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ABSTRACT

Works Councils, Collective Bargaining and Apprenticeship Training*

In this paper, we investigate the effects of works councils on apprenticeship training in Germany. The German law attributes works councils substantial information and co-determination rights to training-related issues. Thus, works councils may also have an impact on the cost-benefit relation of workplace training. Using detailed firm-level data containing information on the costs and benefits of apprenticeship training, we find that firms with works councils make a significantly higher net investment in training compared with firms without such an institution. We also find that the fraction of former trainees still employed with the same firm five years after training is significantly higher in the presence of works councils, thus enabling firms to recoup training investments over a longer time horizon. Furthermore, all works council effects are much more pronounced for firms covered by collective bargaining agreements.

JEL Classification: J24, J50, M53

Keywords: works councils, collective bargaining agreement, apprenticeship training, firm-sponsored training

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1 Introduction

Recent literature has discussed the impact of works councils on worker productivity, wages, employment and capital investments. However, although works councils have substantial rights and duties with respect to training-related issues, no studies thus far have attempted to analyze works council effects on the human capital investments of firms. An important type of human capital investment is apprenticeship training, which is the dominant educational track at the upper secondary level in Germany.

Works councils are in charge of implementing and enforcing quality standards of apprenticeship training and may, thus, induce higher training costs for the firm. However, works councils may also increase the benefits of training because one of their main tasks is to improve job security and working conditions. As a trainee spends the majority of her time during an apprenticeship program in the work place, she becomes an integral part of the work force. Works councils have a formal obligation to represent the interests of the apprentice, thereby increasing the likelihood that the firm offers a regular employment contract to the apprentice after training. Once a former apprentice is part of the regular work force, expected tenure is longer, which, in turn, is related to the works council's rights with respect to firing procedures. Thus, works councils may justify higher human capital investments because higher retention rates and longer tenure of former apprentices enable the firm to recoup training investments over a longer period.

The contribution of this paper is to investigate, for the first time, the effects of works councils on a firm's training behavior, particularly with regard to the cost-benefit relation of apprenticeship training and the firm's retention strategies. For our empirical analysis, we make use of detailed and representative firm-level data on the costs and benefits of apprenticeship training in Germany for the year 2007. We present a model that takes into account both the firm's costs and benefits during the training period as well as potential benefits after training. We then empirically test whether a firm with a works council differs in certain parameters of the model compared with a firm without a works council. We differentiate between firms that are subject to collective bargaining and those that are not. We further offer a separate analysis for a subsample of medium-sized firms with 21 to 100 employees, thereby excluding small (large) firms with a very low (high) probability of having works councils.

Our main results suggest that (i) a firm with a works council makes a substantial and significantly higher net investment in training compared to a firm without a works council if the former is also covered by collective bargaining agreements and (ii) a firm with a works council retains a higher percentage of apprentices than a firm without a works council, which enables the works council firm to generate higher post-training benefits. Finally, we find some evidence for a lower training intensity in works council firms compared to non-works council firms.

The remainder of the paper is structured as follows. In the next section, we provide information on the institutional setting in Germany and review the relevant literature. In section 3, we present a simple theoretical model of the costs and benefits of apprenticeship training and formulate hypotheses about the impact of works councils and collective bargaining on the important determinants of costs and benefits. We describe our data in section 4 and present the empirical estimation strategy in section 5. We then discuss the results in section 6 and conclude the paper in section 7.

2 Institutional setting and relevant literature

Works councils play an important role within the German system of industrial relations. The *Works Councils Constitution Act* (Betriebsverfassungsgesetz, 1972) implemented in the early 1970s, outlines the formation conditions and all rights and duties of works councils. According to this act, the staff in every firm with 5 or more employees has the right to elect a works council. Elected members of the works council are to be exempt from their regular work without pay-cuts during their council activities. In larger firms, works council members are exempted full-time.[1] The rights and duties of a works council are manifold. It may formally object to hiring and firing decisions taken by the management in the event that social criteria are not respected. It further monitors safety standards and is responsible for the implementation and monitoring of collective bargaining agreements at the plant level. Despite the legal right to establish a works council, only 10% of firms with more than 5 employees in the private sector feature a works council. However, because the probability of having a works council increases with firm size, well over 40% of all employees are working in a firm with a works council. While the percentage of firms with

[1] The number of works council members that must be exempted full-time increases with the total number of employees in the firm. A firm with 200 employees has to exempt 1 works council member, while a firm with up to 8,000 employees has to exempt 10 members.

a works council has been relatively stable over the last two decades, the share of employees represented by works councils has declined by approximately 10% since 1996 (Ellguth and Kohaut, 2010).

A number of early studies found significant effects of works councils on productivity, profitability, wages and labor fluctuations (Addison, 2001; Hübler and Jirjahn, 2003).[2] More recent studies, however, point to a neutral impact of works councils on investments (Addison et al., 2007) and productivity (Wagner, 2008). The positive effects on wages remain robust even when more sophisticated estimation methods and richer data sets are applied (Addison et al., 2010). While Addison and Teixeira (2006) find a negative effect of works councils on employment growth, Jirjahn (2010) reports positive employment effects, when taking potential endogeneity of works councils into account.

Before addressing the link between works councils and apprenticeship training, it is useful to determine the main features of this 'dual' system of training in Germany. Approximately two-thirds of all young adults enter the apprenticeship training system. Thus, the 'dual' system is the most important educational pathway at the secondary level in Germany. The apprentice signs a formal contract with the firm and receives a predetermined wage over the entire training period. Apprentice wages are usually a fraction of the wage paid to skilled workers in the same occupation.[3] Depending on the occupation, the duration of an apprenticeship varies between 2 and 3.5 years, during which the apprentice spends, on average, 2 days of a working week in a vocational school and the rest of the week at the firm. During their time at the firm, apprentices learn, in different ways, how to become a skilled worker. Some firms, especially larger ones, use separate in-house training centers and organize additional internal schooling. Other firms train within the production setting, which effectively increases the benefits to the training firm as the apprentices are engaged in productive activities. At the end of the training, apprentices take an external standardized exam. The degree obtained is accepted by employers throughout the country.

The *Works Councils Constitution Act* explicitly gives a works council the right to participate in the planning, implementation, and monitoring of vocational training activities in the firm (Oetker, 1986; Hammer, 1990). With respect to apprenticeship training, the role of a works council is to ensure that the content and the process of training correspond to

[2] Addison et al. (2004) and Frege (2002) provide assessments of theory and the early literature on the economic consequences of works councils.

[3] An apprentice's wages usually increase annually over the training period.

the formal training regulations (*Ausbildungsordnungen*).[4] A works council has the right to call for a replacement of training personnel if they are neglecting their duties (§98). Thus, the training quality in a firm *with* a works council should be, on average, positively affected by this institution as it is more likely that negligence of such duties go undetected in a firm that does *not* have a works council. A higher training quality may go hand-in-hand with higher apprenticeship training costs as workers in charge of this training spend more on training-related issues.

Despite this direct institutional link between works councils and training activities of firms, only a few studies address the relationship between a firm's works council and the firm's organization of apprenticeship training. Freeman and Lazear (1995) argue that a works council leads to increased tenure of employees and that a firm with a works council consequently invests more in firm-specific human capital, which, in turn, increases the firm's willingness to invest in *general* human capital (Kessler and Lülfesmann, 2006). Consistent with Freeman and Lazear (1995), a recent contribution by Hirsch et al. (2010) shows that a German firm with a works council has a lower separation rate of employees than a firm without a works council. Thus, the former may be more inclined to offer apprenticeship training compared to the latter if expected tenure - and, therefore, the pay-off period for training investments - is longer.

In one of the few empirical studies on this issue, Backes-Gellner et al. (1997) find that a firm with a works council employs a significantly lower proportion of apprentices per employee than a firm without a works council, yet they do not find any significant effects of a works council on the retention rate of apprentices. This is explained by an early selection at the apprenticeship level, while the goal of a works council is to limit the number of participants in the rent-sharing process.

The second pillar of industrial relations in Germany is the collective bargaining of social partners. Although the coverage of collective bargaining has declined in recent years (Fitzenberger et al., 2011) this type of institution remains important and may have considerable effects on the firm's training behavior. Dustmann and Schönberg (2009) find that unionization increases participation in training and that a non-unionized firm is less

[4] As training regulations have the status of a legal regulation, a violation on the part of the firm may have severe consequences for the firm. The training regulation outlines the main contents of training to be undertaken by the firm. However, the firm has considerable freedom in how to achieve the respective training aims.

likely to finance training. Dustmann et al. (2009) find that de-unionization goes hand-in-hand with an increased skilled-unskilled worker wage differential. In practice, unions support the implementation of a works council. Conversely, as many works council members are also members of unions, the two institutions are interwoven at the firm-level. Hence, we expect the effects of a works council to differ in firms that additionally have collective bargaining agreements compared to firms with a works council only.

3 Theoretical framework

The costs and benefits of apprenticeship training within the firm can be summarized in the following framework.[5] The firm aims to maximize the total benefits of training, which consist of benefits *during* training (B_t) and expected benefits *after* training ($E[B_{t+1}]$). Because training also involves costs (C_t) during the training period, the principal maximization problem can be formulated as:[6]

$$\max B_t - C_t + E[B_{t+1}]. \tag{1}$$

First, benefits during the training period (B_t) are the result of the apprentice performing unskilled work to which he devotes h_u hours of his working time. Apprentices also perform h_s hours of skilled work with a relative productivity of $\gamma < 1$ as apprentices are not yet as productive as skilled workers in the training occupation. The total time an apprentice spends with productive work is given by

$$h_w = h_u + h_s. \tag{2}$$

The apprentice's involvement in skilled and unskilled tasks is valued at the within-firm wage rate of skilled (w_s) and unskilled workers (w_u). The benefit of an apprentice during the training period is, therefore, given by

$$B_t = h_u \cdot w_u + h_s \cdot \gamma \cdot w_s. \tag{3}$$

[5]The basis for a cost-benefit model of apprenticeship training has been laid by the "Expert-Commission on the costs and financing of vocational education and training" (Sachverständigenkommission Kosten und Finanzierung der beruflichen Bildung, 1974).

[6]Firms maximize over the number of apprentices.

The costs for the training firm (C_t) consist of the wage of the apprentice w_a, the wage of training personnel w_t for the number of hours h_t during which the training personnel was not able to pursue other productive tasks. Other expenses for an apprentice, such as materials, infrastructure, external training courses, recruitment and administrative costs, are denoted by X:

$$C_t = w_a + h_t \cdot w_t + X. \tag{4}$$

Finally, there is a possibility that a firm generates returns in the period following the training program. Such post-training benefits (B_{t+1}) crucially depend on whether apprentices are retained and, if so, for how long these workers remain with the training firm. The retention rate of apprentices is denoted by κ. The sources for post-training benefits are given by (i) reduced hiring costs $H(\kappa)$ and (ii) reduced firing costs $F(\kappa)$. Retaining former apprentices reduces both the firm's need to hire skilled workers, and through employer-learning, the likelihood of having to fire an internally trained worker, which is due to the employer's information advantages regarding the worker's ability and motivation. A further channel for post-training benefits is (iii) a compressed wage structure. In this case, the firm is able to extract a rent $\Delta(\tau)$ from paying a wage below productivity. The size of that rent must be positively affected by employing former apprentices as skilled workers. One could imagine that the retained apprentices have superior abilities compared with skilled workers from the external labor market ("lemons"). Due to information asymmetries, even the most talented apprentices are willing to stay with the training firm despite the below market-value wage.[7]

Post-training benefits B_{t+1} can thus be summarized as

$$B_{t+1} = H(\kappa) + F(\kappa) + \Delta(\tau). \tag{5}$$

Total training benefits consist of net benefits (costs) during the training period t as well as a potential post-training benefit in period $t+1$. The maximization problem in equation 1 thus extends to

$$\max B_t[w_u, w_s, \gamma, h_u, h_s] - C_t[w_a, h_t, w_t, X] + I[B_{t+1}(H(\kappa), F(\kappa), \Delta(\tau)]. \tag{6}$$

[7]The post-training benefits can be seen as an option that the firm holds in the hiring of their own apprentices.

Rather than focusing on the analytical solution of the maximization problem above, our aim is to analyze whether a firm with a works council (henceforth, WC) differs from a firm without a works council (henceforth, NWC) with respect to the relevant factors of the maximization problem.

First, it has been observed that wages (w_u, w_s) in a WC are generally higher than wages in a NWC (Addison et al., 2010). This means that the value of productive work performed by an apprentice is higher in a WC than in a NWC. However, it is not clear if the relative productivity of an apprentice γ differs between a WC and a NWC as we might not expect the productivity of an apprentice in a firm to be systematically different from the productivity of a skilled worker.

The hours that an apprentice spends performing productive activities $(h_u + h_s)$, however, are likely to be lower in a WC than in a NWC because a works council may have the goal to protect work volume for the existing work force and therefore oppose the substitution of productive activities by the apprentice. Thus, even if the value of productive work is higher in a WC than in a NWC, the overall effect on the training benefit is ambiguous as the works council of a firm is likely to reduce the volume of productive work (h_w) allocated to an apprentice.

The gross costs of apprenticeship training may be affected when apprentice pay (w_a) is higher in a WC than in a NWC due to a more selective recruitment strategy of the WC, a point that been argued by Backes-Gellner et al. (1997). A WC may offer higher apprentice pay to attract the more able recent graduates, and a WC may also be inclined to offer more training hours (h_t) to their apprentices. Instruction time in a WC may, as a consequence, be more expensive as training personnel - typically skilled workers in the same training occupation - receive higher wages (w_t) than their counterparts in a NWC. Thus, we expect gross training costs to be higher in a WC than in a NWC.

Summing up, the total effect of works councils on net costs is ambiguous based on the theoretical predictions mentioned herein, and therefore, they must be determined empirically.

With respect to post-training benefits (B_{t+1}), we expect them to be higher in a WC than in a NWC if (i) hiring costs (H) in a WC are higher, e.g., because a WC has higher requirements with regards to the qualification of employees, (ii) firing costs (F) are higher because it is more difficult and, therefore, more costly to lay off an individual worker in the presence of a works council, or (iii) the wage structure with respect to the skill level

($\Delta\tau$) is more compressed in a WC than in a NWC, e.g., because workers in a WC realize a higher productivity than in a NWC.[8]

The realization of post-training benefits crucially depends on the retention rate of former apprentices (κ). Assuming a more selective recruitment strategy, it would be expected that a WC retain a higher share of apprentices than a NWC. In addition, we expect that an apprentice would accept a job with a higher probability in a WC than in a NWC because a works council typically signals better working conditions, higher wages and increased job security compared to a NWC (Backes-Gellner and Tuor, 2010). Thus, based on the theoretical arguments, we expect that a WC has higher expected post-training benefits than a NWC, and thus, a WC would be willing to accept higher net training costs than a NWC.

We further expect that the effects of a works council may be reinforced by collective bargaining agreements in the firm. Freeman and Lazear (1995) argue that distributional conflicts are "externalize" in firms covered by collective bargaining, which leads to a more efficient cooperation between works councils and management. This would, on the one hand, dampen the wage-effects of a works council as wages are predominantly determined on the regional or sectoral level. By contrast, a works council could fully concentrate on worker representation, which could lead to increased tenure of skilled workers.[9] Thus, we expect the effect of a works council on wages to be lower in a firm that is also subject to a collective bargaining agreement, but we would, in turn, expect a stronger effect of a works council on tenure.

In the remainder of the paper, we will focus on empirically testing the differences among the relevant factors of the firm's maximization problem previously presented and discuss implications for the training behaviors of a WC and a NWC.

[8]A general advantage of all training firms (both a WC and a NWC) is that they can learn about the workers true ability in a work-related context (Schönberg, 2007; Pinkston, 2008; Lange, 2007). Lange (2007) shows that employers learn quickly and that after three years, the initial expectation error is halved for all employers. However, there is no reason why a WC would learn quicker about an apprentice's ability compared to a NWC.

[9]Pfeifer (2007) shows that the effect of a works council on voluntary quits is larger if the firm is also covered by collective bargaining agreements. Frick and Möller (2003) provide evidence that the effect on separations is largest when works councils as well as collective agreements are present in the firm.

4 Data

For the analysis in this paper, we use unique firm-level data containing detailed information on the costs and benefits of apprenticeship training. The survey was carried out by the Federal Institute for Vocational Education and Training (BIBB) for the reference year 2007 (Schönfeld et al., 2010). It is the fourth wave of a series of cost-benefit studies. Prior surveys were conducted for the years 1980 (Noll et al., 1983), 1990 (von Bardeleben et al., 1995) and 2000 (Beicht et al., 2004). Approximately 3,000 German training firms were interviewed via a computer-assisted personal interview (CAPI).[10] The sample was randomly drawn from social security register data and, as such, is representative of Germany. Respondents in the firms were the persons responsible for the training organization and, if necessary, included the human resource manager of the firm. In small firms, the respondents tended to be the owner or the general manager of the firm. To calculate the costs of training, we require information on direct costs, such as apprentices' wages, material and costs for administration, and indirect costs, such as the productivity loss of part-time trainers. For the calculation of the benefits *during* the training period, firms were asked to provide information about apprentices' productive work at both the unskilled and skilled levels. Further, firms reported a relative productivity measure for the hours spent performing skilled work and information on wages of unskilled and skilled workers in the training occupation.

Apart from questions about benefits for the period during training, firms supplied information about the recruitment, retention and tenure of former apprentices. In addition, the data set includes information about the process and organization of apprenticeship training in the respective firm.

For the analysis in this paper, we exclude firms operating in the public sector and firms with fewer than 5 employees. The reason we exclude the former is that organizations in the public sector are, unlike private firms, not profit maximizers. The reason for excluding small firms with fewer than 5 employees is that the legal right to establish a works council applies only to employees in firms with a staff of 5 or more employees. Eliminating these firms from the sample leaves results for 2,362 training firms. As the share of firms with a

[10]The field work was managed by the Institute for Applied Social Sciences (infas). For documentation on the survey methodology as well as the calculation of weights used in the subsequent analysis, see Schröder and Schiel (2008).

works council becomes very small among firms with fewer than 20 employees and very large among firms with more than 100 employees (Figure A1), we supply a separate analysis for the group of firms with 21 to 100 employees, as suggested by Addison et al. (2010), thus reducing our sample to 700 firms.

Descriptive information about the samples is provided separately for WCs and NWCs in Tables B.1 and B.2 in the appendix.

5 Estimation strategy

Our primary aim is to estimate whether and how a WC differs from a NWC with respect to the costs and benefits of apprenticeship training. In a first step, we estimate this effect on gross costs, benefits and net training costs. Second, we investigate this effect in more detail by analyzing relevant subcomponents of the cost-benefit model, as discussed in section 3. Third, we are also interested in whether a WC and a NWC differ in respect to post-training benefits. We use a variable measuring the percentage of apprentices that remain in the training firm 1, 3 and 5 years after the completion of their training. Finally, we investigate the training intensity by analyzing both the ratio of apprentices to all employees within a firm and the ratio of apprentices to skilled workers in the training profession. As we only focus on training firms, the variables of training intensity are continuously distributed with only very few firms reporting an intensity > 1.

For our estimation, we apply nearest neighbor matching models.[11] Our goal is to estimate the average treatment effects of a works council.

Let the observed outcome be denoted by Y_i:

$$Y_i = Y_i(WC_i) = \begin{cases} Y_i(0) & \text{if } WC_i = 0 \\ Y_i(1) & \text{if } WC_i = 1 \end{cases}$$

where WC_i , for $WC_i \in 0, 1$, is the treatment indicator. We are interested in estimating the average treatment effect (ATE), which can be interpreted as the overall effect of a works council on the entire sample of training firms:

$$ATE_i = E[Y_i(1) - Y_i(0)|WC_i = 1]$$

[11] For seminal works on matching methods see, among others, Rubin (1974) as well as Rosenbaum and Rubin (1983).

For claiming that the matching estimators are a consistent estimate of the treatment effects of interest, we must assume that the assignment to treatment (i.e., implementing a works council) is independent of the outcomes and conditional on the covariates included in the matching process. Further, the probability of implementing a works council is restricted to be between 0 and 1 (Abadie et al., 2004).

To ensure independence of the outcome variables, we would need an experimental setting where some firms are randomly assigned to implement works councils, while other firms would not be allowed to implement works councils. While in our case, the treatment cannot be interpreted as random, the unconfoundedness assumption (see Rosenbaum and Rubin, 1983) holds when there are no unobserved factors that affect both the firm's employees' decision to implement works councils and the costs and benefits of apprenticeship training. Thus, we must assume that the treatment WC_i is independent of the outcome variables $(Y(0), Y(1))$, i.e., the cost and benefit variables. Although apprenticeship training is typically not the core business of a firm and employees may base their decision to implement a works council solely on unobserved factors that do not affect the costs and benefits of apprenticeship training, our findings cannot be interpreted as strictly causal, as is the case in any non-experimental analysis. A potential violation of the unconfoundedness assumption can be found in wages, as these are an integrated part of the training costs (and benefits). Unobserved firm heterogeneity, such as the average worker quality in the firm, may be correlated both with the probability that workers in a firm institute works councils and with average labor productivity and, therefore, average wages. To account for such heterogeneity, we have included qualitative measures that describe the economic situation, productivity, and legal form of the company. Our results, however, were not significantly affected by the inclusion of these variables, a finding that aligns well with studies that dispute the fact that there are large productivity differences across firms with works councils (e.g., Wagner, 2008).

A further issue is that the probability of implementing a works council strongly increases with firm size. While the staff in firms with 5 to 20 employees almost never initiates the formation of works councils, the majority of firms with more than 100 employees have works councils (see Figure A1 in the appendix). To reduce potential biases due to unobserved firm characteristics correlated with firm size, we also perform our estimations in a reduced sample with firms that have between 21 and 100 employees.

We apply a simple matching estimator proposed by Abadie et al. (2004) to estimate the counterfactual outcomes, i.e., the value that is not observed for firm i. Although the observed outcome is its own estimate, the unobserved outcome is estimated by averaging the outcomes of the most similar firms in the other group of firms such that:

$$\hat{Y}_i(0) = \begin{cases} Y_i & \text{if } WC_i = 0 \\ \dfrac{1}{\#\mathcal{J}_M(i)} \displaystyle\sum_{l \in \mathcal{J}_{M(i)}} Y_l & \text{if } WC_i = 1 \end{cases}$$

and

$$\hat{Y}_i(1) = \begin{cases} \dfrac{1}{\#\mathcal{J}_M(i)} \displaystyle\sum_{l \in \mathcal{J}_{M(i)}} Y_l & \text{if } WC_i = 0 \\ Y_i & \text{if } WC_i = 1 \end{cases}$$

where $\mathcal{J}_M(i)$ denotes the set of indices for the matches for a firm i (for more details, see Abadie et al. 2004).

For the matching of WCs with NWCs, we use a set of control variables from the survey that are required to exactly match the respective other firm. The precondition for a valid match is, thus, an identical value in these variables, which include binary variables regarding whether the firm is covered by collective wage agreement, the region (East and West Germany) of the firm, and the use of a separate in-house training center. We further require the matched firm to be in the same economic sector (5 categories) and train in the same occupation (12 categories). Further variables that we include in the matching process, but that do not necessarily have an exact counterfactual value, are the number of employees and the number of apprentices. We choose these variables considering both the literature on the determinants of costs and benefits of training (as surveyed in Wolter and Ryan, 2011) and on the literature on works councils as discussed herein.

6 Results

6.1 Costs and benefits during the training period

Our results show that a WC incurs higher gross training costs per apprentice than a NWC (Table 1). However, the effects are only significant in the full sample of firms with more than 5 employees. If we restrict the sample to firms with 21 to 100 employees, the effect of a works council is no longer significant. Thus, by excluding firms that either have a very high probability (large firms) or a very low probability (small firms) of having a works council, the effect on the gross costs of training disappears.

Analyzing apprentice pay (which is an important determinant of gross training costs), we find works council effects of approximately € 2,100 per year in the full sample and € 800 per year in the sample for medium-sized firms (Table B.3). Thus, apprentice pay is approximately 8% to 25% higher in a WC than in a NWC. Other costs, such as administrative costs or recruitment costs, are significantly higher in a WC than in a NWC in the full sample, but only in combination with collective bargaining agreements.[12]

Further, training benefits are, on average, somewhat lower for a WC than for a NWC, but the average treatment effect is not significant in any of the models. In the full sample, we find that whereas a WC allocates a significantly higher share of non-productive tasks to its apprentices, this is not the case for the small sample (Table B.4). We also find that the relative productivity of an apprentice in performing qualified tasks does not differ significantly between a WC and a NWC.[13]

Two further important factors for both the costs and benefits of training are the wages of skilled and unskilled workers and the ancillary wage costs. Although our estimates suggest positive and significant wage effects of a works council in the full sample, we find no significant effects on either the skilled or the unskilled wages for medium-sized firms (Table B.5). This result suggests that restricting the sample to medium-sized firms is important as wage determination in small and large firms may depend on other (unobservable) factors correlated with the existence of a works council and thereby lead to biased estimates. Furthermore, we also do not find any significant works council effects with respect to ancillary wage costs in medium-sized firms.

[12]We have further tested for any differences in recruitment costs of hiring an apprentice; however, we do not find any significant differences for a firm with works council and/or collective bargaining. Thus, besides posting higher apprentice pay (which may attract better apprentices), we do not find any evidence for more selective recruitment strategies in a WC than in a NWC.

[13]This result is consistent with Muehlemann et al. (2010), who find in a cross-country analysis for Germany and Switzerland for the year 2000 that apprentices do not differ in their relative productivity. This indicates that the learning process for the apprentice does not seem to differ much whether he is working actively in the firm's production process or learning by practicing. However, productive tasks performed by an apprentice positively influence the firm's cost-benefit ratio.

Table 1: Training costs and benefits – works council ATE

	all firms		*collective bargaining*		*no collective bargaining*	
	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.
Gross training costs	3746***	491	6154***	2505	236	-1290
	(1086)	(1044)	(1608)	(1523)	(1292)	(1302)
Benefits of training	-192	-804	-114	-954	-195	-684
	(641.153)	(798)	(805)	(958)	(1048)	(1243)
Net training costs	3938***	1294	6268***	3459*	431	-606
	(1252)	(1297)	(1729)	(1786)	(1716)	(1724)
Observations	2362	700	674	183	1688	517

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

The table shows the average treatment effect (ATE) of a works council versus a non-works council firm.

Costs and benefits are given in €per apprentice and training year. Reference year is 2007.

Table 2: Retention rates – works council ATE

	all firms		*collective bargaining*		*no collective bargaining*	
	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.
1-yr retention rate	17.13***	3.48	16.45***	5.75	18.36***	2.46
	(4.61)	(5.10)	(6.26)	(6.64)	(6.70)	(7.44)
3-yr retention rate	22.85***	10.70**	19.19***	11.78*	25.79***	10.36
	(4.37)	(5.18)	(5.80)	(6.76)	(6.58)	(7.54)
5-yr retention rate	24.70***	10.87**	21.98***	13.16**	26.90***	8.26
	(4.23)	(5.05)	(5.50)	(6.66)	(6.55)	(7.43)
Observations	2362	700	674	183	1688	517

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

The table shows the average treatment effect (ATE) of a works council on the percentage retention rate of apprentices 1, 3, and 5 years after finishing their apprenticeship in the firm. Reference year is 2007.

The resulting net training costs (i.e., the difference between gross costs and benefits of training) are substantially and significantly higher in a WC than in a NWC. However, this only holds if a firm has both a works council *and* a collective bargaining agreement (Table 1). The average treatment effect in the full sample is almost € 6,300, whereas the effect for firms with 21 to 100 employees is € 3,500 (significant at the 10%-level).

6.2 Post-training benefits

While we find that a WC makes a higher net investment in apprenticeship training than a NWC, we expect profit-maximizing firms to have higher post-training benefits to recoup the higher training investment, as discussed in section 2.

We find significantly higher retention rates in a WC compared to a NWC 1, 3 and 5 years after training in the full sample (Table 2). In the restricted sample, however, retention rates in a WC are only significantly different from a NWC after 3 and 5 years and in combination with collective bargaining agreements, which is consistent with Freeman and Lazear (1995). Thus, immediate retention does not differ much due to a works council; however, a WC is able to keep former apprentices for a longer period of time compared to a NWC, which is what we expect if a works council, in fact, lobbies for job stability. Our results for firms with 21 to 100 employees show that the average treatment effects increase from 5.8%-points (not significant) after 1 year to 13.2%-points (significant at 5% level) after 5 years. This effect is economically substantial, as the average 5-year retention rate in the restricted sample is 48.3% (compared to 35.8% in the full sample).

A further possibility for post-training benefits arises in the presence of compressed wage structures, as discussed in section 2. Unfortunately, we cannot directly observe worker productivity in our data. Assuming that the productivity of workers in a WC and a NWC do not differ significantly, as suggested by the literature, wage compression is likely to have an effect on the skilled/unskilled wage differential (Acemoglu and Pischke, 1999). However, our results do not show any significant differences (Table B.5). This suggests that wage compression is not the main source of differences in post-training benefits, and, therefore, does not justify significantly higher net training investments of a WC.

6.3 Training intensity

As net training costs and retention rates are higher in a WC than in a NWC, we may expect that a WC trains at a lower intensity, i.e., the number of apprentices in relation to the workforce is lower than in a NWC.

Backes-Gellner et al. (1997) provide some evidence for this hypothesis; however, no study has, thus far, been able to investigate this question using representative establishment-level data that allow controlling for firm size, industry, training occupation and, most importantly, collective bargaining agreements. We use two measures of training intensity for our empirical investigation. First, we define training intensity as the number of apprentices divided by the total number of employees in the firm. The results for the full sample show that a WC does indeed have a significantly lower apprentice training intensity compared to that of a NWC. On average, a WC trains at a 7.9%-points lower intensity than a NWC (Table 3). For medium-sized firms, however, the average treatment effects are practically zero. Thus, we suspect that our findings in the full sample may be driven (at least partly) by unobserved firm heterogeneity.

Second, we define training intensity as the number of apprentices divided by the number of skilled workers in the same occupation, which may be a more meaningful measure of a firm's training intensity as the comparison is restricted to the training occupation in question. When using this indicator, we find that a WC has an 20.1%-points lower apprentice training intensity compared to that of a NWC in the full sample (Table 3). As in the case of our first indicator, the coefficient on works council is insignificant when concentrating on the restricted sample with only medium-sized firms. However, the treatment effect is equal to 10.9%-points (and marginally significant) in a medium-sized firm with a collective bargaining agreement, whereas the average training intensity is approximately 20%-points higher for the overall sample of collectively covered firms (Table B.2). The lower training intensity in a WC could be driven by two different effects. First, the management in a WC may train fewer apprentices, anticipating that the works council will strive to retain apprentices. This effect could be described as an indirect effect, as it occurs without direct participation of the works council. Second, the works council may actively propose a strategy to train fewer apprentices as bringing in too many new potential future workers may increase the pressure for the already existing workforce in the firm. The data at hand do not allow for a differentiation between the two (potential) effects.

Table 3: Training intensity – works council ATE

	all firms		*collective bargaining*		*no collective bargaining*	
	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.
Apprentice/employees	-0.079***	-0.011	-0.064***	-0.016	-0.095***	-0.007
	(0.013)	(0.015)	(0.017)	(0.017)	(0.021)	(0.024)
Apprentices/skilled workers	-0.201***	-0.037	-0.201***	-0.109*	-0.184***	0.013
(in training occupation)	(0.045)	(0.048)	(0.062)	(0.063)	(0.069)	(0.068)
Observations	2362	700	674	183	1688	517

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Reference year is 2007.

The table shows the average treatment effect (ATE) of a works council on two indicators of apprenticeship training intensity.

The first is the ratio of apprentices to all workers in the firm and the second is the ratio of apprentices to skilled workers.

Summing up the main results of the analysis, we find that, among the firms that are covered by a collective wage agreement, a WC is associated with a higher net investment in apprenticeship training, a higher retention rate of apprentices, and a lower training intensity compared to a NWC.

7 Conclusions

In this paper, we use German firm-level data to analyze whether a firm with a works council differs from a firm without a works council with respect to training costs, retention strategy and training intensity. We use detailed firm-level data to show that a firm with a works council incurs approximately €6,300 higher net costs per apprentice and year of training compared to a firm without a works council. As very small firms hardly ever implement a works council and a large firm almost always implements one, we also provide results for a sample of medium-sized firms with 21 to 100 employees, for which an analysis of works council effects is more appropriate. The results for medium-sized firms show that a works council leads to €3,500 higher net training costs, but only in combination with a collective bargaining agreement. The main sources for higher net costs are increased wages for apprentices and, to a lesser extent, a reduced involvement of apprentices in productive activities.

Our empirical results further indicate that higher net training costs go hand-in-hand with longer tenure of former apprentices. In a firm with a works council, the fraction of workers that are still employed in the training firm five years later is 25%-points higher (full sample). For a medium-sized firm, the works council effect is equal to 13%-points but, again, only in combination with a collective bargaining agreement. This result suggests that collective bargaining reduces distributional conflicts within the firm, thus leading to a more efficient cooperation between the works council and management and, ultimately, to longer worker tenure.

Our results suggest that firms face a trade-off. Worker representation, both at the firm and the industry levels, places increased pressure on a firm's net investment in apprenticeship training, but at the same time, it enables firms to generate higher post-training benefits to recoup the additional training expenditures. It appears that the effects are most pronounced for a firm with both types of worker representations: a works council *and* a collective bargaining agreement.

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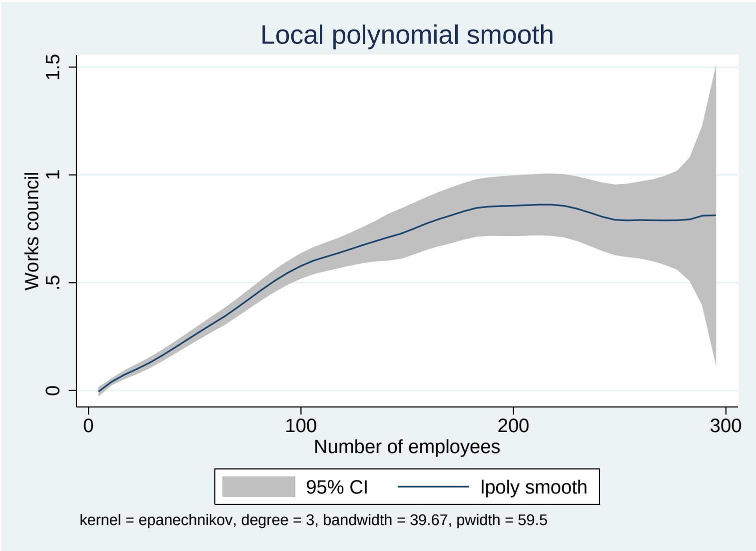
A Figures

Figure A1: Share of firms with works councils



B Tables

Table B.1: Summary statistics by works council and firm size

	Works councils		*No works councils*		*Total*
Number of employees	5+	21-100	5+	21-100	
Institutions					
Firm bound by collective wage agreement	0.76	0.60	0.52	0.45	0.53
Firm located in Eastern Germany	0.14	0.22	0.15	0.20	0.16
Occupation trained in the firm					
Metalworking	0.13	0.10	0.084	0.12	0.10
Electrical engineering	0.13	0.12	0.09	0.12	0.10
Information technology	0.09	0.05	0.06	0.08	0.07
Chemistry	0.07	0.04	0.003	0.02	0.01
Gastronomy	0.06	0.08	0.14	0.12	0.13
Construction	0.03	0.05	0.12	0.10	0.10
Print, media	0.04	0.08	0.02	0.03	0.02
Health	0.003	0.000	0.14	0.04	0.10
Administrative: sales and distribution	0.13	0.17	0.15	0.15	0.15
Administrative: headquarters	0.23	0.25	0.16	0.192	0.178
Administrative: banks/insurance	0.0646	0.0492	0.00975	0.01	0.02
Other occupations	0.01	0.009	0.03	0.02	0.03
Economic sector of firm					
Crafts	0.39	0.39	0.33	0.36	0.34
Trade	0.20	0.29	0.25	0.29	0.25
Services I	0.12	0.09	0.14	0.12	0.13
Services II	0.15	0.14	0.15	0.16	0.15
Public services, education, health	0.14	0.10	0.14	0.08	0.12
Training organisation					
In-house training center	0.06	0.01	0.01	0.02	0.02

Note: Mean of each variable with standard deviation in parentheses.

Table B.2: Summary statistics by works council and firm size

	Works councils		*No works councils*		*Total*
Number of employees	5+	21-100	5+	21-100	
Monthly pay management	4187	3926	3515	3844	3648
	(1574)	(1355)	(1622)	(1606)	(1618)
Monthly wage skilled worker	2633	2447	2120	2450	2236
(administration)	(649)	(672)	(705)	(880)	(755)
Monthly wage skilled worker	2452	2297	2055	2234	2132
(crafts)	(599)	(467)	(637)	(651)	(642)
Monthly wage skilled worker	2839	2748	2406	2640	2500
(technical)	(734)	(767)	(749)	(712)	(757)
Monthly wage unskilled worker	1769	1628	1324	1557	1417
	(612)	(562)	(522)	(582)	(563)
Ancillary wage costs	848	771	647	726	684
	(382)	(309)	(327)	(366)	(344)
Weekly hours of instruction time	5.13	5.71	5.91	5.74	5.81
(per apprentices)	(6.08)	(6.98)	(6.91)	(6.74)	(6.82)
Number of apprentices	7.5	3.5	1.8	3.1	2.6
	(35.2)	(4.5)	(1.7)	(2.6)	(10.6)
Training intensity	0.09	0.11	0.22	0.13	0.19
(apprentices/all employees)	(0.09)	(0.12)	(0.12)	(0.10)	(0.13)
Training intensity	0.17	0.20	0.46	0.25	0.39
(apprentices/skilled workers)	(0.30)	(0.29)	(0.47)	(0.36)	(0.45)
Share of non-productive tasks	28.44	26.35	21.55	25.38	23.02
	(19.01)	(16.93)	(14.92)	(17.94)	(16.12)
Relative productivity of apprentice	61.10	58.40	57.38	58.30	57.90
	(17.17)	(15.71)	(17.00)	(17.53)	(17.08)
Apprentice pay (p.a.)	12127	10718	8610	9663	9189
	(3315)	(2567)	(2047)	(2469)	(2514)
Costs for infrastructure (p.a.)	1013	554	394	493	471
	(1849)	(1487)	(749)	(1293)	(1049)
Other training costs (p.a.)	2824	2307	1799	2086	1960
	(2479)	(1848)	(1439)	(1825)	(1669)
Gross training costs (p.a.)	20841	17965	15340	16834	16189
	(10980)	(7407)	(6694)	(7673)	(7528)
Benefits of training (p.a.)	11789	12131	11795	12350	11907
	(5590)	(5510)	(5176)	(6103)	(5402)
Net costs of training (p.a.)	9052	5834	3545	4485	4282
	(13131)	(9681)	(7852)	(9108)	(8866)

Mean of each variable with standard deviation in parentheses.
Wages and cost-benefit variables in €

Table B.3: Gross cost components – works councils ATE

	all firms		*collective bargaining*		*no collective bargaining*	
	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.
Apprentice pay	2128***	802**	2341***	816*	1918***	761*
	(354)	(312)	(560)	(441)	(359)	(412)
Costs for training personnel	870	-154	2338**	1442	-1269	-1558
	(761)	(854)	(1098)	(1318)	(1018)	(1026)
Costs for training infrastructure	224*	42	413**	51	-87	-45
	(136)	(175)	(206)	(262)	(161)	(186)
Other costs	923***	225	1489***	555	113	-21
	(250)	(266)	(355)	(354)	(313)	(362)
Observations	2362	700	674	183	1688	517

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

The table shows the average treatment effect (ATE) of a works council on gross training cost components.

ATE is given in Euros per apprentice and year of training. Reference year is 2007.

Table B.4: Tasks and productivity – works councils ATE

	all firms		*collective bargaining*		*no collective bargaining*	
	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.
Share of non-productive tasks	3.61**	2.57	4.47*	3.71	4.03	2.15
	(1.76)	(2.51)	(2.41)	(3.30)	(2.74)	(3.70)
Relative productivity	-0.57	0.14	-0.11	2.58	-1.62	-1.54
	(2.03)	(2.38)	(2.74)	(3.13)	(3.26)	(3.47)
Observations	2362	700	674	183	1688	517

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

The table shows the average treatment effect (ATE) of a works council on the share of non-productive tasks and relative productivity of apprentices. ATE is given in percentage points. Reference year is 2007.

Table B.5: Wages – works councils ATE

	all firms		*collective bargaining*		*no collective bargaining*	
	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.	5+ empl.	21-100 empl.
Log unskilled worker wage	0.162***	0.057	0.168***	-0.006	0.219***	0.097
	(0.049)	(0.054)	(0.059)	(0.061)	(0.079)	(0.087)
Log skilled worker wage	0.133***	0.028	0.079**	-0.005	0.173***	0.056
	(0.031)	(0.040)	(0.040)	(0.049)	(0.049)	(0.059)
Skilled/unskilled worker wage diff.	0.010	0.004	0.040	-0.018	0.031	0.012
	(0.039)	(0.045)	(0.049)	(0.056)	(0.065)	(0.067)
Ancillary wage costs	115.417***	31.995	76.407	71.115	120.223*	-3.732
	(39.876)	(48.400)	(51.845)	(64.237)	(62.159)	(68.579)
Observations	2362	700	674	183	1688	517

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

The table shows the average treatment effect (ATE) of a works council on wages, wage differentials and ancillary wage costs in Euros. Reference year is 2007