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Mandated Works Councils and Firm Performance: Labor Productivity and Personnel Turnover in German Establishments*

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Abstract

Traditionally, works councils have been viewed by most economists as welfare reducing cartels that inhibit firms from allocating their resources efficiently. This view has been challenged recently: To the extent that a works council can convince a firm's employees to accept decisions and measures that seem to violate their interests, mandated codetermination is likely to overcome the problems inherent in a "prisoner's dilemma" situation, where credible commitments are impossible to be made without the support of an exogenously implemented institution.

This latter view is supported by the evidence presented in the empirical part of the paper: First, a review of the literature on the influence of works councils on investments in "intangible assets" suggests that concentrating on investments in physical capital, on productivity, profitability, investments, and some other easy to measure indicators of firm performance may lead to a considerable underestimation of the positive effects of mandated works councils. Second, the presence of a works council has a positive and statistically significant influence on labor productivity as well as a significantly negative influence on personnel turnover in German firms. The respective coefficients indicate that these effects are in some cases quite large and that they differ considerably between industry and service sectors as well as between East and West German firms.

Zusammenfassung

Die theoretische Diskussion der wirtschaftlichen Folgen rechtlich autorisierter Arbeitnehmervertretungen ist durch zwei weitgehend inkompatible Sichtweisen charakterisiert: Auf der einen Seite wird argumentiert, dass Mitbestimmung der Arbeitnehmer aufgrund einer Veränderung der Anreizstrukturen zu Effizienzverlusten führen, die Kosten der Etablierung und Koordination von Arbeitsverhältnissen erhöhen und die Möglichkeiten der Arbeitnehmer zu opportunistischem Verhalten verbessern kann. Dem steht die gleichermaßen plausible Vermutung gegenüber, dass Mitbestimmung durch

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eine Verbesserung des Informationsflusses die Kooperations- und Kompromissbereitschaft der Beschäftigten erhöht, die Kanalisierung innerbetrieblicher Konflikte erleichtert, die Wahrscheinlichkeit opportunistischen Verhaltens reduziert und damit die Qualität der Arbeitsbeziehungen verbessert.

Ungeachtet ihrer Defizite ist die verfügbare empirische Evidenz sehr viel eher mit der letztgenannten Hypothese kompatibel: So zeigt eine entsprechende Auswertung der Daten des IAB-Betriebspanels deutlich, dass Betriebsräte einen positiven Einfluss auf betriebliche Investitionen in "intangible assets" (wie z. B. die Stabilisierung individueller Beschäftigungsverhältnisse) haben. Zum anderen wird deutlich, dass die Existenz einer kollektiven Arbeitnehmervertretung unter sonst gleichen Bedingungen mit einer signifikant höheren Bruttowertschöpfung einhergeht.

JEL Classification: M5, J5

1. Introduction

The recent political debate about the now enacted reform of the German "Works Constitution Act" as well as the discussion initiated by the "co-determination commission" (jointly founded by the Hans-Boeckler Foundation and the Bertelsmann Foundation[1]) has led to an unprecedented increase in the public interest regarding the relative impact of alternative forms of worker participation on firm performance. Moreover, the academic discussion by labor and personnel economists has been spurred by a number of different, though closely related developments:

- The increasing globalization of product and labor markets has led to a resurgence in academic interests regarding the German system of industrial relations. On the one hand it has been agued that it may have to surrender to the pressures of competition. On the other hand, it has been argued that its specific idiosyncrasies (like the influence of large banks and the existence of mandated works councils) may be a source of competitive advantage that is unlikely to be eradicated by globalization. Although most of the arguments discussed in this context are well known in the meantime, it is interesting to see how the formerly incompatible theoretical positions seem to have converged recently.
- The availability of two large and representative firm panels has fostered empirical analyses that have been impossible to conduct before. So far, especially the "Hannover Firm Panel" has been used extensively to document the influence of mandated works councils on various dimensions of firm performance. Although the works of Addison, Schnabel and Wagner (1998, 1999, 2001) as well as Jirjahn (1998) represent state of the art econom(etr)ics, they leave some of the crucial questions unanswered:

[1] For the results of their work see Streeck and Kluge (1999) as well as Frick, Kluge and Streeck (1999).

- None of the studies quoted above controls for the capital stock of the firms in the sample. This may cause an "omitted variable bias" if capital intensity and the existence of a works council are correlated. Moreover, the fact that the data is confined to manufacturing firms from Lower Saxony raises the question whether the findings can be generalized to other parts of the country and / or to service firms. Finally, since the West German system of industrial relations has – in the eyes of many critics – been forced upon the East German economy it is worth a separate investigation whether the influence of works councils on firm performance differs between the two parts of the country.
- The main finding of most of the research – other things equal, the existence of a works council has no positive influence on the performance of firms (positive effects on labor productivity and personnel turnover are compensated by a negative influence on profits) – is problematic for at least one reason: Most authors exclusively deal with investments in physical capital, thereby neglecting investments in human and organizational capital which, in turn, may be of paramount importance for the works councils. If this were true, the findings presented so far may lead to inadequate policy implications.

Our contribution to the growing body of literature has three different goals: First, we want to review the theoretical arguments that have been raised in the most recent discussion. In this context we show that the formerly incompatible positions have converged to a considerable extent (section 2). Second, we present the findings of different production function estimates that have been augmented by variables such as, inter alia, the existence of a works council (section 3). Our estimates use data from two years of the IAB-Panel (1998 and 2000). We then look at the impact of works councils on a specific dimension of firms' investments in human and organizational capital, namely personnel turnover (section 4). Our estimates not only distinguish between East and West German firms but also between manufacturing and service firms in each part of the country. We conclude with a summary of our main findings and some implications for further research (section 5).

2. Works Councils: Welfare Reducing Cartels or Efficiency Enhancing Institutions?

Assuming that ownership accompanied by secure property rights is the most effective institution for providing individuals with incentives to create, maintain and improve assets, it is maintained that it is also essential that the residual rights of control, i.e. the rights to make any decisions concerning an asset's use, are exclusively controlled by a single party. The economic importance of residual control follows from the difficulty of writing contracts that

specify all the control rights. This would be possible only if the parties to a contract were able to foresee all future developments and could therefore agree on and enforce a complete contract, i.e. one that specifies what each party has to do in every relevant eventuality at every future date and how the resulting income in each such event should be divided. However, complete contracts are generally impossible for transactions of any significant complexity that occur over a period of more than just a few days:

> "Complete contracting requires freely imagining all the myriad contingencies that might arise during the contract term, costlessly determining the appropriate actions and division of income to take in each contingency, describing all these verbally with enough precision that the terms of the contract are clear, arriving at an agreement on these terms, and doing all this so that the parties to the contract are motivated to follow its terms" (Milgrom and Roberts 1992: 289).

Due to the individuals' bounded rationality, informational deficits and informational asymmetries contracts are necessarily incomplete. Consequently, arrangements that leave all control rights that are not otherwise assigned to a single party (eliminating the need to negotiate and reach agreement for every unanticipated development) may result in significant cost advantages. While the notion of ownership as residual control is relatively clear for a simple asset, it gets increasingly fuzzy when applied to a (large) firm. Decisions by the owner or the management may be especially controversial when not only the physical capital of the firm, but also the human capital of the employees is affected.

Jensen and Meckling (1976, 1979) for example suggest that when the party having residual control rights is also entitled to receive the residual returns, then the residual decisions made tend to be efficient ones. More specifically, they argue that in a firm, where the workers receive contractually agreed upon fixed wages in exchange for the effort they supply, the residual claimant will, just by pursuing his own interests and maximizing his returns, make efficient decisions. Under these assumptions, a redistribution of control rights will necessarily lead to an inefficient resource allocation, because those who bear the residual risks are not the only party to decide on the use of the firm's assets. These arguments, in turn, form the basis of their market-oriented case against mandated codetermination published already more than twenty years ago:

> "If codetermination is beneficial to both stockholders and labor, why do we need laws which force firms to engage in it? Surely, they would do so voluntarily. The fact that stockholders must be forced by law to accept codetermination is the best evidence we have that they are adversely affected by it" (Jensen und Meckling 1979: 474).

More recently, this orthodox position has been challenged by a number of economists – be it proponents or critics of property rights theory[2]. First, it has

been argued that decisions made by the residual claimant may not always be efficient: If only part of the costs of a decision accrue to the party making the decision, then that party will find it in its interest to ignore some of the external effects, sometimes leading to inefficient decisions. If, for example, efficient production requires that workers invest in firm-specific skills, then institutions that protect their investments make them more likely to invest in acquiring those skills[3]. Alchian (1984) and Furubotn (1985, 1988) have argued that in a world of informational asymmetries between self-interested employers and employees, and the risk of post-contractual opportunism, effective cooperation may be advantageous to both parties[4]. In this context they emphasize the importance of firm specific skills and investments:

> "Workers who undertake durable reliance investments commit themselves to the firm for some time into the future and are, therefore, vulnerable. The distribution of the firm's quasi-rents and the value of the labor assets can be affected by the behavior of other members of the coalition. Hence, the possibility exists that worker-investors, if unprotected by institutional or contractual safeguards, may be exploited and suffer serious economic injury" (Furubotn 1988: 167).

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[2] This does not imply, however, that this position has not also been defended quite forcefully. See for example Hart (1995: 686) who argues that "if companies function better when there are worker representatives on the board, then it will be in the interest of the company's founders to put worker representatives on the board – no government intervention is required". He explicitly rejects the "externality argument" by suggesting that firms create many types of externalities and that it is therefore far from clear that mandating worker representatives will encourage firms to internalize the right ones.

[3] See also Dilger, Frick and Speckbacher (1999), Frick, Speckbacher and Wentges (1999) as well as Berthold and Stettes (2001).

[4] More recently, this argument has been further developed by Rajan and Zingales (1998, 2001). They define the firm not as a "nexus of contracts", but as a "nexus of specific investments". Thus, their model (building on an approach developed by Grossman and Hart (1986)) is similar to the one developed by Aoki (1984: 119), who defines the firm as "an enduring combination of firm-specific resources". In the Rajan and Zingales model, the firm requires a physical asset that is specific to the enterprise and two individuals. The total productivity is maximized if both individuals make specific investments in human capital. But each individual must have access to the physical asset to be able to specialize. If either individual fails to specialize, he can be substituted by an unspecialized outsider without loss of total productivity. Moreover, Rajan and Zingales distinguish between "ownership" and "power". In their model, ownership of the enterprise gives the owner the right to exclude other individuals from access to the physical asset and the right to sell the physical asset to a third party. These rights give the owner significant power in bargaining over the eventual distribution of the jointly produced rents. However, participants can also acquire power in another way: Investment by either individual in firm-specific human capital gives the individual bargaining power, because due to his investment there will be more rents to share if he stays in the coalition (see also Blair 1999). In this sense, codetermination may be interpreted as part of an institutional arrangement designed to protect the investments of workers. Zingales (1998: 497) terms such arrangements a "complex set of constraints that shape the ex post bargaining over the quasi-rents generated over the course of the relationship" (see also Williamson 1985 as well as Alchian and Woodward 1988).

Thus, if workers are not protected by institutional or contractual safeguards against opportunistic behavior of other members of the coalition, they will either be unwilling to invest in the acquisition of firm specific skills or may risk serious economic loss in the case of dismissal. In a situation, where not all of the coalition-specific resources are owned by a single party, codetermination is likely to be a governance structure that is capable of dealing with maximizing agents with conflicting interests. Irrespective of this generally favorable view of voluntary codetermination, legal intervention by the state is unequivocally rejected:

> "(E)fforts by governments to ... reshape the firm have not led to particularly desirable results. The approach taken has emphasized the "political" aspect of the firm and the importance of corporate governance while failing to give much attention to broader economic issues and to the relation between the firm's total property-rights structure and its performance. By granting workers major control rights without regard to their actual investment position in the firm, state programs have violated an important rule for ensuring rational allocation – namely, the rule that those making decisions should bear the full costs of the decisions they make. This defect, together with the costly system used to apportion the firm's quasi rents between workers and stockholders, means that the orthodox co-determined firm does not possess a truly efficient organizational structure" (Furubotn 1988: 178).

Second, this view has in the meantime been challenged by, among others, Freeman and Lazear (1995), who argue that codetermination is likely to be underprovided by the market[5]. Cooperative solutions of the prisoner's dilemma are unlikely to occur as long as there is no exogenous regulation by some third party. However, although mandated works councils have the potential to foster an increase in the joint surplus, firms are most likely to oppose them:

> "(I)nstitutions that give workers power in enterprises affect the distribution as well as amount of joint surplus. The greater the power of works councils, the greater will be workers' share of the economic rent. If councils increase the rent going to workers by more than they increase total rent, firms will oppose them. It is better to have a quarter slice of a 12-inch pie than an eighth slice of a 16-inch pie" (Freeman and Lazear 1995: 29).

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[5] Accordingly, Levine and Tyson (1990) argue that in a typical prisoner's dilemma, all firms would benefit if they introduced worker participation. However, since codetermined firms needed – among other things – a compressed wage structure to encourage group cohesiveness and dismissal protection to lengthen the time horizon of workers, they would be at a competitive disadvantage. The reason is that traditional firms will motivate their employees through fear of dismissal and a sharply differentiated wage structure. It is highly unlikely that under such circumstances a participative equilibrium will emerge. The viability of a single codetermined firm will be threatened by adverse selection (it will attract the less motivated job-seekers) and an externality (its best workers will be poached by traditional firms which can pay more). Hence, the market will be biased systematically against codetermined workplaces and the economy will be locked in a socially sub-optimal position. Mandated codetermination could overcome this dilemma by requiring all firms to introduce participatory machinery.

This argument is supported by Sadowski, Junkes und Lindenthal (1999: 9), who emphasize that in distributional conflicts about contractually unprotected quasi-rents, it is at least optimistic, if not naive, to expect an efficient voluntary agreement about the firm's constitution. A selfish rational agent will always prefer a constitution that strengthens his absolute position in ex post bargaining, even if this is detrimental to the firm value. Thus, one cannot expect an efficient constitution of the corporation as a result of a bargaining process between co-specialized investors. Hence, the fact that firms do not offer codetermination rights voluntarily to their workers is only a necessary, but not a sufficient condition of the assumed inefficiency of mandated rights to information, consultation, and decision making (see also Roberts and van den Steen 2001).

Given these seemingly incompatible positions, theory offers no definitive guidance as to the likely effects of mandated codetermination. The beneficial and detrimental effects must be demonstrated empirically. The theoretical arguments presented so far can be summarized in two competing testable hypotheses:

H_1: Codetermination leads to an inefficient allocation of resources by changing the incentive structure of the owners of the firm. Moreover, it is likely to increase the costs of coordination and to increase the probability of worker opportunism (by behaviors such as delaying or even "blocking" decisions that are in the interests of the owners).

H_2: Codetermination fosters communication, increases the employees' readiness to accept management's decisions and reduces the probability of conflict and opportunistic behavior. Thus, it is likely to lead to better labor relations within the firm.

The following two sections contribute to the existing literature by offering some new evidence. While section 3 analyzes the impact of mandated works councils on labor productivity, section 4 presents selected findings regarding the influence of works councils on firms' investments in human and organizational capital. As it turns out, the evidence seems to be compatible with the "performance enhancing-hypothesis" rather than the competing "cartel-hypothesis". However, due to specific econometric problems that have not been solved yet (see section 5), the empirical relevance of the latter hypothesis cannot be ruled out entirely.

3. Works Councils and Labor Productivity

Until recently, the number of studies analyzing the influence of works councils on firm performance was rather low and their quality poor. With the availability of different firm panels, the situation has changed quite dramatically; the number of studies has been – and still is – increasing rapidly and the more

recent studies suffer less from methodological problems than the ones that have been published until the mid and late 1990s[6]. The more recent studies have used a variety of measures, including productivity levels and growth, financial performance and profitability, investment in research and development and job generation. According to the estimates, however, works councils seem to have no clear cut consequences for firm performance: On the one hand, the presence of a works council has – other things equal – a significantly positive influence on labor productivity, but a significantly negative impact on profitability. On the other hand, works councils do not have an influence on investment behavior and / or on innovations (neither on product nor process innovations)[7].

To date, only few empirical studies have been able to control for the capital stock of the companies in the samples used[8]. Thus, most available studies are unable to rule out the possibility that it is capital intensity rather than the presence of a works council that fosters the economic performance. To overcome this methodological problem we use the 6th and the 8th wave of the IAB-Panel for firms located in West Germany and the 3rd and the 5th wave from East Germany (the data is from 1998 and 2000 respectively, see Kölling 2000). Our estimates are based on sample sizes that vary between slightly less than 700 (service firms in East Germany in the year 2000) and slightly more than 2.600 (all West German firms in 2000).

In 1998 as well as in 2000, the respondents in the sample firms have been asked how much money had been spent in the previous year to replace used capital goods. Assuming that the amounts recently spent are highly correlated with the capital stock, we estimate different types of production functions (Cobb-Douglas, CES and Translog) with value added as our dependent variable. Besides information on capital and workers employed, the production function estimates include a wide range of variables identified as (potential) determinants of firm performance: Apart from a works council and a profit sharing-dummy our augmented production function estimates include the percentage of qualified employees, two dummy variables indicating whether the firm invested in new communication or computer technologies ("process innovation") or brought new products and / or services to the market ("product innovation") within the last two years. Moreover, we include indicators measuring the percentage of sales exported, whether the firm employed any appren-

6 For a recent overview – including a distinction between three different phases of economics research – see Addison, Schnabel and Wagner (2003). Studies that have been published prior to 1997 are also summarized by Frick (1995, 1997b).

7 See Addison, Schnabel and Wagner (1996, 1998, 1999, 2001); Addison, Siebert, Wagner and Wei (2000), Dilger (2002), Hübler and Jirjahn (2002, 2003), Jirjahn (2003) and Schank, Schnabel and Wagner (2002).

8 To the best of our knowledge the only notable exception is FitzRoy and Kraft (1987, 1990).

tices and whether the firm is a member of an employers' association and has, therefore, to apply the rules agreed upon in one or more collective agreements.

Our first model based on a Cobb-Douglas production function is of the following general form:

$$Y = A * L^{\alpha} * K^{1-\alpha} \tag{1}$$

Augmenting the model by a works council dummy the estimate has the following form:

$$Y = A * L^{\beta 1} * K^{\beta 2} * BR^{\beta 3} \tag{2}$$

Taking logs and "translating" the model into one that can be estimated yields the following expression:

$$\ln BWS = \beta_0 + \beta_1 \ln L + \beta_2 \ln K + \beta_3 BR + \varepsilon \tag{3}$$

The full model to be estimated is as follows:

$$\begin{aligned} \ln BWS = {} & \beta_0 + \beta_1 \ln L + \beta_2 \ln K + \beta_3 BR + \beta_4 MB + \beta_5 BR * MB + \beta_6 PI + \\ & + \beta_7 PD + \beta_8 QA + \beta_9 TV + \beta_{10} EQ + BD + \varepsilon \end{aligned} \tag{4}$$

where $\ln BWS$: log value added,
$\ln K$: log replacement investments,
$\ln A$: log nominal volume of labor,
BR: existence of a works council (0 = no; 1 = yes),
MB: profit sharing for employees (0 = no; 1 = yes),
PI: process innovations (0 = no; 1 = yes),
PD: product innovations (0 = no; 1 = yes),
QA: percentage of qualified employees,
LA: firm employs any apprentices (0 = no; 1 = yes),
TV: firm bound to a collective agreement (0 = no; 1 = yes),
EQ: percentage of sales exported,
BD: vector of sector dummies (n =15).

The constant elasticity of substitution production function may be written as follows (see Greene 1993: 397):

$$\ln Y = \ln\gamma - \frac{\upsilon}{\rho} \ln[\delta \mathrm{K}^{-\rho} + (1-\delta)\mathrm{L}^{-\rho}] + \varepsilon \tag{5}$$

where δ: distribution parameter;
ρ: substitution parameter;
γ: level parameter;
υ: homogeneity parameter.

A Taylor series approximation to this function around the point $\rho = 0$ is

$$\ln Y = \ln\gamma + \ln K + \upsilon(1-\delta)\ln L - 0,5\,\rho\upsilon\delta(1-\delta)[\ln K - \ln L]^2 + \varepsilon \tag{6}$$

This, in turn, leads to the following coefficient estimates (for the other coefficients see equation (4)).

$$\ln BWS = \beta_0 + \beta_1 \ln L + \beta_2 \ln K + \beta_3[\ln K - \ln L]^2 + \varepsilon \tag{7}$$

The translog function has the most flexible functional form. It is a generalization of the CES-function and is of the following general form:

$$\ln Y = f(\ln L, \ln K) \tag{8}$$

A Taylor series approximation gives the following equation that can be easily estimated (for the additional coefficients see again equation (4)):

$$\ln BWS = \beta_0 + \beta_1 \ln L + \beta_2 \ln K + \beta_3 \frac{\ln^2 L}{2} + \beta_4 \frac{\ln^2 K}{2} + \beta_5(\ln L^{*}\ \ln K) + \varepsilon \tag{9}$$

Our estimates (see Tables 1 and 2) reveal that the works council dummy is significantly positive in every single estimate[9]. The values of the coefficients obtained indicate that in West German firms the presence of a works council increases labor productivity by about 25% while in East German firms the respective figure is about 30%. Surprisingly, however, the presence of a profit-sharing plan increases labor productivity significantly only in West German firms (in East Germany, the coefficient has the expected sign, but is not significantly different from zero at conventional levels). Again surprisingly, the coincidence of a works council and the existence of a profit-sharing plan does not have the expected positive impact on value added in either part of the country[10].

[9] Alternative specifications with additional independent variables (such as per capita wages, quality of technical equipment, R&D spending, overtime hours, product market competition) leave the influence of the works council dummy virtually unchanged without being statistically significant themselves.

[10] This is surprising insofar, as union resistance against the introduction of profit sharing is usually defended with the argument that the basis for the calculation of workers' share of the firm's profits can be easily manipulated by management. Such opportunistic behavior may not occur if a works council has been elected by the employees.

Table 1

Production Functions for West German Firms (1998)

	Cobb-Douglas	CES	Translog
$\ln K$	0,0120* 2,54	0,0612** 5,91	0,0030 0,13
$\ln L$	1,0170** 56,51	0,9472** 46,60	0,9110** 7,51
$(\ln L - \ln K)^2$	–	0,0083** 5,61	–
$\frac{(\ln K)^2}{2}$	–	–	0,0208** 6,22
$\frac{(\ln L)^2}{2}$	–	–	0,0144 1,09
$\ln L * \ln K$	–	–	–0,0132** 4,27
BR	0,2803** 4,41	0,2880** 4,61	0,2896** 4,61
$\bar{MB}$	0,2386* 2,12	0,2165* 2,01	0,2421* 2,25
$\bar{BR} * \bar{MB}$	–0,0944 0,75	–0,0699 0,58	–0,1305 1,08
TV	0,0022 0,04	–0,0183 0,35	–0,0166 0,32
$\bar{PI}$	0,0655 1,29	0,0995* 1,96	0,1142* 2,26
PD	0,01216 0,30	0,0068 0,17	0,0018 0,05
QA	0,4592** 5,77	0,4475** 5,64	0,4639** 5,82
LA	–0,0952 1,93	–0,1069* 2,19	–0,0962* 1,96
EQ	0,4075* 2,04	0,4317* 2,24	0,3805* 1,96
Industry Dummies	yes	yes	yes
CONST	4,3695** 26,98	4,4341** 31,54	4,7730** 8,83
adj. R^2	0,8945	0,8967	0,8975
$\bar{F}$-Value	755,50**	910,38**	742,88**
N of Cases	1770	1770	1770

Table 2

Production Functions for East German Firms (1998)

	Cobb-Douglas	CES	Translog
ln*K*	0,0156** 4,02	0,0719** 8,42	0,0167 0,66
ln*L*	0,9575** 48,90	0,8851** 41,89	1,0900** 7,58
$(\ln L - \ln K)^2$	–	0,0095** 7,33	–
$\frac{(\ln K)^2}{2}$	–	–	0,0220** 8,27
$\frac{(\ln L)^2}{2}$	–	–	–0,0076 0,45
ln*L* * ln*K*	–	–	–0,0149** 4,48
BR	0,3614** 6,10	0,3294** 5,73	0,3237** 5,61
MB	0,0664 0,80	0,0773 0,94	0,0772 0,93
BR * *MB*	0,0189 0,16	0,0506 0,44	0,0628 0,55
TV	0,0926* 2,33	0,0899* 2,30	0,0866* 2,21
PI	0,0652 1,59	0,0869* 2,14	0,0947* 2,30
PD	0,0669 1,74	0,0721 1,91	0,0702 1,85
QA	0,4185** 5,38	0,3717** 4,78	0,3509** 4,41
LA	0,0094 0,22	-0,0068 0,16	-0,0194 0,46
EQ	0,0912 0,46	0,0410 0,20	0,0390 0,19
Industry Dummies	yes	yes	yes
CONST	4,1810** 9,054	4,0788** 8,393	3,3745** 4,505
adj. R^2	0,8245	0,8297	0,8303
F-Value	497,01**	495,08**	465,73**
N of Cases	2434	2434	2434

* $p < .05$; ** $p < .01$; robust *t*-values according to White.

Moreover, membership in an employers' association – with the ensuing obligation to apply the wages and working conditions stipulated by the respective collective agreement(s) – has a positive influence on labor productivity in East German firms only (a finding that may raise the question of causality). The coefficients of the remaining explanatory variables have the expected signs and are statistically significant in most of the cases. Process innovations increase productivity in East as well as in West German firms, product innovations in East German firms only (and here at the 90%-level of significance only). The percentage of formally qualified employees increases productivity while the employment of apprentices reduces it (however, the respective coefficients are statistically significant only for West German firms). Finally, exporting firms from East Germany are significantly more productive than those who sell their products within the country only (this latter finding does not apply to firms in West Germany).

Table 3

The Impact of Works Councils on Labor Productivity in Different Sectors of the German Economy (1998 and 2000)#

Year	All Firms	Industry	Services
	East Germany		
1998	0,291 4.82**	0,333 4.80**	0,212 1.67+
2000	0,285 5.45**	0,199 3.21**	0,419 4.26**
	West Germany		
1998	0,097 1.38+	0,124 1,48+	0,085 0.70+
2000	0,145 2.87**	0,011 0.17+	0,290 3,46**

+ not significant; ** $p < .01$.

Coefficients from translog production functions. Full results are available from the authors upon request.

Comparing the three different specifications, it appears that from a statistical point of view the translog-model is to be preferred. On the one hand, in East as well as in West German firms, the interaction between labor and capital has a positive influence on gross value added – a finding that is at odds with the Cobb-Douglas specification[11]. On the other hand, an F-test shows that

[11] The substitution elasticities of the CES-function for 1998 are as follows: West Germany $\delta(4) = 0{,}7899$; $\delta(5) = 0{,}7683$ and $\delta(6) = 0{,}7759$; East Germany $\delta(4) = 0{,}7847$; $\delta(5) = 0{,}7751$ and $\delta(6) = 0{,}7778$.

the null hypothesis (the coefficients estimated with the CES- and the translog-model are identical) is to be rejected, i.e. the latter of the three specifications is to be preferred.

Repeating our estimates with data from the year 2000 confirms our findings presented above (see Table 3). What is worth mentioning, however, is the fact that the positive impact of works councils on labor productivity in 2000 seems to be much more pronounced in the service sector: When we distinguish between manufacturing and service firms, it appears that the point estimate for service firms in East Germany is twice the size than that for manufacturing firms. For West German firms, the works council dummy is even insignificant for manufacturing firms, but is highly significant for service firms.

4. Codetermination, Human and Organizational Capital

The findings presented so far are neither compatible with the notion of works councils as "rent-seekers" that tend to ignore the interests of owners and / or managers nor with the argument that firms will always benefit from the existence of a legally mandated plant-level representations[12]. Given these rather incompatible results (which, in turn, may simply reflect the incompatibility of the theoretical propositions derived in section 2 above), it is worth extending the analysis of the impact works councils may have on firm performance to what has come to be known as "intangible assets", i.e. especially the stock of human and organizational capital. Although investments in such assets may be of paramount importance for the short- and the medium-term performance of firms, they are very often neglected by economists. In the following section we will therefore concentrate on the impact of works councils on the credibility of long-term career promises, the readiness to finance and to participate in initial as well as in further training and the acceptance of organizational change (Table 4 displays the results of the available evidence).

[12] The determinants of the presence (or otherwise) of a works council have first been identified by Frick and Sadowski (1995) and Addison, Schnabel and Wagner (1997).

Table 4: **Works Councils and Personnel Policies of German Firms**

Author(s)	Sample / Data	Type and Indicator(s) of Personnel Policy	Indicator(s) of Codetermination	Effects of Codetermination
Voluntary and Involuntary Turnover				
Addison, Schnabel and Wagner (1998, 1999, 2001)	Hannover Firm Panel*	Hires, Departures and Labour Turnover	Presence of a Works Council	Significantly negative (all firms); not significant in firms with 21 – 100 employees
Addison, Siebert, Wagner and Wei (2000)	Hannover Firm Panel	Net Employment Change	Presence of a Works Council	Not significant
Beckmann and Bellmann (2002)	IAB-Panel**	Churning Rate	Presence of a Works Council	Significantly negative
Dilger (2002)	NIFA-Panel***	Personnel Turnover, Departures and Hires per 100 Employees	Presence of a Works Council; Type of Works Council	Significantly negative Significantly negative
Frick (1996a, 1996b, 1997a)	Representative Sample of West German Firms ($n > 1.600$, mid 1980s)****	Dismissals and Quits per 100 Employees Hires per 100 Employees	Presence of a Works Council	Significantly negative Not significant
Gerlach, Hübler and Meyer (2001)	Hannover Firm Panel	Coefficient of Variation of the Size of the Workforce	Presence of a Works Council	Significantly negative

* See Brand, Carstensen, Gerlach and Klodt (1996) for a description.
** See Kölling (2000) for a description.
*** See Widmaier (2001) for a description.
**** See Büchtemann and Höland (1989) for a description.

Table 4 continued

Kraft (1986)	Small Sample of Large Manufacturing Firms ($n = 62$, late 1970s)	Labour Turnover as Perceived by Management (Dummy "High" vs. "Low")	Presence of a Works Council; Participation Index	Not significant Significantly negative
Schmidtke and Backes-Gellner (2002)	IAB-Panel	Vacancies per 100 Academics, Skilled White-Collar Employees and Skilled Blue-Collar Workers	Presence of a Works Council	Not significant Not significant Significantly negative
Initial and Further Training				
Backes-Gellner, Frick and Sadowski (1995, 1997)	Representative Sample of West German Firms	Percentage of Apprentices Among Workforce; Retention Rate of Apprentices after Completion of Training	Presence of a Works Council	Not significant Not significant
Jirjahn (1998); Gerlach and Jirjahn (2001)	Hannover Firm Panel	Probability of Further Training Per-Capita Expenditures for Further Training	Presence of a Works Council	Significantly positive Significantly positive
Zwick (2002)	IAB-Panel	Per-Capita Expenditures for Further Training	Presence of a Works Council	Significantly positive
Special Groups of Employees				
Bellmann (2003)	IAB-Panel	Probability of Employing Subcontractors Percentage of Subcontractors	Presence of a Works Council	Significantly positive Significantly positive
Boockmann and Hagen (2001); Hagen and Boockmann (2002)	IAB-Panel	Percentage of Fixed-Term Contracts Percentage of Subcontractors Percentage of Freelance Work	Presence of a Works Council	Significantly positive Not significant Not significant

Table 4 continued

Düll and Ellguth (1999)	IAB-Panel	Percentage of Fixed-Term Contracts Percentage of "Marginal" Employment Relationships	Presence of a Works Council	Significantly positive Significantly negative
Frick (1992, 1994); Frick and Sadowski (1995); Sadowski and Frick (1990, 1992)	Representative Sample from Firm Register in Rhineland-Palatinate	Compliance with the Handicapped Act[13] Dismissals of Disabled Employees	Presence of a Works Council Behaviour of the Works Council (in support of employee)	Significantly positive Significantly positive with respect to probability of reinstatement
Fringe Benefits				
Bellmann and Frick (1999); Frick (2000)	IAB-Panel	Voluntary Pension Plan Operated by Employer Number of Benefits Provided	Presence of a Works Council	Significantly positive Significantly positive
Schnabel and Wagner (1999)	Hannover Firm Panel	Voluntary Pension Plan Operated by Employer	Presence of a Works Council	Significantly positive
Labour Costs, Flexible Staffing Arrangements and High Performance Work Practices				
Addison, Schnabel and Wagner (1998, 1999, 2001)	Hannover Firm Panel	Per-Capita Wages	Presence of a Works Council	Significantly positive (all firms as well as firms with 21 – 100 employees)
Bellmann and Kohaut (1999)	IAB-Panel	Per-Capita Wages	Presence of a Works Council	Significantly positive in East German firms only

[13] Measured by the percentage of the workforce officially recognized as "severely disabled" according to the German "Handicapped Act" of 1974.

Table 4 continued

Dilger (2002)	NIFA-Panel	Flexible Working Hours	Presence of a Works Council; Type of Works Council	Significantly positive
Frick (2002)	NIFA-Panel	Number of "High Performance Work Practices"	Presence of a Works Council; Positive Evaluation of Works Council by Management Level of Activities and Type of Works Council	Not significant Significantly positive Significantly positive
Gold (1999)	Hannover Firm Panel	Probability of "High Labour Costs" and "Excessive Staff Size"	Presence of a Works Council	Significantly positive
Hübler and Jirjahn (2003)	Hannover Panel	Per-Capita Wages	Presence of a Works Council	Significantly positive, but higher in firms not covered by a collective agreement as compared to those in the covered sector
Jirjahn (1998); Jirjahn and Klodt (1998)	Hannover Panel	Per-Capita Wages	Presence of a Works Council	Significantly positive
Schank (2001)	IAB-Panel	Per-Capita Wages	Presence of a Works Council	Significantly positive

In order to maximize worker effort, loyalty and motivation, firms usually implement specific incentive mechanisms to avoid opportunistic behavior. Since the deposition of bonds or "entrance fees" is neither feasible nor legally enforceable, workers are initially paid less than their marginal product, but eventually are paid a wage exceeding their marginal product. Over the expected tenure with the firm workers receive an expected present value of compensation equal to the present value of their productivity (see Lazear 1979, 1981). Workers whose productivity is below a certain minimum can be immediately dismissed, thereby loosing their rent of staying with the firm. In an "institutional vacuum", firms prefer rather steep wage profiles in order to dismiss workers by the time their wage rate equals their marginal product, because at this point the firm can maximize its "dismissal profit". In a perfectly competitive labor market, however, such opportunistic behavior severely damages the firm's reputation as an honest employer. In the long run, such firms will face considerable problems in recruiting qualified and loyal personnel – except in the case they offer flatter age-earnings profiles, which, in turn, increase the probability of worker opportunism because in the latter case the opportunity costs of being dismissed are significantly lower than in the case of steep profiles[14].

While the payment of seniority wages creates a kind of dependency on the part of workers, the same is true for firms, because the fixed costs of recruiting and training workers have to be amortized during the course of the individual employment relationship. Especially in the case of the most productive workers this amortization is permanently endangered, because those workers can – due to their sector specific skills and knowledge – change employers without any severe depreciation of their human capital. At the same time, firms are – irrespective of legal constraints – usually able to dismiss the less productive workers first, if workforce reductions become unavoidable, i.e. due to a reduction in product demand. There is ample evidence that workers who voluntarily resign from their last employment relationship are more productive than those who had been dismissed: In their new jobs, they have on average much higher returns on their human capital than laid-off workers, although the respective rates had been nearly identical prior to the job change (see Gerlach and Schasse 1991). In the latter group those who had lost their job due to a plant closure did not experience lasting reductions in their returns to human capital while those who were dismissed for personal reasons incurred substantial losses that could not be compensated even in the long run (see Gibbons and Katz 1991). Since firms usually have some discretion with respect to whom to dismiss, the market obviously infers that workers dismissed due to plant closures are on average of high quality while those who had been dismissed individually are of low quality.

[14] Firms that pay seniority wages are indeed more successful in economic terms than otherwise identical firms which do not consider tenure as an important determinant of the development of individual wages and salaries (see Kühl 1995).

In the absence of legally enforceable codetermination rights, workers are less willing to invest in the acquisition of firm specific human capital than otherwise observationally equivalent workers who are protected by exogenous regulations against an expropriation of their quasi-rents due to unjust dismissals (see Alchian 1984)[15]. This kind of "uncooperative" behavior is likely to cause disturbances in the production process and to inhibit the transfer of firm specific skills and knowledge from the incumbent to the new employees. The most likely result of a lack of worker participation is, therefore, an increase in non-wage labor costs due to an increase in voluntary turnover. Since the labor market's transparency is rather limited, the reputation mechanism is unlikely to guarantee that firms always remain "honest" and never dismiss workers in order to expropriate their quasi-rents (see Sadowski 1988). Thus, from the worker's point of view seniority wages lack a self-enforcing mechanism that inhibits employer opportunism. The more widespread seniority wages become and the steeper the age-earnings profiles are, the more the demand for institutional safeguards to reduce employer opportunism will increase[16]:

> "Once a bond is posted, a firm has a strong incentive to label a worker a shirker and to claim his bond. Unless, as is likely in practice, third parties can be relied on to determine whether a worker has shirked, workers will only be willing to post bonds if they are convinced that the firm will not take them under false pretence. Workers should trust firms not to falsely expropriate bonds so long as the bond is smaller than the value to the firm of maintaining its reputation as an employer. When workers are uncertain of the trustworthiness of firms, they are unlikely to be willing to post bonds" (Dickens et al. 1990: 165).

If neither the reputation mechanism nor the extent of relation-specific investments are sufficient conditions to suspend employer opportunism, the question arises whether and to what extent mandated codetermination is likely (or even indispensable) to improve the quality of plant-level labor relations and the functioning of firm-internal labor markets. Thus, to the extent that works councils serve as "collective information agencies" whose main task is the reduction of information asymmetries between management and workforce, they form an important part of a micro-corporatist arrangement, de-

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15 In his Nobel lecture, Becker (1993: 394) explicitly states that "firm-specific investments produce rents that must be shared between employers and employees, a sharing process that is vulnerable to "opportunistic" behavior because each side may try to extract most of the rent after investments are in place".

16 The hypothesis that the reputation mechanism cannot rule out employer opportunism is supported by two empirical observations: On the one hand, the risk of being dismissed increases c.p. with the worker's age and irrespective of the presence or absence of mandated job protection legislation (see Farber 1993 for the USA and Frick 1994 for Germany). On the other hand, more than 50% of all dismissals occur in a minority of only 10% of all firms, which nevertheless survive in the market (see Frick 1997a). This finding seems to be stable across countries and occurs in growing as well as in shrinking companies.

signed to overcome the prisoner's dilemma situation which is characteristic for labor relations. Since on the one hand, management is usually better informed about the financial situation of the enterprise, it can systematically try to pretend that the situation is worse than it actually is in order to achieve a redistribution of quasi-rents which is more in its favor. The works council's task, therefore, is to ascertain the "true" reduction of the marginal product of labor and / or to make sure that the initial distribution of the quasi-rent is retained (see Freeman and Lazear 1995)[17]. On the other hand, workers representatives' are usually better informed about the productivity and motivation of individual employees than is management. This information, in turn, can be valuable to management not only in the case of dismissals, but also when selecting workers for further training, etc. This information is likely to be very reliable, because the works council's interest in a maximization of the joint surplus to be distributed is unlikely to conflict with management's interest in profit maximization[18].

Contrary to the unions in the US and Great Britain, works councils in German firms have a *de jure* rather strong position with regard to dismissals, implying that employment protection in the latter country has a strong collective component. According to § 1 of the Dismissal Protection Act of 1969, dismissals must not be "socially unwarranted". This means that they must be justified in terms of either the conduct of the individual employee or the operational requirements of the enterprise (for an overview, see Birk 1993)[19]. Prior consultation with the works council is a prerequisite for the validity of any dismissal (§§ 102 – 103 Works Constitution Act). The works council must be informed within one week, and has one week in which to respond to an ordinary dismissal. In cases of extraordinary dismissal, i.e. severe misconduct, the works council must be informed immediately and has three days in which to object to the dismissal. The works council may either give its consent, remain silent, express its misgivings, or even lodge a formal contradiction. If the works council objects to the dismissal, the employee generally has a claim to continued employment pending a judicial decision or until a settlement has been reached.

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17 There is ample evidence that German works councils adequately fulfill this task: In a large number of recent cases they supported management in its attempt to reduce labor costs by either separating parts of the enterprise from the mother company (although this usually results in more or less severe income losses), by renouncing to fringe benefits in order to increase investments or by extending the number of weekly working hours. The most prominent example, however, was the works council's approval to introduce the four-day working week at Volkswagen.

18 This is to be expected as least as long as the firm's personnel policy does not threaten the stability of the dominant coalition among the workforce, i.e. the qualified, middle-aged employees with long tenure (see Sadowski 1985).

19 These regulations explicitly exclude small firms with less than six employees, and employees who have not yet completed a minimum probationary period of six months.

Special procedures are applicable to collective dismissals, depending on the number of employees affected, and on the size of the firm. In general, employers must inform and consult the works council, communicating, inter alia, the reasons for the proposed dismissals, the timetable for their implementation, and the number of employees affected. Both the employees affected, and also the works council, may contest collective dismissals on grounds of improper criteria used for the selection of employees to be laid off. In firms with more than 20 employees the employer must, at the request of the works council, negotiate a social plan. Until recently there was little empirical evidence on whether works councils do indeed influence employers' dismissal (and employees' quit) decisions. Therefore, the question is to what extent works councils act as "safeguards" against employer opportunism and as "protectors" of employees' quasi-rents by reducing dismissals as well as voluntary resignations. If the works councils fulfill their constituents' expectations, the relative number of dismissals and resignations (dismissals and resignations per 100 employees) should be significantly lower in firms with a works council than in enterprises without plant-level representation.

Using the 5th and the 8th wave of the IAB-Panel to calculate the respective figures it turns out that, first, the rate of (in-)voluntary turnover is indeed significantly higher in the latter as compared to the former type of firms. Second, the observed pattern is more or less identical in East and West German firms as well as in firms located in the second and tertiary sectors (see Table 5).

Table 5

Personnel Turnover in East and West German Firms*

Sector	East German Firms		
	All Firms	Firms with Works Council	Firms without Works Council
All Firms	13,0	8,5	17,3
Industry	13,7	9,2	16,3
Services	12,7	8,2	18,2
	West German Firms		
All Firms	12,1	9,4	15,7
Industry	10,2	8,5	13,2
Services	13,1	10,0	16,8

* Number of hires and departures per 100 employees during the first six months of the year 2000 in firms with five and more workers.

Source: IAB-Panel, Wave 8 from West Germany and wave 5 from East Germany.

In order to analyze the impact of works councils on personnel turnover we follow an approach suggested by Hübler and Jirjahn (2003) who distinguish not only between firms with and without a works council but also between firms that are members of an employers' organization and those who are not. Our estimates reveal that in firms with a works council personnel turnover is significantly lower than in firms without a plant-level interest representation. This effect is more pronounced in firms that have to obey to one or more collective agreements, suggesting that management attitudes also play a role in reducing turnover (see Table 6). At the same time, however, it appears that the existence of a works council is of paramount importance.

These findings, however, are only a necessary, but not a sufficient condition for the proposed "internal efficiency" (see Aoki 1984) of the German Works Constitution. At first sight they are even supportive of the conflicting view, that codetermination is one of the main reasons for the "inflexibility" of German firms when facing the need to adjust the workforce. It is, therefore, necessary to show that the works councils not only take into consideration the quasi-rents of the insiders, but also the interests of the firm as well as those of the (unemployed) outsiders. Additional estimates (not presented here) show that works councils neither oppose dismissals in contracting firms nor prevent recruitments in expanding firms (see Frick 1997a).

If, as has been pointed out by several critics, the works councils unilaterally favor the interests of the incumbent workforce, we should observe the following (see Frick 1997a: 254 – 260): In shrinking firms with a works council the percentage of younger and / or qualified workers should be disproportionately high among the leavers if the works councils actually favor those with long tenure and reduced opportunities on the external labor market. This, in turn, would be detrimental to the firm's economic performance, because in the long run it is left with its less productive workers, putting it at a competitive disadvantage compared to otherwise identical firms without a works council. In shrinking firms without a works council, the percentage of older and / or less qualified workers should be disproportionately high among the leavers, because of the firm's interest in retaining its most productive employees. The respective estimates show that the presence or absence of a works council does not have any influence on the qualification structure of those who leave or stay in the case of inevitable workforce reductions.

Apart from the above mentioned differences in the turnover rates of firms with and without a works council, it is still possible that the presence of a plant-level interest representation severely restricts the firm's ability to react to technical progress or to changes in product demand. If this were the case, the standard deviation of the number of dismissals should be much smaller in firms with a works council than in otherwise identical firms without a works council. However, looking at the relative concentration of dismissals in

Table 6

The Separate Impact of Works Councils and Collective Agreements on Personnel Turnover in East and West German Firms (2000)[1]

Variable / Firms	B	SE B	T
East German Firms			
MBR / MTV[2]	–0,3682	0,0674	–5,46***
MBR / OTV[3]	–0,1701	0,0830	–2,05**
OBR / MTV[4]	–0,1165	0,0497	–2,35**
West German Firms			
MBR / MTV	-0,2752	0,0463	–5,95***
MBR / OTV	-0,1946	0,0661	–2,94***
OBR / MTV	-0,1671	0,0400	–4,18***
Industry (East Germany)			
MBR / MTV	–0,2708	0,0877	–3,09***
MBR / OTV	–0,1916	0,1048	–1,83*
OBR / MTV	–0,0404	0,0631	–0,64+
Industry (West Germany)			
MBR / MTV	–0,2553	0,0623	–4,10***
MBR / OTV	–0,1640	0,0866	–1,89*
OBR / MTV	–0,1939	0,0608	–3,19***
Services (East Germany)			
MBR / MTV	–0,5471	0,1079	–5,07***
MBR / OTV	–0,1246	0,1344	–0,93+
OBR / MTV	–0,2771	0,0808	–3,35***
Services (West Germany)			
MBR / MTV	–0,3005	0,0707	–4,25***
MBR / OTV	–0,2396	0,1017	–2,36**
OBR / MTV	–0,1557	0,0531	–2,93***

+ not significant; * $p < .10$; ** $p < .05$; *** $p < .01$.

[1] Dependent variable is log odds of personnel turnover $\left(\ln(pt/(1-pt))\right)$. For additional controls see tables 1 – 2. The full results are available from the authors upon request.

[2] MBR / MTV: with works council, with collective agreement

[3] MBR / OTV: with works council, no collective agreement

[4] OBR / MTV: no works council, with collective agreement
(reference category OBR / OTV: no works council, no collective agreement).

expanding as well as in contracting firms with and without a works council, it appears that the respective Gini-coefficients are nearly identical and that the Lorenz-curves intersect twice in both cases. In shrinking firms with a works council, the coefficient value is 0,635; in firms without a works council it is

0,666. In growing firms the respective values are 0,657 (with works council) and 0,705 (without works council), suggesting that there are no systematic differences in the adjustment behavior of firms with and without workers' representation. Thus the concentration of dismissals among a minority of "marginal firms" is more or less identical in the four subgroups, which indicates that although works councils reduce the level of dismissals and quits, they do not impose an undue burden on the marginal firms (see Frick 1997a: 261 – 263)[20].

5. Summary and Implications

The findings of our study – one of the first that uses a proxy for capital intensity to rule out the possibility that the works council influence on labor productivity may be caused by an "omitted variable bias" – can be summarized as follows:

- First, controlling for a number of firm characteristics, the presence of a works council has a positive and statistically significant influence on the economic performance of German firms. The respective coefficients indicate that these effects are rather large and that they differ significantly between industry and service sectors. Moreover, comparing the different specifications it appears that the translog production function is the most appro-

[20] Moreover, the findings presented in this section are compatible with the following observations (for an overview see Table 4 above): First, the presence of a works council has a significantly positive influence on the probability that the firm invests in the training of its workforce as well as on the training expenditures per employee (see Gerlach and Jirjahn 2001). This positive impact of works councils on further training is in accordance with the hypothesis that mandated codetermination promotes cooperative and trustful industrial relations which alleviate many of the market failure problems resulting from employer provided further training. Second, the presence of a works council contributes significantly to the firm's flexibility of deploying its workforce. Thus, although works councils may be seen as an institution that reduces the firm's "external" flexibility (however, the empirical findings quoted above do not seem to support that assumption), they apparently increase "internal" flexibility by promoting among their constituents the introduction of working time arrangements that deviate from "standard" working hours (see Dilger 2002). Third, it is not the presence of a works council per se that influences the adoption of high performance work practices but its "level of activities" – measured by the number of firm-level agreements concluded during the last three years – and the "type" of the works council as viewed by the management of the firm: In firms with an "antagonistic" works council, the number of high performance work practices is higher than in otherwise similar firms that have either a "disinterested" or even an "excluded" works council (see Frick 2002). Looking at the performance effects of such practices, it becomes apparent why the works councils are often rather sceptical as to their consequences for the employees: other things equal, the adoption of the above-mentioned practices increases expected as well as actually realized firm performance (measured by changes in product demand, in sales, and in profitability), but at the same time it reduces the demand for labor. This means that firms do indeed benefit from such practices – but very often at the expense of their workers.

priate functional form, suggesting that it is not only the amount of labor and capital used that matters, but that their interaction is also of paramount importance for the performance of firms.

- Second, the presence of a works council has a statistically significant impact on personnel turnover: On the one hand, it reduces the number of dismissals, thereby securing workers' quasi-rents. On the other hand, it also reduces the number of voluntary quits, thereby reducing the turnover costs of firms by increasing workers' readiness to accept, inter alia, deferred compensation schemes which are likely to increase company performance too. Moreover, the seemingly high degree of consensus between management and workers' representatives even in the case of (individual or mass) dismissals indicates that personnel problems are usually dealt with in a largely co-operative manner[21].

Thus, the German works constitution can be termed "institutionally efficient" (see Aoki 1984): To the extent that a credible works council can convince the firm's workforce to accept the implementation of measures that seem to violate their expectations, mandated codetermination is likely to overcome the problems inherent in a "prisoner's dilemma" situation, where credible commitments are impossible to be made without the support of an exogenously implemented institution, whose task is to monitor the behavior of the contracting parties.

The major shortcomings of our analysis are obvious: We do not yet know whether the productivity increase induced by mandated works councils is large enough to compensate firms for the associated increase in labor costs (see the findings summarized in Table 4 above). Moreover, we cannot yet completely reject the hypothesis, that the productivity increases associated with mandated works councils may be the result of some omitted variables, such as an especially competent management. However, given the plausibility of the theoretical arguments suggesting a positive impact of works councils on firm productivity, we have no reason to expect that econometric analyses using other (and possibly better) data would yield results fundamentally different from the ones presented above[22].

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21 Höland (1985: 98) shows that in the case of dismissals the works councils usually support the employers' position: In only 6% of all cases works councils express their misgivings (arguing that the dismissal is socially unacceptable, that no social plan has been designed, etc.), while in 8% they lodge a formal contradiction (arguing that the employer's arguments are not valid, that other employment opportunities within the firm exist, etc.) In the remaining 86% of cases the works councils either explicitly agree with the employer (66%) or they remain silent (20%). Using different data Sadowski and Frick (1992) and Frick and Sadowski (1993) reach a very similar conclusion.

22 Unfortunately, panel-estimation techniques cannot be applied, because the existence of a works council is a time-invariant parameter. Thus, it is not possible to estimate fixed effects models.

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