Continuous Training and Company-Level Pacts for Employment in Germany

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Company-level pacts for employment and competitiveness are agreements between management and the firms` workforce that are characterized by concessions from both bargaining partners. Employees agree to firm-specific deviations from a collective contract that include reduced wages or prolonged working time in exchange for employment guaranteed or investment programs. As these pacts also increase the stability of employment, our hypothesis is that establishments having introduced a CLP provide continuous training more often. We use the IAB Establishment Panel data 2003-2007, and apply cross-section time-series regression models and difference-in-difference combined with matching. As the treatment effect may be represented by an interaction effect or an interaction term in nonlinear models we follow the methods suggested by Ai and Norton (2003) and Puhani (2008) for its interpretation.

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1   Introduction

As the German economy is hit by probably the deepest recession since 1949 and as industry-wide bargained wages are diagnosed as a source of inflexibility company-level pacts for employment and competitiveness (CLP) are regarded as an instrument for firms to adjust the level and dispersion of wages to the dramatically changing conditions in labour and product markets. Furthermore, they are able to improve their competitiveness by continuous training measures, because continuous training is regarded as a very important human resource management tool toward adjusting to new qualificational requirements as caused by technological, organizational and demographic change. Calmfors and Driffill (1988) as well as Berthold and Fehn (1996) argue that the level of employment is higher in decentralized wage-setting regimes compared with wage-bargaining at the industry-level. Thus, these authors expect that CLPs tend to increase the level of employment in case of a negative shock. Consequently, the employment stability at least for core employees enhances, which might have a positive impact on human capital formation. Whereas some studies have provided econometric evidence of the effects of CLPs on employment (Hübler 2005a, 2005b, Bellmann, Gerlach and Meyer 2008) and the firms' economic performance (Hübler 2006), to our best knowledge no study exists until now in which the impact of CLPs on establishments` training activities is investigated.

As recent empirical results provided by Muehler, Beckmann and Schauenberg (2007) have shown, not only firm-specific training but also general training is associated with larger wage increases thus in the long run wage increase can be expected, which at least partially compensate for the wage reductions negotiated with the introduction of CLPs. Therefore, the question we address in this paper is: Are the CLPs successful in the sense that significantly more establishments provide continuous training activities?

To answer this question it is necessary to compare the development of establishment which have implemented CLPs which those do not adopt them. This prerequisite is fulfilled by the IAB Establishment Panel in which special questions concerning CLPs are asked in the year 2006. Using this data set allows the identification of the year the CLPs are concluded. Therefore it is possible to study the introduction as well as the impact of the CLPs which is a major advantage compared to data which were used in previous studies. Thus, we are able to avoid methodological problems of cross-section data which consists of establishments which have introduced CLPs at different points of time. For causal analyses structural information

about the establishments from the time before the CLPs are introduced is necessary and provided by the IAB Establishment Panel.

The paper is organised as follows. Section 2 discusses the theoretical background and previous empirical research. Section 3 describes briefly the IAB Establishment Panel data which were used for our study. In Section 4 we present our descriptive findings and the econometric analyses of the impact of CLPs on continuous training conducted at the establishment level. Section 5 concludes.

2 Theoretical background and previous studies

Several approaches deal with the possible effects of CLPs. They focus on the decentralization of wage setting, theories concentrating on efficient bargaining and approaches which are related to the productivity effects of an enduring employment relationship.

As already mentioned Calmfors and Driffill (1988) as well as Berthold and Fehn (1996) have pointed out the level of employment is higher in decentralized wage-setting regimes. However, Fitzenberger and Franz (1999, 2000) show that a transfer of wage-bargaining from industry-level to firms does not with necessity lead to higher employment. In their model unions can bargain at the firm- or industry-level either myopically (not taking into account the repercussions of wages on employment in the steady state) or with a long-term orientation (being aware of these repercussions). Making a distinction between insiders who are more productive than outsiders they argue that on the one hand employees and the union in profitable firms prefer pay hikes to new hires. They are also inclined to accept wage cuts only if their own jobs are endangered. On the other hand an industry-wide collective wage agreement specifies a uniform wage across all firms, which is relatively lower in profitable firms and relatively higher in less profitable ones. Thus, the employment effect of a transfer of a wage-setting regime is ambiguous.

With the existence of company-level pacts that authorize a trade-off between employment and wages, a renegotiation of wages at the plant level is feasible if a firm with posterior full information about product demand faces severe employment losses due to the prior bargained wage at the industry-level. The renegotiation, however, incurs costs of information and transactions, for instance. The existence of pacts induces the monopoly union to set a higher wage as it is no longer binding if a negative product demand with concomitant employment losses materializes. Consequently, the overall employment effect of CLPs is ambiguous, too,

although positive employment effects might be expected for companies implementing the pacts.

In principle, the negotiation of an efficient contract at the company-level can substitute or complement an industry-wide agreement. Especially for larger companies Hassel and Rehder (2001) emphasize the efficiency-enhancing impact of peaceful labour relations. Industry-wide collective contracts prohibit strikes during the term of the contract. In addition, pacts at the company-level facilitate the control of labour costs by enabling a variety of working time regimes, a differentiation of working conditions and an implementation of pay cuts. Thus, particularly for larger companies it might be advantageous to retain the peace obligations of collective contracts and to simultaneously attain the higher degree of flexibility provided by CLPs. Small and medium sized plants dispose of more informal procedures to react negative shocks.

Empirical research on the determinants and the effects of CLP is based on rather small surveys of firms in certain industries (Ackermann/Vollmer 1999, Berthold, Brischke and Stettes 2003b, Heidemann 2005). Furthermore, the Economic and Social Research Institute affiliated with the Federation of German Unions (WSI – Wirtschafts- und Sozialwissenschaftliches Institut) has asked some special questions concerning CLPs in its Works Council Survey 2003. According to the study of Seifert and Massa-Wirth (1995) 23 per cent of all firms in the private economic sectors with a works council and with at least 20 employees have concluded a CLP. The survey Establishment Interest Regulation in Germany BISS (Betriebliche Interessenregulierung in Deutschland – Survey und Strukturanalyse) (Hauser-Ditz, Hertwig and Priest 2006) is based on a broader target group. It covers all establishments with at least 10 employees in the private sector of the economy. Only 7% of these establishments report the existence of a CLP. Ellguth and Kohaut (2008) investigate the diffusion of CLPs using the IAB Establishment Panel data, because in 2006 CLPs are surveyed in greater detail. They find that approximately 2 percent of all establishments in the private sector with five and more employees implement CLPs. These establishments employ approximately 14 percent of the workforce.

Hübler (2005a, 2005b) uses data from the WSI Works Council Survey. His study reveals positive employment effects in the short run, in the medium terms he finds negative employment effects and in the long run the development of employment shows positive effects. For our own analysis it is interesting that Hübler`s studies show that on-the-job training has a positive impact on the development of employment. Based on the IAB Establishment Panel of the years 2004 to 2007 Bellmann, Gerlach and Meyer (2008)

investigate the effects of CLPs on the actual and expected employment development. Applying conditional difference-in-difference matching they do not find evidence that the CLPs help to stabilize or increase employment. In contrast the evidence is rather in favour of a negative association between pacts and employment growth.

Whereas the empirical studies of Hübler (2005a, 2005b) and Bellmann, Gerlach and Meyer (2008) do not recourse to a specific model, the theoretical considerations of Calmfors and Driffill (1988) as well as of Berthold and Fehn (1996) rely on restrictive assumptions (e. g. homogeneity of labour). Fitzenberger and Franz (1999, 2000) argue on the basis of the insider-outsider theory, whose starting point are employees` cost associated with hiring and firing of employees (e. g. as search and training costs). Therefore, training costs are central for this strand of theory and ideally, the empirical analyses of Hübler (2005a, 2005b) and Bellmann, Gerlach and Meyer (2008) should differentiate between several groups of employees e. g. according to their qualification. Alternatively the firms` decision to provide continuous training for their employees can be studied. Before turning to the details some general remarks are useful.

A decisive element of human capital theory is the distinction between specific and general human capital (Becker 1964). In the case of complete competition it is not worthwhile for firms to invest in general or transferable human capital, because they have no guarantee that employees who have received general training will remain in the firm once they have completed their training. If the trainees leave, the firm can no longer benefit from the increase in productivity as a result of training and bears only its costs. Investment in general human capital is only worthwhile for firms if the trainees are paid wages after completion of training which are lower than their productivity, and thus a margin can be realized. The new training literature (Bassanini et al. 2005) discusses several reasons for this type of remuneration leading to compressed wage structure in which, as skills increase, wage grow less quickly than productivity (Acemoglu and Pischke 1998, 1999a, 1999b). Costs can be avoided as a result of lower staff turnover since those completing training remain in the firm longer and because of a reduced risk of recruiting the "wrong" employees (Franz and Soskice 1995).

The revenues of continuous training as a form of investment into human capital gained depend on the employee structure. Statistically a relationship between trainability and thus success in learning, and the qualification and training can be found, so that establishments with a large proportion of qualified employees expect higher training revenues. In the case of older employees, women and/or part-time employees, the establishments often assume a shorter amortization period, with the result that less continuous training can be expected in

establishments with a large proportion of these employee groups. If an establishment reports large proportion of apprentices, this can be interpreted as an indication for general human capital orientation leading to more continuous training activity. Furthermore, reforms of the dual training system in Germany stress the importance of exemplary training and life-long learning, thus increasing the demand of young employees for continuous training after having completed initial vocational training.

Through their effect on the attractivity of jobs and their codetermination rights in § 96 of the Works Constitution Act the existence of works councils contributes not only to a lower staff turnover, but gives continuous training a higher priority (Bellmann/Ellguth 2006). Since some industry-level wage-contract committed the employer to offer training courses for their employees we expect a positive effect of the existence of such contracts. Establishments` interest in continuous training arises as a result of the introduction of new products and production processes as well as changes in the establishments` organisation and information systems. Large firms train usually more relatively employees because they frequently have their own training department and/or specialised courses can be organized. While these arguments are studied empirically in a number of articles (Gerlach and Jirjahn 1998, 2001, Düll and Bellmann 1998, Bellmann and Büchel 2001, Bellmann, Düll and Leber 2001, Neubäumer and Kohaut 2007) Zwick and Schröder (2001) point out that training may just a necessity when the workforce is not adequately qualified and firms are forced to retrain workers internally instead of facing high labour turnover costs and a shortage of skilled workers on the labour market. Furthermore Bellmann and Büchel (2001) stress the fact that the establishments` decision to train is selective and that training must fit to the establishments` organisation. Zwick (2002) argues along these line and finds that firms with inefficient production structures use training in order to boost productivity.

3   Data and variables

For our empirical analysis we use the IAB Establishment Panel. The basis for its sampling is the establishment file of the Federal Employment Agency, so that the population includes all establishments with at least one employee covered by social security (cf. Fischer et al. 2008). The IAB Establishment Panel surveys approximately 16,000 establishments on an annual

basis. We restrict our analysis to establishments with five and more employees of the private enterprise sector without agriculture, foresting and fishing[1].

The survey units are establishments, i.e. the local units in which goods and services are produced. Their owner or managers are interviewed by TNS Infratest Munich on behalf of the IAB. The annual survey programme covers structural characteristics of the establishments about the development and structure of the workforce and business development. In addition to the questions which are asked each year, are various special focus subjects in individual years. In 2003, 2005 and 2007 the establishments are asked additional questions about the incidence and intensity of further training. In the wave 2006 questions are raised about the existence of CLPs, the motivation to conclude a CLP, the duration of the contract and other characteristics of the pacts. The survey focuses on agreements with concessions from the workforce or the council representing the employees and from the management of the company. Pacts with unilateral concessions are excluded. In contrast to the Works Council Survey it also covers smaller companies with less than 20 employees and is not restricted to establishments with a works council.

Analytically there are two basic management decisions concerning continuous training – first a qualitative decision: either the firm trains employees or it does not, and secondly the quantitative decision: how many employees are to be trained by an individual firm. In both models we introduce a given set of exogenous variables. As mentioned the dummy variable "company-level pact" uses information with is measured directly. In the year 2006 we asked the establishments whether they have adopted a CLP and in which year they concluded the pact.

To control for observed heterogeneity of establishments the "proportion of qualified employees", "the proportion of part-time employees", "the proportion of apprentices" and the "retention rate of apprentices" are included in our regression models. We expect positive effects of these variables with the exception of the "proportion of part-time employees". The staff turnover rate as the share of personnel outflow exceeding the change in the number of employees the so-called "churning rate" is expected to be negatively associated with both the incidence and intensity of continuous training.

As there is an expected complementarity between human capital and physical capital, firms invest in information and communication technology are more inclined to invest also in the human capital of their employees. Through their effect on the attractivity of jobs and their

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[1] Excluded are establishments reporting that they characterize their transaction volume by „budget size" and companies affiliated to the sectors „education", „representation of interests, churches and other associations without pecuniary rewards", and „private households".

code termination rights the "existence of a works councils" should exert a positive impact on continuous training. Collective bargaining often includes negotiations about continuous training, the respective dummy variable is expected to have positive influence in the regressions.

4   Descriptive statistical results and multivariate analyses

Table 1 is based on wave 2006 of the IAB Establishment Panel and includes establishments with and without a CLP. The first column shows the distribution of establishments according to size classes. Although the proportion of all establishments with a CLP is 2.3 percent, in establishments with more than 500 it employees is 33 percent. In one out of four establishments with a CLP also qualification measures are adopted and concluded in the CLP. Furthermore, we find that larger establishments are more active in concluding CLPs than their smaller counterparts.

Table 1

Interestingly, establishments with a CLP employ approximately 14 percent of the workforce (Ellguth and Kohaut 2008) and larger establishments are more likely to introduce CLPs with the intention to strengthen their competitiveness and with a longer duration (Bellmann, Gerlach and Meyer 2008). Table A1 (see appendix) shows that the incidences of continuous training almost monotonically increase with the establishment size whereas the establishments, which adopted a CLP, exhibit larger values than those without CLPs. Only small differences in the intensity of continuous training exist between establishments which belong to different establishment size classes and with or without usage of a CLP.

In the following multivariate analysis the intensity of continuous training is examined. As this quantity is censored at zero, OLS would result in biased estimates. Since a simple tobit model is quite restrictive in the sense that it assumes an identical parameter vector in both the firms` qualitative decision about the incidence and the quantitative decision regarding the supply of continuous training (the intensity) we split this two dimensions. We use a probit model to estimate the qualitative dimension of the decision problem and a truncated regression to model the quantitative dimension, given the firm offers a positive amount of continuous training (Greene 2003). Table 2 reports the results of a linear regression (which ignores censoring), the truncated regression and the probit model. In the OLS regression the CLP variable exerts a significantly positive impact at a conventional level. Among the exogenous

variables the proportion of qualified employees, the proportion of skilled employees, the retention rate of apprentices, IT-investment, and the dummy variable indicating the existence of a works councils show significantly positive effects. The proportion of apprentices and the dummy controlling for a binding collective agreement exert significant influences in the OLS regression model, only. The training intensity is significantly lower in the year 2003 than in the years 2005 and 2007. Not reported are the regression coefficients for the establishments` size class. The corresponding dummies reveal a positive effect of the establishment sizes on training intensity. In the last column of Table 2 we present the determinants of continuous training incidence. Interestingly, the CLP variable shows a significantly positive impact. Obviously the positive effect measured in the OLS regression is driven by the positive effect within the qualitative decision. All the exogenous variables show significant effects with the exception of the churning rate and the dummy for the year 2005. Thus, in contrast to its effect on the continuous training intensity, the proportion of part-time employees exerts a significantly negative effect on the continuous training incidence.

Table 2

In the next step we analyze the introduction of a CLP by considering the following basic relationship

(1) $\qquad y_{it} = \gamma D_i + \lambda T_t + \delta_1 D_i T_t + z'_{i2004} x + \varepsilon_{it}, \qquad\qquad t = 2003, 2005, 2007.$

The corresponding estimation is based on a subsample which contains the years 2003, 2005 and 2007. Only establishments are included which either do not have any kind of CLP in 2003, 2005 and 2007 (control group) or do not have a CLP in 2003 but in 2005 and 2007 (treatment group). For the latter D_i equals one. Also a time dummy T_t is included, which is from 2005 equal to one. The third variable $D_i T_t$ is an interaction term, which is equal to one if the observation is made from 2005 and in an establishment which introduced a CLP in 2005. Z'_{i2004} is a vector of observable firm characteristics measured in 2004. ε_{it} is the remaining error term. To estimate the effect of a CLP on the incidence and the intensity of continuing training we compare the change in the endogenous variables (incidence and intensity of continuous training) from 2005 between the treatment and control group. This results in the classical difference-in-difference estimator (Meyer 1995) which has the following general form

(2) $\Delta_{did} = [E(y \mid T=1, D=1, TD=1) - E(y \mid T=1, D=0, TD=0)] -$
       $[E(y \mid T=1, D=0, TD=0) - E(y \mid T=0, D=0, TD=0)].$

Given the identifying assumption that the development of the endogenous variables would have been the same in both groups if there wasn´t an introduction of CLPs in the treatment group, the interaction effect gives the treatment effect of a CLP. In linear models the interaction effect corresponds to the coefficient of the interaction term. So the treatment effect is directly given by δ. However this simple relationship does not hold for nonlinear models like probit and truncated regression. Following Ai and Norton (2003) we estimate the interaction effect and hence (under the identifying assumption) the treatment effect by evaluating the four expected values in (2) explicitly. Since the marginal effects in nonlinear models depend on all exogenous variables in the model, we calculate the treatment effect on the mean linear prediction for the exogenous variables. The standard errors are estimated by applying the delta method (Ai and Norton 2003).

Puhani (2008) argues that the identifying assumption, which can be expressed by

(3) $[E(y \mid T=1, D=1, TD=0) - E(y \mid T=0, D=1, TD=0)] -$
       $[E(y \mid T=1, D=0, TD=0) - E(y \mid T=0, D=0, TD=0)] = 0$

does not hold for nonlinear models. Hence the treatment effect is given by

(4)
$\Delta^{p}_{did} = [E(y \mid T=1, D=1, TD=1) - E(y \mid T=0, D=1, TD=0)] -$
       $[E(y \mid T=1, D=0, TD=0) - E(y \mid T=0, D=0, TD=0)] -$
       $[E(y \mid T=1, D=1, TD=0) - E(y \mid T=0, D=1, TD=0)] +$,
       $[E(y \mid T=1, D=0, TD=0) - E(y \mid T=0, D=0, TD=0)]$
$= [E(y \mid T=1, D=1, TD=1) - E(y \mid T=1, D=1, TD=0)]$

Since it is not subject of this paper to clarify who is right, Ai and Norton (2003) or Puhani (2008), we estimate the treatment effects in both ways (2) and (4), to see whether our results are robust. While the approach of Ai and Norton (2003) relies on an identifying assumption which may be wrong especially in nonlinear models, Puhani (2008) relaxes this assumption and calculates the counterfactual outcome directly from the estimated model. However this also may cause problems. The reason is that this approach uses predicted values which are far away from the data on which the estimates are based on. Which means that it is not clear whether $E(y \mid T=1, D=1, TD=0)$ is really a reliable estimator for the counterfactual situation since there are no observations with T=1, D=1 and TD=0 within the dataset. Of

course one may argue that this is very usual for counterfactual situations because such situations are always unobservable.

Finally a key problem of our design may be selectivity. To avoid such problems which might arise when the treatment (the introduction of a CLP) is endogenously determined by the establishments themselves, we adopt matching techniques. Table 3 shows that the treatment and the control group differ significantly in relevant characteristics, which supports our presumption of possibly occurring selection biases.

Table 3

Table 3 also presents the results of a probit estimation for the determinants of the introduction of a CLP. Among the exogenous variables the churning rate reveals a significantly negative effect. This means that "excess fluctuation" reduces the probability of a binding collective agreement and a works council increase the likelihood of a CLP significantly. On the basis of the predicted propensity scores (did firm i introduce a CLP in 2005?) we try to find in the large group of plants without a CLP those establishments which are similar to the establishments with a CLP in almost all aspects except for the fact that they have not introduced a CLP. Applying nearest neighbour matching[2], we get a subsample which consists of treatment and control plants being very similar with respect to the covariates used in the matching algorithm (see Table 3). The treatment effects of the difference-in-difference estimation on this matched sample are presented in Table 4 where we also report treatment effects for different years.

Table 4

The difference-in-difference estimates on the matched sample show no treatment effects. This result does not depend on the way this quantities are calculated, whether the marginal interaction effect or the marginal effect for the interaction term is interpreted as the treatment effect. There is also no selection effect[3] (see appendix table A2, variable "Company-level pact"). Furthermore we apply our difference-in-difference approach on the non matched

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[2] We also tried radius matching (calliper 0.01 and 0.05) and nearest neighbour matching with more than one neighbour. The results remain stable.

[3] The fact that the sample size for the estimates on which the calculation of the treatment effects are based on is quite small could cause serious technical problems, because asymptotic assumptions which are needed for maximum likelihood and delta method may not hold. However the results remain stable, if we run OLS regressions instead of probit or truncated regressions models.

sample (see appendix table A3 and A4). The estimates show (table A3, variable "Company-level pact") a significantly positive selection effect for both, the quantitative and the qualitative decision regarding the firms' continuous training supply. Thus, firms which concluded a CLP in 2005, also show in 2003, 2005 and 2007 (on average) a higher continuous training incidence and a higher continuous training intensity. Moreover only the calculated (treatment) effect for 2003 vs. 2005 is significant negative around 7 percentage points (table A4, variable "Treatment effect 2003 vs. 2005"). However the estimations on the matched sample suggest that this negative effect may be not due to the introduction of CLPs but rather because of systematic differences in relevant characteristics for the training and the treatment decision between the treatment and the control group. Thus our conclusion is that we do not find any causal effect of CLPs on the firms' continuous training behaviour at all.

5   Conclusions

CLPs are agreements between management and the firms' workforce that are characterized by concessions from both bargaining partners. Employees agree to firm-specific deviations from a collective contract that include reduced wages or prolonged working time in exchange for employment guarantees or investment programs. As the pacts also increase the stability of employment, human capital theory and the new training literature argue that establishments having introduced a CLP provide continuous training more often than other establishments. Using the IAB Establishment Panel data in which special questions concerning CLPs are asked in the year 2006 we estimated OLS regression and truncated regression models for the intensity of continuous training as well as probit models for the incidence of continuous training for the time period 2003-2007. The regression coefficients of the CLP variable are significantly positive. The adoption of difference-in-difference matching techniques does not corroborate this significant impact of CLPs, but reveals the importance of a selectivity effect. This rather pessimistic assessment of the extent continuous training is provided by establishments, which conclude CLPs, means that continuous training is not enhanced in exchange for moderate wage hikes and/or employees` working time concessions.

Additional investigations are urgently needed. First the longer-term effects of CLPs are of special relevance. In the wave 2008 of the IAB Establishment Panel most questions concerning CLPs are reiterated and will enable further research of this topic. Second on the basis of the selective participation in continuous training schemes reported in the cited literature, a differentiation of the analyses presented with respect to type of continuous training (external or internal courses, on-the-job training, job rotation ets.) and the chances of

members of different socio-economic group to participate in continuous training should be studied. Thereby the codetermination rights of the works councils concerning the selection of employees for participation in continuous training measures are of special interest.

Tables

Table 1 Diffusion of company-level pacts for employment and especially qualification company-level pacts for employment within different firm size classes 2006

Establishment size class	Proportion with a CLP	Proportion with a qualification CLP
5-9 employees	0.009	0.001
10-19 employees	0.019	0.008
20-49 employees	0.034	0.007
50-199 employees	0.084	0.016
200-499 employees	0.184	0.042
more than 500 employees	0.333	0.119
total	0.023	0.005

Source: IAB Establishment Panel 2006; own calculations. Results listed are extrapolated.

Table 2 Continuous training intensity and incidence and company-level pacts for employment, Pooled cross-section time-series OLS, truncated regression and probit regression model

| | Dependent variable | | |
| | Continuous training intensity | | Continuous training incidence, dummy, 1 if yes |
	OLS regression	Truncated regression	Probit Regression
company-level pact,	0.020 **	0.048	0.268 ***
dummy, 1 if yes	(0.009)	(0.051)	(0.064)
proportion of qualified employees	0.165 ***	0.849 ***	0.716 ***
	(0.009)	(0.139)	(0.048)
proportion of part-time employees	-0.016	0.072	- 0.254 ***
	(0.014)	(0.083)	(0.064)
proportion of apprentices	0.064 **	- 0.230	1.278 ***
	(0.028)	(0.153)	(0.157)
retention rate of apprentices	0.233***	0.685 **	0.829 **
	(0.082)	(0.307)	(0.417)
churning rate	0.057	0.272	0.054
	(0.039)	(0.235)	(0.153)
investment in IT,	0.059 ***	0.094***	0.451 ***
dummy, 1 if yes	(0.005)	(0.027)	(0.023)
collective agreement,	0.023 ***	0.004	0.179 ***
dummy, 1 if yes	(0.005)	(0.027)	(0.026)
works council,	0.040 ***	0.080 **	0.308 ***
dummy, 1 if yes	(0.006)	(0.032)	(0.032)
year 2005,	-0.009 **	-0.069 ***	0.033
dummy, 1 if yes	(0.004)	(0.021)	(0.023)
year 2007,	-0.007 *	-0.068 ***	0.056 **
dummy, 1 if yes	(0.004)	(0.024)	(0.024)
constant	0.191 ***	-0.105 ***	-0.100
	(0.049)	(0.395)	(0.207)
39 sector dummies included	yes	yes	Yes
5 establishment size dummies included	yes	yes	Yes
number of observations	21,150	14,647	21,159
R^2	0.1263	.	.
$\chi^2(51)$		132.73 ***	3559.87 **
Pseudo R^2			0.2376

The columns present the estimated coefficients and in parentheses the cluster-adjusted standard errors.
***, ** and * indicate statistical significance at the 1, 5, and 10 percent level.
Source: IAB Establishment Panel, wave 2003, 2005 and 2007; own calculations

Table 3 Determinants of company-level pacts for employment. Probit regression model, t-test for the unmatched and matched samples.

	Probit Regression	**t-tests**					
		unmatched sample			**matched sample**		
		Mean Treatment group	Mean Control group	p-value	Mean Treatment group	Mean Control group	p-value
proportion of qualified employees	-0.240 (0.236)	0.721	0.684	0.121	0.721	0.711	0.735
proportion of part-time employees	- 0.614 (0.417)	0.082	0.156	0.000	0.082	0.102	0.269
proportion of apprentices	-1.558 (1.286)	0.041	0.055	0.064	0.041	0.045	0.582
retention rate of apprentices	2.776 (3.649)	0.010	0,012	0.969	0.010	0.084	0.286
churning rate	-10.816 ** (4.724)	0.004	0.014	0.060	0.004	0.004	0.919
investment in IT, dummy, 1 if yes	0.028 (0.118)	0.700	0.467	0.000	0.700	0.683	0.781
collective agreement, dummy, 1 if yes	0.558 *** (0.151)	0.917	0.514	0.000	0.917	0.933	0.626
works council, dummy, 1 if yes	0.907 *** (0.177)	0.925	0.263	0.000	0.925	0.883	0.275
constant	-2.736 *** (0.606)						
39 sector dummies included	Yes						
5 establishment size dummies included	Yes						
$\chi^2(51)$	399. 40 ***						
Pseudo R^2	0.3504						
number of observations	3619	3417	120		120	120	

The columns present the estimated coefficients. Nearest neighbour matching is performed.

***, ** and * indicate statistical significance at the 1, 5 and 10 percent level.

Source: IAB Establishment Panel Survey, wave 2004; own calculations

Table 4 Treatment effects of the introduction of company-level pacts for employment on continuous training intensity and incidence and company-level pacts for employment, based on difference-in-difference estimates on the matched sample

	Dependent variable			
	Continuous training incidence, dummy, 1 if yes		Continuous training intensity	
	Ai/Norton	**Puhani**	**Ai/Norton**	**Puhani**
treatment effect,	0.04	0.03	-0.04	-0.03
2003 vs. 2005	(0.04)	(0.03)	(0.07)	(0.06)
treatment effect,	-0.02	-0.02	-0.00	0.01
2003 vs. 2007	(0.03)	(0.02)	(0.04)	(0.05)
treatment effect,	0.01	0.01	-0.02	-0.01
2003 vs. 2005+	(0.03)	(0.03)	(0.05)	(0.04)

The columns present the estimated coefficients, standard errors in parentheses calculated using the delta-method. The number of observations for the treatment effects 2003 vs. 2005 and 2003 vs. 2007 is 480 and for the treatment effect 2003 vs. 2005+ is 720.

***, ** and * indicate statistical significance at the 1, 5 and 10 percent level. The sample is restricted to those establishments which report that they did not adopt a CLP in 2003. *Source*: IAB Establishment Panel, waves 2003, 2005, 2007; own calculations

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Appendix

Table A1 Incidence intensity of continuous training in establishments with and without company-level pacts for employment within different firm size classes 2006

Establishment size class	Continuous training incidence, dummy, 1 if yes		Continuous training intensity	
	CLP in 2006	no CLP in 2006	CLP in 2006	no CLP in 2006
5-9 employees	0.519	0.455	0.279	0.215
10-19 employees	0.793	0.536	0.174	0.212
20-49 employees	0.844	0.690	0.297	0.216
50-199 employees	0.842	0.831	0.240	0.214
200-499 employees	0.974	0.915	0.212	0.197
more than 500 employees	0.984	0.922	0.233	0.235

Source: IAB Establishment Panel 2006; own calculations. Results listed are extrapolated.

Table A2 Difference-in-difference estimate on the matched sample

	Dependent variable	
	Continuous training incidence, dummy, 1 if yes	Continuous training intensity
	Probit Regression	**Truncated regression**
company-level pact and year 2007,	-0.169	0.113
dummy, 1 if yes	(0.288)	(1.140)
Company-level pact and year 2005,	0.334	-0.889
Dummy, 1 if yes	(0.262)	(1.309)
Company-level pact,	0.287	0.813
Dummy, 1 if yes	(0.242)	(1.047)
year 2007,	0.101	-0.592
dummy, 1 if yes	(0.203)	(1.039)
year 2005,	-0.171	-0.565
dummy, 1 if yes	(0.171)	(0.889)
constant	1,282***	-6.265
	(0.156)	(6.423)
number of observations	720	662

The columns present the estimated coefficients and in parentheses the cluster-adjusted standard errors.
***, ** and * indicate statistical significance at the 1, 5, and 10 percent level.
Source: IAB Establishment Panel, wave 2003, 2005 and 2007; own calculations

Table A3 Difference-in-difference estimate on the non-matched sample

	Dependent variable	
	Continuous training incidence, dummy, 1 if yes	**Continuous training intensity**
	Probit Regression	**Truncated regression**
company-level pact and year 2007,	-0.183	-0.044
dummy, 1 if yes	(0.250)	(0.127)
Company-level pact and year 2005,	0.152	-0.246*
Dummy, 1 if yes	(0.242)	(0.135)
Company-level pact,	0.468**	0.191*
Dummy, 1 if yes	(0.211)	(0.099)
year 2007,	0.055**	-0.050**
dummy, 1 if yes	(0.028)	(0.022)
year 2005,	0.055**	-0.050**
dummy, 1 if yes	(0.028)	(0.022)
proportion of qualified employees	0.700***	0.638***
	(0.075)	(0.104)
proportion of part-time employees	-0.228**	0.011
	(0.099)	(0.079)
proportion of apprentices	1.088***	-0.105
	(0.242)	(0.190)
retention rate of apprentices	0.231	-0.080
	(0.689)	(0.390)
churning rate	-0.347	0.144
	(0.338)	(0.366)
investment in IT,	0.418***	0.057**
dummy, 1 if yes	(0.037)	(0.028)
collective agreement,	0.103***	0.002
dummy, 1 if yes	(0.040)	(0.031)
works council,	0.266***	0.060
dummy, 1 if yes	(0.056)	(0.044)
constant	-0.546	-0.456*
	(0.417)	(0.249)
39 sector dummies included	***	***
5 establishment size dummies included	***	***
number of observations	11277	7508

The columns present the estimated coefficients and in parentheses the cluster-adjusted standard errors. ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level.
Source: IAB Establishment Panel, wave 2003, 2005 and 2007; own calculations

Table A4 Treatment-Effects of the introduction of company-level pacts for employment on continuous training intensity and incidence, based on difference-in-difference estimates (table A2) on the non-matched sample

	Dependent variable			
	Continuous training incidence, dummy, 1 if yes		Continuous training intensity	
	Ai/Norton	Puhani	Ai/Norton	Puhani
treatment effect,	0.028	0.032	-0.076*	-0.073*
2003 vs. 2005	(0.051)	(0.050)	(0.041)	(0.040)
treatment effect,	-0.045	-0.042	-0.018	-0.014
2003 vs. 2007	(0.059)	(0.058)	(0.043)	(0.042)
number of observations	11277	11277	7508	7508

The columns present the estimated coefficients, standard errors in parentheses calculated using the delta-method.

***, ** and * indicate statistical significance at the 1, 5 and 10 percent level. The sample is restricted to those establishments which report that they did not adopt a CLP in 2003. *Source*: IAB Establishment Panel, waves 2003, 2005, 2007; own calculations

Table A5 Descriptive statistics for the exogenous variables used in the OLS regression

	OLS Regression (Table 2)	
	Mean	Standard deviation
company-level pact, dummy, 1 if yes	0.060	-
proportion of qualified employees	0.693	0.255
proportion of part-time employees	0.173	0.220
proportion of apprentices	0.053	0.077
retention rate of apprentices	0.010	0.025
churning rate	0.187	0.069
investment in IT, dummy, 1 if yes	0.548	-
collective agreement, dummy, 1 if yes	0.521	-
works council, dummy, 1 if yes	0.374	-
year 2005, dummy, 1 if yes	0.364	-
year 2007, dummy, 1 if yes	0.366	-
5-9 Employees	0.223	-
10-19 Employees	0.186	-
20-49 Employees	0.214	-
50-199 Employees	0.223	-
200-499 Employees	0.094	-
more than 500 Employees	0.060	-

Source: IAB Establishment Panel, wave 2003, 2005 and 2007; own calculations