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Works councils, collective bargaining and apprenticeship training

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Abstract

We investigate the effects of works councils on apprenticeship training. The German law attributes works councils substantial information and co-determination rights on 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 in Germany, we apply econometric matching methods to identify works council effects. We find that firms with works councils make a significantly higher net investment in apprenticeship training compared to firms without such an institution. However, we also find that the fraction of workers still employed with the same firm five years after training is significantly higher in the presence of works councils, enabling firms to recoup training investments over a longer time horizon. All works council effects, however, 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, while works councils have substantial rights and duties with respect to training-related issues, no studies so far have attempted to analyze works council effects on human capital investments of firms. A very important type of human capital investments is apprenticeship training, which is the most important 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 trainees spend the majority of their time during an apprenticeship program at the work place, they become an integral part of the workforce. Works councils in fact have a formal obligation to represent the interests of apprentices, thereby increasing the likelihood of the firm offering a regular employment contract after training. Once former apprentices are part of the regular work force, expected tenure is therefore longer due the engagement of works councils. 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 of time.

The contribution of this paper is to investigate for the first time the effects of works councils on the firm's training behavior, particularly on the costs-benefit-relation of apprenticeship training, and on 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 firms with works councils (WF) differ in certain parameters of the model compared to firms without works councils (NWF). 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) WF make a substantial and significantly higher net investment in training compared to NWF, if WF are also covered by collective bargaining agreements, and (ii) WF retain a higher percentage of apprentices than NWF, which enables WF to generate higher post-training benefits. Finally, we find some (weak) evidence for a lower training intensity in WF compared to NWF.

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 section 7 concludes.

2 Institutional setting and relevant literature

Works councils play an important role within the German system of industrial relations. Works councils deal with employment and safety issues, handle individual grievances, and are responsible for the implementation and monitoring of collective bargaining agreements at the individual firm. Thus, the focus of works councils is on the plant level, while collective agreements are usually binding for specific industries or regions. According to the *Works Councils Constitution Act* (Betriebsverfassungsgesetz, 1972), works councils have substantial rights and duties, ranging from informational to participation rights. Thus, works councils are able to influence the decision-making process within firms.

A number of early studies found significant effects of works councils on productivity, profitability, wages, and labor fluctuations (Addison, 2001; Hübler and Jirjahn, 2003).[1]

[1] Addison et al. (2004) and Frege (2002) provide assessments of theory and the early literature on the

More recent studies, however, point towards a neutral impact of works councils on investments (Addison et al., 2007) and productivity (Wagner, 2008). The positive effects on wages remain robust even if 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 the endogeneity of works councils into account.

Among other responsibilities, the *Works Councils Constitution Act* explicitly gives works councils the rights to participate in the planning, implementation, and monitoring of vocational training activities in the firm (Oetker, 1986; Hammer, 1990). This concerns both, *initial* and *continuing* vocational training measures. With respect to initial vocational training (apprenticeship training), the role of works councils is to ensure that the content and the process of training meets the formal training regulations (*Ausbildungsordnungen*). Works councils have the right to call for a replacement of training personnel neglecting their duties (§98). Thus, the training quality in firms *with* work councils (WF) may be positively affected by this institution, as it is more likely that negligence of such duties go undetected in firms that do *not* have works councils (NWF). A higher training quality may go hand in hand with higher training costs, as workers in charge of training spend more on training-related issues.

Despite this direct institutional link between works councils and training activities of firms, only few studies deal with the relation of works councils and the firms organization of apprenticeship training. Freeman and Lazear (1995) argue that works councils lead to a longer run perspective of workers and that WF consequently invest more in *firm-specific* human capital, which in turn also increases the firm's willingness to invest in *general* human capital (Kessler and Lülfesmann, 2006). In line with Freeman and Lazear (1995), a recent contribution by Hirsch et al. (2010) shows that German WF have a lower separation rate of employees than NWF. Thus, WF may be more inclined to offer apprenticeship training than NWF if expected tenure – and therefore the pay-off period for training investments –

economic consequences of works councils.

is longer.

Backes-Gellner et al. (1997) find that WF employ a significantly lower proportion of apprentices per employee than NWF, yet they do not find any significant effects of works councils on the retention rate of apprentices. This is explained by an early selection at the apprenticeship level, while the goal of works councils is to limit the number of participants in the rent-sharing process.

Although the coverage of collective bargaining – the second pillar of industrial relations in Germany – has declined in recent years (Fitzenberger et al., 2011) this type of institution remains important and may have considerable effects on the firms training behavior. Dustmann and Schönberg (2009) find that unionization increases participation in training and that non-unionized firms will not finance training. Dustmann et al. (2009) find that deunionization goes hand in hand with an increased skilled-unskilled worker wage differential. Hence, we might expect the effects of works councils to differ in firms that additionally have collective bargaining agreements compared to firms with works councils only.

3 Theoretical framework

The cost and benefits of apprenticeship training within the firm can be summarized in the following framework[2]. The firm aims to maximize the total benefits of training, consisting of benefits *during* training (B_t), and expected benefits *after* training ($E[B_{t+1}]$). Since training also involves costs (C_t) during the training period, the principal maximization problem can be formulated as:[3]

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

First, benefits during the training period (B_t) arise from the apprentice performing

[2]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)

[3]Firms maximize over the number of apprentices.

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 $\gamma < 1$, since apprentices are not yet as productive as skilled workers in the training occupation. The total time an apprentice spends with productive work is consequently given by

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

The apprentices 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

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

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 training personnel was not able to pursue other productive tasks. Other expenses for apprentices, such as material, 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 firms 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,

and the size of that rent must be positively affected by employing former apprentices as skilled workers. One could think of a superior ability of retained apprentices compared to those on the external labor market ("lemons"). Due to information asymmetries, even the most talented apprentices are willing to stay with the training firm despite the wage being below productivity./footnoteThe post-training benefits can be seen as an option that the firm holds in the hiring of their own apprentices.

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:

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

Instead of focusing on the analytical solution of the maximization problem above, our aim is to analyze whether firms with works councils (WF) differ from those without works councils (NWF) with respect to the relevant factors of the maximization problem.

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

The hours that apprentices spend performing productive activities $(h_u + h_s)$, however, are likely to be lower in WF than NWF, because works councils may have the goal to protect work volume for the existing work force, therefore opposing substitution of productive activities by apprentices. Thus, even if the value of productive work is higher in WF than NWF, the overall effect on the training benefit is ambiguous, as WF are likely to reduce the volume of productive work (h_w) allocated to apprentices.

The gross costs of apprenticeship training might be affected through apprentice pay (w_a) being higher in WF than NWF due to a more selective recruitment strategy of WF, which has been argued by Backes-Gellner et al. (1997). WF may offer higher apprentice pay in order to attract the more able school-leavers. WF may also be inclined to offer more training hours (h_t) to their apprentices. Instruction time in WF might therefore be more expensive, as training personnel – typically skilled workers in the same training occupation – receive higher wages (w_t) than in NWF. Thus, we expect gross training costs to be higher in WF than in NWF.

Summing up, the total effect of works councils on net costs is ambiguous based on the theoretical predictions above, and therefore needs to be determined empirically.

With respect to post-training benefits (B_{t+1}), we expect those to be higher in WF than in NWF, if (i) hiring costs (H) in WF are higher, e.g., because WF have 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 individual workers in the presence of works councils, or (iii) the wage structure with respect to the skill level ($\Delta\tau$) is more compressed in WF than NWF, e.g., because workers in WF have a higher productivity than in NWF.[4]

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 WF retain a higher share of apprentices than NWF. In addition, we expect that apprentices would accept a job with a higher probability in WF than in NWF, because works councils typically signal better working conditions, higher wages and increased job security compared to NWF (Backes-Gellner and Tuor, 2010). Thus, based on theoretical arguments, we expect that WF have higher expected post-training benefits than NWF - and thus, WF would be willing to accept higher net training costs than NWF.

[4]A general advantage of all training firms (both WF and NWF) 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, after three years the initial expectation error is halved for all employers. However, there is no reason why WF would learn quicker about apprentices' ability compared to NWF.

We further expect that the effects of works councils may be reinforced by collective bargaining agreements of the firm. Freeman and Lazear (1995) argue that distributional conflicts are "externalized" in firms covered by collective bargaining, leading to a more efficient cooperation between works councils and management. This would, on the one hand, dampen the wage-effects of works councils, as wages are predominantly determined on the regional or sectoral level. On the other hand, works councils could fully concentrate on worker representation, which could lead to higher tenure of skilled workers.[5] We thus expect the effect of works councils on wages to be lower in firms that are also subject to collective bargaining agreements, but we would – in turn – expect a stronger effect of works councils on tenure.

In the remainder of the paper, we will now focus on testing differences in the relevant factors of the firm's maximization problem above empirically and discuss implications for the training behavior of WF and NWF.

4 Data

For the analysis in this paper, we make use of 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). About 3000 German training firms were interviewed in a computer assisted personal interview (CAPI)[6]. The sample was randomly drawn from social security register data and as such is representative for Germany. Inter-

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

[6]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).

view partners in the firms were the persons responsible for the training organization and, if necessary, the human resource manager of the firm. In small firms, the interview partner often was 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 as well as 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 both on the unskilled and skilled level. Further, firms reported a relative productivity measure for the hours spend with 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 firms.

For the analysis in this paper, we exclude firms operating in the public sector as well as firms with less than 5 employees. The reason to exclude the former is that firms in the public sector usually do not follow a profit-maximizing strategy, as can be assumed for private sector firms. We further exclude small firms with fewer than 5 employees, because the legal right to establish works councils applies only to employees in firms with a staff of 5 or more employees. Eliminating these firms from the sample leaves us with 2,362 training firms. Since the share of firms with works councils becomes very small among firms with 20 or less employees and very large among firms with more than 100 employees (fig. A1), we supply a separate analysis for the group of firms with a size between 21 and 100 employees, as suggested by Addison et al. (2010) – which reduces our sample to 700 firms.

Descriptive information about the samples is provided separately for NWF and WF in Tables B.1 and B.2.

5 Estimation strategy

Our primary aim is to estimate whether and how WF differ from NWF 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 2. Third, we are also interested in whether firms with works councils 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 completion of training. Finally, we investigate the training intensity. We analyze both the ratio of apprentices to all employees within a firm as well as 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 neighbour matching models.[7] Our goal is to estimate average treatment effects of works councils.

Let the observed outcome be denoted by Y_i:

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

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

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

To ensure that the matching estimators are a consistent estimate of the treatment effects of interest, we need to assume that the assignment to treatment (i.e., implementing a

[7]For seminal work on matching methods see among others Rubin (1974) and Rosenbaum and Rubin (1983).

works council) is independent of the outcomes, conditional on the covariates included in the matching process. Further, the probability of implementing a works council is restricted between zero and one (Abadie et al. 2004). While in our case, the treatment cannot be interpreted as random, the unconfoundedness assumption (see Rosenbaum and Rubin, 1983) still holds. The matching estimates would only be biased if firms had chosen to implement works councils based on unobserved factors that are related to our apprenticeship training variables. However, as apprenticeship training is typically not the core business of firms, we assume that firms base their decision to implement works councils on factors other than the costs and benefits of apprenticeship training. Thus, we assume that the treatment WF_i is independent of the outcome variables $(Y(0), Y(1))$, i.e., the cost and benefit variables.[8] We further carry out all our estimations in the full sample, as well as in a reduced sample containing firms with 21-100 employees only – thereby reducing potential biases due to unobserved firm characteristics. While firms with 5-20 employees almost never instate works councils, it can be observed that the majority of firms with more than 100 employees have works councils (see Figure A1 in the apprendix).

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. While 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

[8] A potential violation of the unconfoundedness assumption can be found in wages, as those are an integrated part of training costs (and benefits). Unobserved firm heterogeneity, such as the average worker quality in the firm, may be correlated both with the probability that a firms instates works councils as well as with average labor productivity – and therefore average wages. To account for such heterogeneity, we have included qualitative measures describing the economic situation and the productivity, as well as the legal form of the company. Our results, however, were not significantly affected by these variables. Furthermore, the literature disputes the fact that there are large productivity differences across firms that are associated with works councils (Wagner, 2008). Thus, as there is evidence against differences in productivity, we expect that any differences in wages are in fact caused by the instatement of works councils.

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

and

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

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).

6 Results

6.1 Costs and benefits during the training period

Our results show that WF incur higher gross training costs per apprentice than NWF (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 21-100 employees, the effect of works councils 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 works councils, 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 about € 2100 per year in the full sample, and € 800 per year in the sample for medium-sized firms (Table B.3). Thus, apprentice pay is about 8% to 25% higher in WF than in NWF. Other costs, such as administrative costs, or recruitment costs, are significantly higher in WF than NWF in the full sample – but only in combination with collective bargaining agreements.[9]

[9]We have further tested for any differences in recruitment costs of hiring apprentices – however, we do

Further, training benefits are, on average, somewhat lower for WF than for NWF, but the average treatment effect is not significant in any of the models. In full sample, we find that WF allocate a significantly higher share of non-productive tasks to apprentices, however, this is not the case for the small sample (Table B.4). We also find that the relative productivity of apprentices in qualified tasks does not differ significantly between WF and NWF.[10]

A further important factor for both costs and benefits of training are wages of skilled and unskilled workers, as well as ancillary wage costs. While our estimates suggest positive and significant wage effects of works councils in the full sample, we find no significant effects on both skilled and 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 works councils and thus 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.

The resulting net training costs (i.e., the difference between gross costs and benefits of training) turn out to be substantially and significantly higher in WF than in NWF – however, only if a firm has both works councils *and* a collective bargaining agreement (Table 1). The average treatment effect in the full sample is almost € 6300, whereas the effect for firms with 21-100 employees is € 3500 (significant at the 10%-level).

not find any significant differences for firms with works councils and/or collective bargaining. Thus, besides posting higher apprentice pay (which might attract better apprentices), we do not find any evidence for more selective recruitment strategies in WF than NWF.

[10]This result is in line 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 apprentices positively influence the firm's cost-benefit ratio.

Table 1: Training costs and benefits – 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.
Gross training costs	3746.2972***	490.6902	6153.9434***	2505.1745	236.4421	-1290.4352
	(1085.718)	(1043.575)	(1608.375)	(1523.411)	(1292.011)	(1301.846)
Benefits of training	-191.6176	-803.5532	-114.1204	-954.3055	-194.6514	-684.2020
	(641.153)	(797.567)	(804.609)	(957.980)	(1047.573)	(1243.090)
Net training costs	3937.9149***	1294.2435	6268.0639***	3459.4800*	431.0935	-606.2330
	(1251.855)	(1297.444)	(1729.000)	(1786.023)	(1716.135)	(1724.358)
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 non-works council firms.

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

Table 2: Retention rates – 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.
1-yr retention rate	17.1328***	3.4783	16.4475***	5.7469	18.3614***	2.4648
	(4.610)	(5.102)	(6.258)	(6.639)	(6.701)	(7.436)
3-yr retention rate	22.8545***	10.7016**	19.1889***	11.7768*	25.7887***	10.3647
	(4.374)	(5.183)	(5.795)	(6.760)	(6.577)	(7.541)
5-yr retention rate	24.6989***	10.8656**	21.9795***	13.1643**	26.8951***	8.2623
	(4.230)	(5.054)	(5.497)	(6.659)	(6.550)	(7.425)
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 works councils on the percentage retention rate of apprentices one, three, and five years after finishing their apprenticeship in the firm. Reference year is 2007.

6.2 Post-training benefits

While we find that WF are making a higher net investment in apprenticeship training than NWF, 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 WF compared to NWF *one*, *three* and *five* years after training in the full sample (Table 2). In the restricted sample, however, retention rates in WF are only significantly different from NWF after three and five years and in combination with collective bargaining agreements, which is in line with Freeman and Lazear (1995). Thus, immediate retention does not differ much due to works councils, however, WF are able to keep former apprentices for a longer period compared to NWF, which is what we expect if works councils do in fact aim for job stability. Our results for firms with 21-100 employees show that the average treatment effects increase from 5.74%-points (not significant) after one year to 13.2%-points (significant at 5% level) after five 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 productivity of workers in WF and NWF do not differ significantly, as suggested by the literature, wage compression is likely to have an effect on the skilled/unskilled wage differentials (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 post-training benefits, and therefore does not justify significantly higher net training investments of WF.

6.3 Training intensity

As net training costs and retention rates are higher in WF than in NWF, it may be expected that WF train at a lower intensity, i.e., the number of apprentices in relation to the workforce is lower than in NWF.

Table 3: Training intensity – 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/employees	-0.0786***	-0.0110	-0.0639***	-0.0162	-0.0954***	-0.0069
	(0.013)	(0.015)	(0.017)	(0.017)	(0.021)	(0.024)
Apprentices/skilled workers	-0.2010***	-0.0372	-0.2009***	-0.1092*	-0.1843***	0.0129
(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 works councils 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.

Backes-Gellner et al. (1997) provide some evidence for this hypothesis, however, no study has so far been able to investigate this issue using representative establishment-level data that allows to control 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 total employment in the firm. The results for the full sample show that WF indeed have a significantly lower apprentice training intensity compared to NWF. On average, WF train at a 7.4%-points lower intensity than NWF (Table 3). For medium-sized firms, however, 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. Using this indicator shows that WF have a 18.5%-points lower apprentice training intensity compared to NWF in the full sample (Table 3). As in the case of our first indicator, the coefficient on works councils are insignificant when concentrating on the restricted sample with only medium-sized firms. However, the treatment effect is equal to 11.3% (and marginally significant) in firms with a collective bargaining agreement, which is economically significant, as average training intensity is 19.7% (Table B.2).

Thus, while WF – in combination with collective bargaining agreements – make a higher net investment in apprenticeship training than NWF, WF also retain a higher fraction of apprentices and train at a lower intensity compared to firms without collective agreements.

7 Conclusions

In this paper, we make use of unique German firm-level data to analyze whether firms with works councils differ from firms without such an institution concerning their training costs, retention strategy and training intensity. We use detailed firm-level data to show

that firms with works councils incur about €6300 higher net costs per apprentice and year of training, compared to firms without works councils. As very small firms hardly ever implement works councils, and large firms almost always do, we also investigate a sample of medium-sized firms with 21-100 employees, for which an analysis of works council effects is more appropriate. The results for medium-sized firms show that works councils lead to €3500 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 lesser involvement of apprentices in productive activities.

Our empirical results further indicate that higher net training costs go hand in hand with a longer tenure of former apprentices. In firms with works councils, the fraction of workers that is still with the training firm five years later is 25%-points higher (full sample). For medium-sized firms, the works council effect is 13%-points – but, again, only in combination with collective bargaining agreements. This result can be interpreted as evidence for collective bargaining reducing distributional conflicts within the firm, therefore leading to a more efficient cooperation between works councils and the management, and thus to longer tenure of workers.

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

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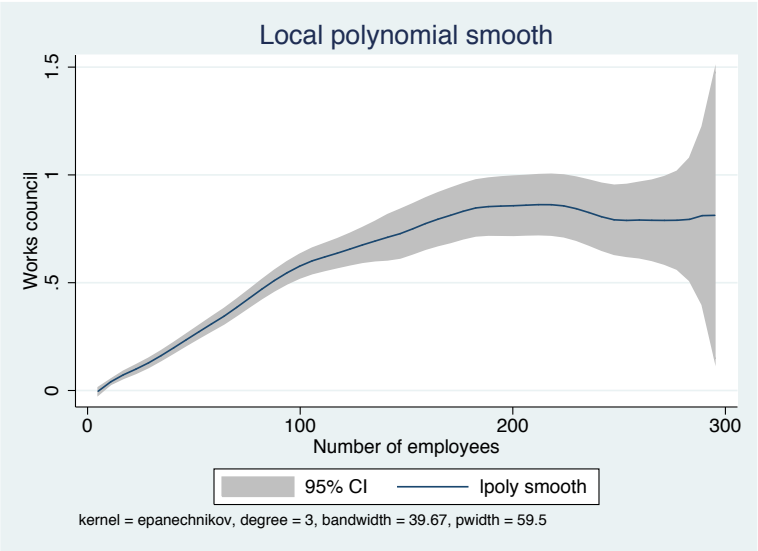
A Figures

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	
Collective wage agreement	0.761	0.603	0.521	0.446	0.532
Eastern Germany	0.137	0.215	0.151	0.202	0.162
Metalworking	0.127	0.0983	0.0843	0.122	0.0952
Electrical engineering	0.134	0.121	0.0880	0.120	0.0990
Information technology	0.0870	0.0536	0.0611	0.0813	0.0665
Chemistry	0.0721	0.0417	0.00282	0.0156	0.0127
Gastronomie	0.0645	0.0772	0.144	0.119	0.130
Construction	0.0321	0.0536	0.117	0.0969	0.103
Print, media	0.0433	0.0770	0.0150	0.0343	0.0236
Health	0.00257	0.000	0.138	0.0378	0.102
Administrative: sales and distribution	0.132	0.168	0.146	0.151	0.147
Administrative: headquarters	0.229	0.251	0.164	0.192	0.178
Administrative: banks/insurance	0.0646	0.0492	0.00975	0.0108	0.0164
Other occupations	0.0107	0.00922	0.0302	0.0199	0.0258
Crafts	0.394	0.389	0.332	0.355	0.344
Trade	0.202	0.287	0.249	0.287	0.253
Services I	0.120	0.0901	0.139	0.122	0.132
Services II	0.145	0.135	0.145	0.160	0.147
Public services, education, health	0.139	0.0991	0.135	0.0767	0.123
In-house training center	0.0576	0.0139	0.0118	0.0177	0.0168

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	4186.9	3926.2	3514.6	3843.8	3648.2
	(1574.2)	(1354.5)	(1622.3)	(1606.3)	(1618.3)
Monthly pay skilled worker	2632.6	2447.1	2119.7	2450.3	2236.2
(administration)	(648.7)	(671.6)	(704.9)	(879.9)	(754.5)
Monthly pay skilled worker	2452.2	2297.4	2055.4	2234.4	2131.5
(crafts)	(599.1)	(466.7)	(637.0)	(650.6)	(641.8)
Monthly pay skilled worker	2839.1	2748.3	2406.0	2640.4	2499.5
(technical)	(733.7)	(767.3)	(749.0)	(711.6)	(756.6)
Monthly pay unskilled worker	1769.3	1627.7	1324.2	1556.8	1416.6
	(611.7)	(562.1)	(522.4)	(581.5)	(562.7)
Ancillary wage costs	847.5	770.6	646.8	726.3	683.5
	(381.8)	(309.0)	(326.5)	(365.8)	(343.5)
Weekly hours of instruction time	5.126	5.707	5.912	5.738	5.805
(per apprentices)	(6.083)	(6.980)	(6.909)	(6.744)	(6.817)
Number of apprentices	7.532	3.485	1.797	3.059	2.582
	(35.21)	(4.486)	(1.681)	(2.603)	(10.58)
Training intensity	0.0903	0.111	0.223	0.129	0.191
(apprentices/all employees)	(0.0869)	(0.122)	(0.121)	(0.104)	(0.126)
Training intensity	0.174	0.197	0.464	0.247	0.389
(apprentices/skilled workers)	(0.297)	(0.293)	(0.469)	(0.364)	(0.447)
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.)	12127.3	10717.8	8609.8	9662.9	9189.1
	(3315.0)	(2567.1)	(2047.0)	(2469.1)	(2513.6)
Costs for infrastructure (p.a.)	1013.4	554.1	393.5	492.6	470.9
	(1849.2)	(1486.7)	(748.7)	(1292.5)	(1049.4)
Other training costs (p.a.)	2823.9	2307.4	1799.1	2085.8	1959.6
	(2479.1)	(1847.7)	(1439.4)	(1825.2)	(1669.3)
Gross training costs (p.a.)	20840.8	17965.0	15339.9	16834.4	16188.8
	(10980.4)	(7406.5)	(6693.9)	(7673.4)	(7528.3)
Benefits of training (p.a.)	11788.8	12130.7	11794.9	12349.5	11906.9
	(5590.2)	(5509.7)	(5175.8)	(6102.7)	(5402.1)
Net costs of training (p.a.)	9052.0	5834.2	3545.0	4485.0	4281.9
	(13131.4)	(9680.9)	(7851.6)	(9108.2)	(8865.9)

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

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	2128.1281***	802.1713**	2340.8481***	816.3676*	1918.2642***	760.6626*
	(354.267)	(312.326)	(559.736)	(441.244)	(358.640)	(411.762)
Costs for training personnel	870.0653	-154.0793	2337.8774**	1441.9361	-1268.6050	-1557.5520
	(760.627)	(853.844)	(1097.729)	(1317.944)	(1017.981)	(1025.883)
Costs for training infrastructure	224.4798*	42.0738	413.0820**	50.7807	-87.4317	-44.9350
	(136.032)	(175.015)	(205.628)	(261.683)	(161.100)	(186.432)
Other costs	922.5961***	225.0067	1488.6836***	554.6451	112.8182	-20.7091
	(250.395)	(266.231)	(355.293)	(354.342)	(313.002)	(362.213)
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 works councils 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	3.6064**	2.5652	4.4746*	3.7084	4.0317	2.1547
	(1.759)	(2.514)	(2.411)	(3.298)	(2.737)	(3.699)
Relative productivity	-0.5660	0.1375	-0.1084	2.5825	-1.6191	-1.5370
	(2.027)	(2.384)	(2.735)	(3.127)	(3.260)	(3.473)
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 works councils 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	0.1618***	0.0573	0.1679***	-0.0058	0.2191***	0.0974
	(0.049)	(0.054)	(0.059)	(0.061)	(0.079)	(0.087)
Log skilled worker wage	0.1329***	0.0278	0.0794**	-0.0051	0.1731***	0.0556
	(0.031)	(0.040)	(0.040)	(0.049)	(0.049)	(0.059)
Skilled/unskilled worker wage diff.	0.0102	0.0042	0.0399	-0.0178	0.0311	0.0115
	(0.039)	(0.045)	(0.049)	(0.056)	(0.065)	(0.067)
Ancillary wage costs	115.4168***	31.9952	76.4065	71.1150	120.2229*	-3.7320
	(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 wages, wage differential and ancillary wage costs in Euro.

Reference year is 2007.