

Do works councils improve the quality of apprenticeship training in Germany? Evidence from workplace data

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Abstract

Purpose: Works councils have the legal right to participate in a firm's training process, and where necessary call for a replacement of training instructors. We empirically test whether works councils are indeed associated with a higher input, process or output quality of apprenticeship training in Germany.

Design/methodology/approach: We use two representative cross-sectional surveys of German workplaces in 2007 and 2012/13 that were conducted by the Federal Institute for Vocational Education and Training (BIBB) in Germany. To account for selection-on-observables, we apply nearest-neighbor matching models to estimate to what extent works councils are associated with training quality.

Findings: The results of the paper shed light on the influence of works councils on the quality of apprenticeship training in Germany. Based on a quality model, we show that works council are associated with a (moderately) higher output quality in apprenticeships, particularly with regard to the share of retained apprentices. However, we do not find strong relations of works councils to input- and process quality indicators.

Research limitations/implications: Although the identification of causal effects due to the existence of works councils is difficult and cannot be fully addressed in our analysis, we can use a number of important control variables at the workplace level. The results suggest that works council play a moderate role in enhancing quality in the German apprenticeship system.

Originality/value: We provide first empirical evidence on how the existence of a works council is associated with the input, process and outcome quality measures in the German apprenticeship system.

1. Introduction

The dual apprenticeship system is an important education track in Germany and an essential component of a successful integration of young adults into the labor market. Every year, close to 60% of a school-graduate cohort start an apprenticeship (BIBB, 2015). This number indicates that the popularity of apprenticeships remains high among young adults in Germany. One reason is the high quality of apprenticeship training that is acknowledged worldwide (The Economist 2014; Lazear and Janssen, 2016). However, direct empirical evidence about the quality of apprenticeship training in Germany beyond the often appraised low youth unemployment rates is scarce. Soskice (1994) argues that the cooperation between the chambers on the one hand and works councils and unions on the other hand is a necessary determinant for a high training quality in Germany. Although many researchers found a positive association between a firm's participation in apprenticeship training and unions and works councils (e.g., Beckmann 2002, Bellmann et al. 2011, Dustmann and Schönberg 2009, Stegmaier 2012), no studies directly investigated whether such institutions are also associated with different dimensions of training quality.

Thus, our research focuses on the role and effects of works councils on the training quality in particular. Works councils in Germany have extensive information and co-determination rights to ensure quality standards at the workplace. Works councils also have a consultation function and therefore provide apprentices with a voice in the case of conflicts with the trainer or management. We thus expect firms with works councils to deliver a higher training quality compared to firms without works councils.

Largely based on the previous work of the Expert Committee on Costs and Financing of Vocational Training (1974), we first outline a quality model and define input, process and output quality indicators for apprenticeship training in Germany. We then exploit two waves

German workplace surveys¹ that contain extensive information on (i) input quality measures, such as the amount of training that apprentices receive at the workplace, or the investment in training infrastructure, (ii) process quality measures, such as hours of instruction time, and (iii) also information on output quality measures, such as apprentices' retention or dropout rates. We apply nearest neighbor matching models to quantify potential works council effects, whereas we provide separate estimates for a subsample of medium-sized firms to account for the fact that almost all large firms have works councils, whereas small firms rarely do.

Although our results reveal a statistically significant association of works councils with some of our quality indicators, the economic significance is largely limited to two outcome measures. We find that firms with works councils have lower rates of sickness absence and higher retention rates, which is in line with the previous literature (Kriechel et al. 2014, Pfeifer 2017). However, we find no significant differences between works council and non-works council firms with regard to input and process quality indicators. As firms with works councils offer higher apprentice pay (Kriechel et al. 2014) and invest more resources in the recruitment process (Wenzelmann et al. 2017), our results suggest that the observed differences in output quality is also at least partly driven by a positive selection of apprentices, rather than by a superior input and process quality in firms with works councils.

2. Theoretical considerations and literature

2.1 Theoretical considerations

In recent years, the interest in works councils and their effect on firm outcomes has increased. Several studies focus on the effect of works councils on industrial and labor relations and refer to the seminal exit voice hypothesis of Hirschman (1970) as motivation. Hirschman argues that workers have two options if a conflict with the management occurs. They can either leave the

¹ Cost benefit surveys 2007 and 2012/13 conducted by the Federal Institute for Vocational Education and Training (BIBB).

firm (“exit”) or try to improve the situation and “voice” their dissatisfaction with the situation to repair or improve the relationship. An institution like the works council can moderate conflicts in the workplace. Hence, the works councils can help in giving the workers a “voice”. Freeman (1976, 1980) investigates the effects of unions in the US and he argues that the “voice” effect of works councils reduces fluctuation and thereby increases the productivity in firms. In a theoretical study, Freeman and Lazaer (1995) show that the existence of a works council can improve a firm’s efficiency and reduce employee turnover.

Apart from the exit-voice framework, we rely on literature that investigates the role of works councils in the German system. The concept of actors-centered institutionalism (Scharpf, 2006) views works councils as a cooperative actor in the firm. According to Windeler and Sydow (2001), the influence of works councils is not limited to the consultation function and hence to giving apprentices a voice in conflicts. The authors argue that works councils in Germany have many possibilities of acting and shaping the apprenticeship programs in the firm context.

But what is the role of works councils in shaping the quality of apprenticeship training in a firm? On the one hand, works councils have the legal duty to ensure the commitment of the firm to the training standards outlined in the curricula. The Works Constitution Act (BetrVG) explicitly defines the monitoring function of works councils. In the case that the person in charge of training organization neglects his/her duties, the works council can call for a replacement (§§ 92, 92a, 96, 97 BetrVG). In addition, the Works Constitution Act also provides for the possibility to shape the quality of apprenticeship training.

On the other hand, according to Berger (2013), especially members of the works council that have completed an apprenticeship training in their professional career are particularly motivated to shape the training conditions in their firm. This finding is in line with Cohen et al. (2001), who argue that psychological involvement and active political participation are strongly related. Based on both the legal entitlement of the works council and the personal involvement of works

council members, we expect a higher training quality in firms with - than in firms without a works council.

2.2 Literature

A number of studies show that works councils increase productivity and wages in Germany (Addison, et al. 2001, Hübler and Jirhan, 2003). Moreover, Boockmann and Steffes (2010) find that works councils increase tenure and reduce the fluctuation among the workforce (Hirsch et al., 2010) with respect to employee-related termination (Pfeifer, 2011) but also with respect to employer-related termination (Frick, 1996, Bellmann et al., 2011).

In the context of the effect of works councils on training, the empirical results are contradictory: On the one hand, Stegmaier (2012), Allaart et al. (2009) and Bellmann et al. (2011) find evidence that firms with works councils provide more training to their employees compared to firms without works councils. On the other hand, Görlitz and Stiebale (2011) cannot find a higher training participation of employees in firms with works councils. Niederalst (2004) and Backes-Gellner et al. (1997) also show that the training rate, i.e. the number of trainees in relation to the number of employees, is lower in companies with works councils than in companies without works councils. Kriechel et al. (2014) investigate the influence of collective bargaining and works councils on training investments and the labor market outcomes of apprentices after completing their training. Their results indicate that works council firms invest more and employ a larger proportion of apprentices as skilled workers after the training, largely by offering higher apprentice pay. Summing up these studies, the training rate of works council firms is lower, but the training investments and the chances of apprentices to be employed in the training firm are higher than in non-works council firms. Although there is a presumption that training investment are also associated with a higher quality of education, there is no empirical evidence for such a works council effect.

3. The Quality Model

With regard to the operationalization of the quality model of vocational training at the firm level, the paper draws on the work of the Expert Committee on Costs and Financing of Vocational Training (1974), the so-called 'Edding Commission'. In its empirical study on the quality of training in firms, the Experts Committee distinguished between the input, process and output quality of training. Indicators for measuring input and process quality included the organization of training, the technology of training, the intensity of training, the qualification of the training staff and the method of training. Output quality was measured by four factors: formal aptitude, job-related aptitude, work-related aptitude, and societal aptitude. Münch et al. (1981) examined the extent to which job-specific interdependencies of the learning location structures and output quality can be determined. The authors viewed the learning location structure as the central factor of the input quality, while they expanded the output quality by the factor of the further employment chances (i.e. the retention of apprentices).

Based on this literature, we distinguish between input, process and output quality indicators. From the BIBB Cost-Benefit Surveys, we use the following input quality indicators: Investments in the training infrastructure (measured in Euros) and whether the firm provides an in-house training center. We operationalize the process quality of training by indicators on the provision of additional certified qualifications that are not part of the training curriculum, the provision of external training phases (in external training centers) and the cooperation with other actors (such as secondary schools or other training firms). Furthermore, the data provides for indicators for the supervision intensity during training (measured as the weekly hours the trainer spends with the apprentice). We measure output quality through indicators on illness-related absence of apprentices, drop-out rates during the training period and the post-training employment opportunities for the apprentices (measured by the share of apprentices that the training firms employs as skilled workers 1 year, 3 years and 5 years after the training).

According to the theoretical considerations, we expect a positive effect of works councils on the quality of apprenticeship training. In detail, we expect:

Input quality

- Higher investments in the training infrastructure
- A higher likelihood to provide in-house training centers

Process quality

- A higher probability of training of additional qualifications
- More external training phases of the trainees
- A stronger networking of training companies (cooperation)
- A higher supervision intensity during the training

Output quality

- Lower sickness absence of trainees
- A lower number of drop-outs during the training period
- A higher retention rate for apprenticeship graduates

In our empirical analysis, we test each of the quality indicators against the influence of works councils in a matching framework. The following section describes the data source and empirical strategy.

4. Data and empirical strategy

4.1 Data

For the empirical analysis, we use two waves of the BIBB Cost-Benefit Survey (BIBB CBS) for the reference years 2007 and 2012/13². The BIBB CBS provides detailed information about the training behavior of the respective firms. Each wave contains interviews of about 3000 German training firms. The main purpose of these surveys is to measure the costs and benefits of training. However, the large questionnaire also includes questions on the training organization, recruitment of apprentices and skilled workers and several important structural variables. The sample of firms is representative for all German training firms, because the

² Unfortunately we cannot identify firms in both cross-sections, therefore we are unable to perform a difference-in-differences estimation.

addresses were drawn from the establishment register of the Federal Employment Agency. The interviewers visited the company in person and the interviews were conducted using a computer-assisted interview (CAPI). The regions (sample points) where the survey was conducted were randomly drawn. The survey data refer to a specific training occupation, in which the company trains apprentices in the reference year. Respondents were those persons responsible for the training of apprentices in the company.

We exclude firms with less than 5 employees and firms in the public sector. For firms with at least 5 employees, the Works Constitution Act establishes the legal right to form a works council. We exclude public sector firms because these in principle do not pursue the goal of maximizing profits like firms in the private sector. Descriptive information with respect to structural variables is provided for in Table A1 in the appendix.

4.2 Empirical Strategy

Following Kriechel et al. (2014), we estimate the average treatment effect (ATE) by using nearest neighbor matching models to solve the missing data problem that occurs because we observe only the outcome of the treatment group firms with works council but not the outcome that the same sample of firms would achieve without works councils. Therefore, we match pairs of one firm of the treatment group with works councils with the nearest neighbor in our dataset according to a set of criteria. We require the matched firms to be in the same economic sector (5 categories) and train in the same occupation (12 categories), whether the firm is affected by a collective wage agreement, the region of the firm (West or East Germany), the number of employees and the number of apprentices. We provide separate estimates for a subsample of medium-sized firms (21 to 100 employees) to account for the fact that almost all large firms have works councils, whereas most small firms rarely do.

5. Descriptive statistics and results

Table 1 provides the summary statistics on the quality indicators and a t-test for the difference in the means of the treatment and control group for the entire sample of firms with at least 5 employees for the year 2007. For this year, we observe 2653 firms of which 917 firms have a works council. The descriptive results show that firms with works councils are more likely to have in-house training facilities, cooperation with other training firms and a lower illness-related absence of trainees. Moreover, they invest more in their training infrastructure, have higher retention rates of apprentices compared to firms without a works council and are more likely to train additional qualifications. For the indicator of external training and drop-out rates of apprentices during the training period we find no difference between firms with works councils and firms without works councils. For the year 2012, we observe 2769 firms of which 924 have a works council.

-- Table 1 about here ---

Table 2 provides the respective summary statistics and a t-test for the sample of firms with at least 5 employees. We find similar descriptive results as for the reference year 2007. Firms with works councils have higher retention rates of apprentices and fewer illness-related absence days compared to firms of the reference group. In addition, firms with works councils invest more in the training infrastructure, are more likely to have in-house training facilities, are more likely to have a cooperation with other training firms and to train additional qualifications.

-- Table 2 about here ---

Overall, descriptive results suggest a positive correlation between works councils and several of the training quality indicators. To test whether these hold when matching firms with and without works councils, Table 3 column 1 and column 2 present the results of our nearest neighbor matching models for the sample of firms with at least 5 employees and the subsample

of firms with 21 to 100 employees for the year 2007. With regard to the input quality indicators of investments in training infrastructure, we do not find statistically significant differences between firms with and without works councils for both samples of firms. For the input quality indicator of providing an in-house training center, we find a statistically significant effect for the sample of firms with at least 5 employees. For the reduced sample of firms with 21 to 100 employees, we do not find a statistically significant difference between firms with and without works councils for the year 2007. With respect to the process quality indicator of external training phases, the respective coefficient is also not significant. We further find a higher likelihood that training firms cooperate with other training firms for firms without works councils. However, this relationship only refers to the reduced sample in column 2. For firms with at least 5 employees, we do not find a statistically significant difference. Concerning the process quality indicators training of additional qualifications and supervision intensity during the training, we do not find statistically significant effects for the sample of firms with at least 5 employees and the reduced sample of firms with 21 to 100 employees.

However, we find strong associations for our output quality measure of apprentice retention. Firms with works council have a roughly 20 percent higher retention rate compared to firms without works council for the sample of firms with at least 5 employees in the year 2007. This effect is statistically significant at the 1 percent level. For the reduced sample of firms in column 2 we find that firms with works councils have a 12 percent higher retention rate of apprentices after 3 and 5 years. This effect is also statistically significant at the 1 percent level.

-- Table 3 about here ---

In Table 3 column 3 and 4, we present the results for year 2012. Overall, the results are similar to the results of the year 2007 in column 1 and 2. For the indicators investment in training infrastructure, cooperation of training companies, training of additional qualifications and drop-out rates during the training period we do not find a statistically significant effect for firms with

and without works councils. However, firms with works councils are 10 percent more likely to have an in-house training center. This effect is statistically significant at the 5 percent level. For the reduced sample in column 4 this effect is no longer present. Moreover, we find that trainers in firms with works councils invest a statistically significant lower number of hours per week in the supervision of their apprentices. However, this effect is only observed for the sample of firms with at least 5 employees. For the output quality indicator illness-related absence of trainees, we find that firms with works councils have a significant lower number of days that apprentices are absent due to illness reasons. On average firms with works councils report up to 5 days less of illness-related absence of trainees for the reduced sample in column 4. The coefficient is highly statistically significant at the 1 percent level. This result is in line with Pfeifer (2017), who uses similar data to establish a link between works councils and absenteeism of apprentices.

Again, we find a strong positive relationship between firms with works councils and retention of apprentices. Firms with works councils have a roughly 20 percent higher retention rate compared to firms without works council for the sample of firms with at least 5 employees. This effect is statistically significant at the 1 percent level. For the reduced sample in column 4, we find no statistically significant effect for the retention rates. The weaker effect in 2012/13 compared to 2007 is likely to be due to different situation on the skilled labor market. In 2012/13, skilled workers in Germany were much more scarce compared to 2007, and thus most firms that trained apprentices were interested in retaining them after training. Thus, the positive association of works councils with the retention rates appears to be less pronounced in times of a tight labor market.

In a robustness check (Table A2), we show the results for a subsample of small sized firms (5 to 20 employees). For the year 2007 we find similar results compared to the sample of 5+ employees firms. For the year 2012/13 the retention rates are not significantly different for

firms with and without works councils. The same results are reported for the medium size firms in Table 3 Column 4.

Overall, our results suggest that the works council influence is largely limited to output quality measures. Conversely, the input and process quality of apprenticeships appear largely unaffected by the existence of works councils in training firms.

When interpreting the results, we need to acknowledge potential limitations of the data. First, we cannot claim to fully control for selection processes. Both the implementation of a works council and the training quality could be correlated with unobserved factors that we cannot account for with our data. Secondly, we cannot address potential selection of apprentices into works council firms. It could be the case that the “better” apprentices select themselves into works council firms, because works councils signal better working and career conditions. Indeed, previous research showed that works councils offer higher apprentice pay (Kriechel et al. 2014) and also invest more resourced in recruitment process (Wenzelmann et al. 2017). Thus, in the absence of significant differences in the input and process quality measures, and to the extent that we did not omit other important quality factors, our results are in part also driven by a positive selection of apprentices into firms with works councils.

6. Conclusions

A high-quality apprenticeship system is a necessary condition for remaining an attractive educational pathway for non-college bound youth and for providing well-qualified workers to the labor market. We investigate whether works councils are associated with a higher training quality in the workplace, a question that was not previously addressed in the empirical literature. Our results suggest that works councils are associated with an improved outcome quality, as measured in lower drop-out rates and fewer absences due to sickness during training. Moreover,

retention rates are higher in firms with works councils, although these effects are no longer statistically significant in times of a tight skilled labor market. Thus, our results suggest that works councils provide some assurance that apprentices are offered a permanent work after training contract even in times when there is no scarcity of skilled workers on the external labor market.

Our results do not suggest that works councils never improve input or process quality measures, because shaping the organization and learning environments of apprentices is not necessarily a top priority of works council members in general. Topics related to the hiring and layoff processes are likely more pressing areas that call for the involvement of works councils, which is in line with our results concerning the retention rates of apprentices. Overall, we interpret our result as mixed evidence for works council involvement in safeguarding the training quality in firms. Nonetheless, as works councils are highly heterogeneous with respect to individual and collective priorities and preferences, future research should focus on whether works councils that also established a committee to represent young workers and apprentices (*Jugend- und Auszubildendenvertretung*) in fact contribute to an increased training quality in the workplace.

Table 1: Training firms 2007

	(1) 5+ employees Works Council	(2) 5+ employees No Works Council	(3) Difference (1)-(2)
Investment in training infrastructure	1180.8 (66.96) Obs. 917	673.0 (21.91) Obs. 1736	507.7*** (8.87)
In-house training facilities	0.189 (0.013) Obs. 917	0.046 (0.005) Obs. 1736	0.143*** (12.22)
External training phases	0.630 (0.016) Obs. 917	0.641 (0.012) Obs. 1736	-0.011 (-0.551)
Cooperation of training firms	0.299 (0.015) Obs. 913	0.150 (0.009) Obs. 1729	0.149*** (9.19)
Training of additional qualifications	0.229 (0.014) Obs. 917	0.149 (0.009) Obs. 1736	0.080*** (5.19)
Supervision intensity during the training	11.451 (0.401) Obs. 912	14.828 (0.349) Obs. 1722	-3.378*** (-6.02)
Illness-related absence of trainees	7.049 (0.196) Obs. 917	8.304 (0.168) Obs. 1736	-1.255*** (-4.62)
Drop-out rates during the training period	0.234 (0.014) Obs. 917	0.252 (0.010) Obs. 1736	-0.018 (-1.02)
Retention rate after 1 year	74.84 (1.267) Obs. 835	61.11 (1.090) Obs. 1560	13.73*** (7.82)
Retention rate after 3 years	62.78 (1.331) Obs. 823	46.99 (1.080) Obs. 1512	15.78*** (8.95)
Retention rate after 5 years	56.45 (1.349) Obs. 802	37.48 (1.038) Obs. 1462	18.96*** (11.02)

*10% level sig.; **5% level sig.; ***1% level sig.. Source: BIBB CBS 2007.

Notes: Table 1 shows the mean of the respective quality indicators for all firms in our sample for the year 2007. Column 1 shows the mean for firms with works councils and Column 2 for firms without works councils. Standard deviations are displayed in parentheses. Column 3 shows the differences between Column 1 and 2 and results of a t-test of the differences in means in parentheses.

Table 2: Descriptive statistics, training firms 2012

	(1) 5+ employees Works Council	(2) 5+ employees No Works Council	(3) Difference (1)-(2)
Investment in training infrastructure	999.2 (56.82) Obs. 896	703.9 (19.49) Obs. 1791	295.3*** (6.06)
In-house training facilities	0.193 (0.013) Obs. 921	0.119 (0.008) Obs. 1846	0.074*** (5.26)
External training phases	0.589 (0.016) Obs. 924	0.603 (0.011) Obs. 1845	-0.014 (-0.70)
Cooperation of training firms	0.350 (0.016) Obs. 924	0.207 (0.009) Obs. 1847	0.143*** (8.19)
Training of additional qualifications	0.251 (0.014) Obs. 921	0.175 (0.009) Obs. 1844	0.076*** (4.74)
Supervision intensity during the training	13.862 (0.418) Obs. 924	18.053 (0.328) Obs. 1846	-4.189*** (-7.62)
Illness-related absence of trainees	8.897 (0.197) Obs. 924	10.563 (0.175) Obs. 1847	1.666*** (5.68)
Drop-out rates during the training period	0.309 (0.015) Obs. 917	0.346 (0.011) Obs. 1841	-0.037** (-0.96)
Retention rate after 1 year	75.06 (1.188) Obs. 895	59.32 (0.995) Obs. 1731	15.74*** (9.68)
Retention rate after 3 years	62.08 (1.258) Obs. 875	43.26 (0.977) Obs. 1672	18.82*** (11.56)
Retention rate after 5 years	55.36 (1.274) Obs. 855	32.63 (0.929) Obs. 1617	22.73*** (14.41)

*10% level sig.; **5% level sig.; ***1% level sig.; Pct.: percentage of exact matches. Source: BIBB CBS 2012.

Notes: Table 2 shows the mean of the respective quality indicators for all firms in our sample for the year 2012. Column 1 shows the means for firms with works councils and Column 2 for firms without works councils. Standard deviations are displayed in parentheses. Column 3 shows the differences between Column 1 and 2 and results of a t-test of the differences in means in parentheses.

Table 3: Nearest neighbor matching: Pooled sample of training firms 2007 and 2012

	(1)5+ employees	(2)21-100 employees	(3)5+ employees	(4) 21-100 employees
Investment in training infrastructure	0.065 (0.113) Obs. 2198 Pct. 97.2	0.027 (0.138) Obs. 636 Pct. 93.9	0.001 (0.136) Obs. 1572 Pct. 84.7	0.123 (0.181) Obs. 540 Pct. 74.9
In-house training facilities	0.059** (0.027) Obs. 2318 Pct. 100	0.023 (0.033) Obs. 690 Pct. 99.0	0.107** (0.049) Obs. 1677 Pct. 86.9	-0.024 (0.060) Obs. 591 Pct. 77
External training phases	0.027 (0.052) Obs. 2318 Pct. 100	0.009 (0.066) Obs. 690 Pct. 99.0	-0.164*** (0.060) Obs. 1677 Pct. 87.6	0.023 (0.087) Obs. 590 Pct. 76.0
Cooperation of training companies	-0.018 (0.039) Obs. 2307 Pct. 100	-0.088* (0.046) Obs. 687 Pct. 99.1	0.003 (0.051) Obs. 1679 Pct. 86.8	-0.035 (0.070) Obs. 591 Pct. 77.0
Training of additional qualifications	-0.010 (0.039) Obs. 2318 Pct. 100	-0.028 (0.054) Obs. 690 Pct. 99.0	0.001 (0.050) Obs. 1676 Pct. 86.9	-0.022 (0.076) Obs. 591 Pct. 77.0
Supervision intensity during the training	-2.080 (1.659) Obs. 2300 Pct. 100	-0.845 (2.139) Obs. 685 Pct. 99.0	-5.633*** (1.748) Obs. 1678 Pct. 87.5	0.559 (2.170) Obs. 590 Pct. 77.0
Illness-related absence of trainees	0.350 (0.788) Obs. 2318 Pct. 100	1.659 (1.084) Obs. 690 Pct. 99.0	-1.905** (0.909) Obs. 1679 Pct. 86.8	-4.829*** (1.246) Obs. 591 Pct. 77.0
Drop-out rates during the training period	-0.037 (0.046) Obs. 2318 Pct. 100	-0.045 (0.059) Obs. 690 Pct. 99.0	-0.066 (0.057) Obs. 1675 Pct. 86.9	-0.131 (0.088) Obs. 588 Pct. 76.2
Retention rate after 1 year	18.308*** (4.797) Obs. 2093 Pct. 100	3.996 (5.290) Obs. 626 Pct. 98.9	18.605*** (5.111) Obs. 1593 Pct. 87.1	10.699 (6.899) Obs. 565 Pct. 78.4
Retention rate after 3 years	23.049*** (4.740) Obs. 2041 Pct. 100	12.982** (5.456) Obs. 604 Pct. 99.8	20.758*** (4.994) 1541 Pct. 88.2	6.553 (7.359) Obs. 544 Pct. 78.6
Retention rate after 5 years	25.043*** (4.620) Obs. 1979 Pct. 100	12.537** (5.535) Obs. 588 Pct. 96.2	26.077*** (4.836) Obs. 1507 Pct. 86.4	10.361 (7.439) Obs. 529 Pct. 77.5

*10% level sig.; **5% level sig.; ***1% level sig.; Pct.: percentage of exact matches.

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Appendix

Table A1: Descriptive information for firms in samples 2007 and 2012

	Means 2007	Means 2012
Industry		
NACE1	43 Pct.	25 Pct.
NACE2	17 Pct.	19 Pct.
NACE3	21 Pct.	14 Pct.
NACE4	12 Pct.	30 Pct.
NACE5	7 Pct.	12 Pct.
Number of Employees	165	161
Number of Apprentices	5	5
Works Council	28 Pct.	27 Pct.
Collective Wage Agreement	52 Pct.	49 Pct.
West Germany	76 Pct.	79 Pct.
Observations	2653	2769

Pct.: percentage.

Table A2: Robustness Check Nearest neighbor matching:
Pooled sample of training firms 2007 and 2012

	(1)5-20 employees	(2)5-20 employees
Investment in training infrastructure	0.247 (0.250) Obs. 1101 Pct. 59.5	-0.453* (0.235) Obs. 721 Pct. 51.0
In-house training facilities	0.187** (0.074) Obs. 1119 Pct. 58.3	-0.013 (0.109) Obs. 734 Pct. 54.1
External training phases	0.103 (0.111) Obs. 1119 Pct. 58.3	-0.104 (0.152) Obs. 734 Pct. 55.7
Cooperation of training companies	0.205** (0.096) Obs. 1114 Pct. 60.9	0.035 (0.132) Obs. 735 Pct. 55.8
Training of additional qualifications	0.076 (0.086) Obs. 1119 Pct. 58.3	-0.148 (0.096) Obs. 732 Pct. 55.9
Supervision intensity during the training	-2.004 (3.407) Obs. 1109 Pct. 58.0	-5.714 (4.409) Obs. 735 Pct. 55.8
Illness-related absence of trainees	-1.119 (1.439) Obs. 1119 Pct. 58.3	-0.944 (2.331) Obs. 735 Pct. 55.8
Drop-out rates during the training period	0.049 (0.101) Obs. 1119 Pct. 58.3	0.120 (0.150) Obs. 735 Pct. 55.8
Retention rate after 1 year	28.128*** (9.055) Obs. 1003 Pct. 51.0	-6.583 (13.608) Obs. 689 Pct. 54.3
Retention rate after 3 years	30.046*** (8.489) Obs. 973 Pct. 51.7	2.898 (13.283) Obs. 665 Pct. 55.1
Retention rate after 5 years	26.769*** (8.379) Obs. 943 Pct. 51.4	13.231 (12.407) Obs. 650 Pct. 52.8

*10% level sig.; **5% level sig.; ***1% level sig.; Pct.: percentage of exact matches. Column 1 shows the results for year 2007 and column 2 shows the results for year 2012.