located in East Germany (.2241, .4178).
Industry dummies	Five industry dummies for manufacturing, construction, retail, logistic and communication, services for companies, and services for privates are included in the regressions.
Age of establishment	Time span between the year 2005 and the year the establishment has been founded (41.57, 42.20).
(Age of establishment) ²	Squared age of the establishment

$N = 241$

Table 3: Determinants of Intra-Establishment Industrial Relations

<i>Dependent Variable</i>	(1) <i>Bad Relation</i> <i>Method: Probit ML</i>	(2) <i>Strong Influence</i> <i>Method: Probit ML</i>
<i>Explanatory Variables</i>		
Age of works council	-.0693 (2.15)**	.0647 (3.03)***
(Age of works council) ²	.0013 (2.23)**	-.0010 (2.68)***
Size	.0038 (0.84)	-.0057 (1.94)*
Size ² /1000	-.0053 (0.56)	.0099 (1.56)
University graduates	-.8789 (1.02)	.2421 (0.42)
Skilled blue-collar employees	-.4342 (0.45)	-.1645 (0.29)
Skilled white-collar employees	1.676 (2.06)**	-.4751 (0.85)
Part-time employees	-.3804 (0.72)	.0231 (0.07)
Female employees	-1.279 (1.27)	-.0715 (0.14)
Strong support by workforce	-2.441 (4.08)***	2.106 (3.74)***
Modest support by workforce	-1.222 (2.64)***	1.211 (2.27)**
Direct participation	-.3828 (1.34)	-.0996 (0.50)
Managed by successor	-1.474 (3.24)***	-.8650 (3.23)***
Managed by founder	.2697 (0.64)	-.0103 (0.04)
Collective agreement	-.0580 (0.19)	.3651 (1.73)*
Strong influence of unions	.8943 (2.42)**	.3008 (1.25)
Modest influence of unions	.1401 (0.33)	.4000 (1.42)
Employment growth	-1.155 (3.84)***	.1791 (0.86)
East Germany	.3533 (0.82)	-.3817 (1.39)
Constant	-.2885 (0.31)	-1.700 (2.18)**
Industry dummies	Yes	Yes
Pseudo R^2	.34	.20
N	241	241

Robust T-statistics are in parentheses. *** Statistically significant at 1%; ** statistically significant at 5%; * statistically significant at 10%.

Table 4: Projections on Intra-Establishment Industrial Relations

<i>Dependent Variables</i> <i>Age of Works Council</i>	<i>(1)</i> <i>Projected Probability of</i> <i>Bad Relations</i>	<i>(2)</i> <i>Projected Probability</i> <i>of a Strong Influence</i>
1	.047	.158
5	.027	.221
10	.015	.301
20	.006	.428
30	.005	.481
40	.009	.453
50	.029	.347

The probabilities of a bad relation with management are projected using the estimated coefficients in column (1) of in Table 3. The probabilities of a strong influence are projected using the estimated coefficients in column (2) of Table 3. All of the other control variables are assumed to be at their mean level.

Table 5: Determinants of Establishment Performance

<i>Dependent Variables</i>	(1) <i>LnProductivity</i> <i>Method: OLS</i>	(2) <i>Quit Rate</i> <i>Method: Tobit ML</i>
<i>Explanatory Variables</i>		
Age of works council	.0279 (2.09)**	-.0008 (2.02)**
(Age of works council) ²	-.0004 (1.81)*	.00001 (1.55)
Size	.0003 (3.02)***	-----
LnSize	-----	.0025 (1.05)
University graduates	1.051 (2.42)**	-.0225 (1.94)*
Skilled blue-collar employees	-.1677 (0.36)	-.0259 (2.40)**
Skilled white-collar employees	.5479 (1.13)	-.0088 (0.90)
Part-time employees	-.2406 (1.00)	.0083 (1.53)
Female employees	-.7843 (2.27)**	.0228 (2.74)***
Strong support by workforce	.1081 (0.39)	-.0010 (0.16)
Modest support by workforce	-.0976 (0.40)	.0040 (0.71)
Direct participation	.1234 (1.01)	-.0030 (0.76)
Managed by successor	-.4320 (2.89)***	-.0070 (1.49)
Managed by founder	-.4328 (2.49)**	-.0050 (0.82)
Collective agreement	-.0472 (0.39)	-.0066 (1.76)*
Strong influence of unions	.2557 (1.68)*	.0016 (0.37)
Modest influence of unions	.4522 (1.88)*	-.0077 (1.58)
East Germany	-.2914 (1.68)*	-.0024 (0.54)
Constant	11.00 (23.61)***	.0209 (1.28)
Industry dummies	Yes	Yes
R^2	.36	-----
Pseudo R^2	-----	.10
N	222	236

Robust T-statistics are in parentheses. *** Statistically significant at 1%; ** statistically significant at 5%; * statistically significant at 10%.

Table 6: Projections on Establishment Performance

<i>Dependent Variables</i> <i>Age of Works Council</i>	(1) <i>Projected Productivity</i> <i>in Euros</i>	(2) <i>Projected Quit Rate</i>
1	109316	.035
5	120994	.033
10	134847	.031
20	157487	.026
30	169413	.022
40	168636	.019
50	151130	.017

Sales are projected using the estimated coefficients in column (1) of in Table 5. The quit rates are projected using the estimated coefficients in column (2) of Table 5. All of the other control variables are assumed to be at their mean level.

Table 7: Determinants of Intra-Establishment Industrial Relations and Establishment Performance; Establishment Age as Additional Control Variable

<i>Dependent Variable</i> <i>Explanatory Variables</i>	<i>(1a)</i> <i>Bad</i> <i>Relation</i> <i>Method:</i> <i>Probit ML</i>	<i>(1b)</i> <i>Bad</i> <i>Relation</i> <i>Method:</i> <i>Probit ML</i>	<i>(2a)</i> <i>Strong</i> <i>Influence</i> <i>Method:</i> <i>Probit ML</i>	<i>(2b)</i> <i>Strong</i> <i>Influence</i> <i>Method:</i> <i>Probit ML</i>	<i>(3a)</i> <i>LnProductivity</i> <i>Method: OLS</i>	<i>(3b)</i> <i>LnProductivity</i> <i>Method: OLS</i>	<i>(4a)</i> <i>Quit Rate</i> <i>Method:</i> <i>Tobit ML</i>	<i>(4b)</i> <i>Quit Rate</i> <i>Method:</i> <i>Tobit ML</i>
Age of works council	-.0581 (1.73)*	-.0569 (1.42)	.0701 (3.12)***	.0725 (3.02)***	.0296 (2.41)**	.0257 (1.93)*	-.0008 (1.96)**	-.0007 (1.69)*
(Age of works council) ²	.0013 (2.22)**	.0013 (1.92)*	-.0010 (2.64)***	-.0011 (2.65)***	-.0004 (1.81)*	-.0004 (1.53)	.000001 (1.55)	.000001 (1.37)
Age of establishment	-.0087 (1.29)	-.0097 (0.74)	-.0032 (0.96)	-.0048 (0.61)	-.0010 (0.42)	.0016 (0.31)	.00001 (0.19)	-.000002 (0.14)
(Age of establishment) ²	-----	.00001 (0.07)	-----	.00001 (0.23)	-----	-.00002 (0.70)	-----	.00000002 (0.32)
Pseudo R ²	.35	.35	.20	.20	.37	.37	-----	-----
R ²	-----	-----	-----	-----	-----	-----	.09	.09
N	241	241	241	241	222	222	236	236

Robust T-statistics are in parentheses. *** Statistically significant at 1%; ** statistically significant at 5%; * statistically significant at 10%. In regressions 1a to 2b (3a to 4b), all of the other control variables listed in Table 3 (Table 5) are included but are suppressed to save space.

Endnotes

¹ A recent econometric study by Jirjahn and Smith (2006) examines the determinants of a cooperative relationship between works council and management. However, this study does not consider the role of learning.

² The survey provides no information on the capital stock. A meta-analysis by Doucouliagos and Laroche (2003) shows that accounting for the capital stock has no significant influence on the estimated performance effect of industrial relations. Rather, controlling for the structure of the workforce appears to be important for obtaining unbiased estimates.

³ Compared to Table 3, we make two minor changes to the specification in order to improve the estimations. First, we use different specifications of establishment size. Second, we remove the dummy variable for positive employment growth during the last three years.

⁴ Note that the tobit model is a nonlinear model. Hence, even if the squared age variable is held constant, the relationship between the council's age and the predicted quit rate is nonlinear.

⁵ A further finding by Gilman and Marginson (2002) may also indicate the importance of learning. While the authors do not directly examine the learning process EWCs undergo, they provide some evidence that the management-employee negotiations over implementing EWCs are subject to a learning process.