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Profit Sharing and Employment Stability*

Abstract: This article investigates whether profit-sharing establishments reduce the number of hirings, layoffs and quits thus decreasing the total number of separations and the labour turnover. The principal argument is that profit sharing increases wage flexibility and also brings them in line with a changing marginal revenue product. As employment stability makes their human capital investment more profitable, increases labour productivity and morale, firms could be interested to adopt profit sharing schemes. The empirical analysis is based on the IAB Establishment Panel. We estimate cross-section time-series regressions and apply some state-of-the-art matching estimators that explicitly account for observed and unobserved heterogeneity. We find a significantly positive effect of profit sharing on hirings and a significantly negative effect on layoffs in the regressions, whereas the results obtained by the matching estimators are not significant.

JEL Classification: M52, J24, J33, J63, C14, C25

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1. Introduction

At the beginning of the 80s after the two oil price shocks and the high interest rate policy of the US Federal Reserve Bank under Paul Volcker the idea that extensive use of profit sharing in compensating workers could reduce unemployment publicly surfaced with the publication of Martin Weitzman's book entitled The Share Economy (Weitzman 1984). This book and an article (Weitzman 1987) initiated a highly controversial discussion around profit sharing. As profit sharing makes wages more flexible, under adverse market conditions both the number of layoffs and under favourable market conditions the number of quits are reduced. According to Weitzman's theory the firms are always eager to hire. Another strand of argument is that since many years business leaders also have found the notion attractive that firms do better when they share the returns form success with workers (Hashimoto 1975, 1979, Huselid 1995, Freeman 2008). Several studies have provided evidence of the effects of profit sharing on productivity (Kruse 1993, OECD 1995, Doucouliagos 1995, Blasi et al. 2006, Carstensen, Gerlach and Hübler 1995, Kraft and Ugarkovic 2005a, Strotmann 2006, Bellmann and Möller 2005). We will investigate the impact of profit sharing on employment stability, because the implications of Weitzman's employment theory and the productivity arguments on labor turnover have been studied in a few articles until now (Blakemore, Low and Ormiston 1987, Chelius and Smith 1990, Hart and Hüber 1990a, Azfar and Danninger 2001, Gielen 2007). Second, to our best knowledge no study exists until now in which both regression and matching methods are used to investigate the impact of profit sharing on employment stability. Third, productivity studies are mostly restricted to establishments in manufacturing industries, because the measurement of productivity is critical for other industries like services.

In Germany research on the effects of profit sharing is also hindered by the fact that these schemes are only applied by a minority of firms, (Bellmann and Möller 2006), so that selectivity effects may arise. For that reason regression analyses have been criticized,

because the estimated coefficients cannot be interpreted as causal effects. Matching methods are widely used for the evaluation of labour market policy programmes to solve comparable methodological problems (Heckman et al 1999). However, in the meantime matching methods are adopted for the investigation of the effects of profit sharing schemes with the data of the IAB Establishment Panel (Bellmann and Möller 2005, Kraft and Ugarkovic 2005a, 2005b, 2006, Strotmann 2005). In our study, we also use the data of the IAB-Establishment Panel and apply OLS regression analyses and some state-of-the-art matching estimators that explicitly account for observed and unobserved differences between establishment with and without profit sharing schemes. First we apply a matching approach that accounts for selectivity that can be attributed to observed establishments' characteristics (e.g. establishment size or sector). We secondly employ a conditional difference-in-difference matching estimator.

The paper is organized as follows: In Section 2 we discuss the theory and in Section 3 the previous empirical research pertaining to hirings, layoffs and quits. Section 4 then outlines our data and model specification, while Section 5 presents the empirical results. Section 6 contains a summary and research perspective.

2. Theoretical Background and Related Research

In the *rent sharing* theory of Hashimoto (1975, 1979) and others variable wages in the form of bonus payments help workers and employers to protect future returns on their investments in specific human capital during a business downturn. Hashimoto clarifies Becker's (1962) original specific-investment hypothesis. His model predicts that increased profitability of on-the-job investments in skills leads to an increased prevalence of bonuses and similar measures. He considers on-the-job training which has some specificity to the firm in the sense that the value of the amount of human capital produced by the investment may differ between the current employer and the alternative employment. Thus, enhanced wage flexibility leads to longer tenure, because employees are encouraged to remain longer with the firm and employers' amortization periods for investment into specific human capital are prolonged. From Hashimoto's perspective general human capital is financed by the employees. However, the new training literature (e.g. Stevens 1994, Acemoglu and Pischke

1998, 1999a, 1999b) argues that firms invest in general human capital if the trainees after the completion of training are paid wages which are lower than their productivity. Reasons for “wage compression” include mobility costs, asymmetric information, efficiency wages and wage floors. Beckmann (2002) shows that this model can be expanded to accommodate the risk of poaching. The stability of employment is increased by the wage flexibility due to profit sharing, in other words higher wages under favourable market conditions and lower wages under adverse market conditions. Thereby profit sharing contributes both in the case of specific and general human capital to a higher expected job retention and therefore employers’ incentives to invest into human capital are increased as well.

The morale or productivity argument regards profit sharing as an instrument which complements *efficiency wages* to reach the various goals proposed by the different versions of the efficiency-wage theory i.e. the reduction of labour turnover, improved recruitment of skilled labour via self-selection mechanism, less shirking and to a larger extent the perception of fairness (Yellen 1984). Whereas in a small firm the individual efforts could affect the whole enterprise’s profit, there is an ongoing debate whether the introduction of profit sharing systems might encourage employees in larger companies to work harder (Blanchflower and Oswald 1987, Lazear 1993). However, there are some communalities between the investment argument put forward by Hashimoto (1975, 1979) and the productivity or moral argument. Both arguments tend to associate profit sharing with a less tight external labour market and more employment stability of insiders compared to outsiders in the face of demand shocks. That said, the total effect of profit sharing on the firm’s employment stability is ambiguous.

In contrast to efficiency wage theory in the *employment theory* proposed by Weitzman (1984, 1987) profit shares act as substitute for wages. In this macroeconomic approach profit sharing is regarded as a cure for unemployment: Although total labour costs are not affected the profit sharing systems serve to lower the marginal price of labour and stimulate employment because under a profit sharing regime firms are obliged to pay a contractural wage plus a fraction of profit. Thus, the employer continues to hire an additional employee as

long as the marginal revenue product exceeds the marginal cost of labour, which is lower under a profit sharing regime compared to a fixed wage regime. The notion that profit sharing firms are always eager to hire is made very explicit by Weitzman (1984, 1987). The employment stability effect of a profit-sharing firm determines its behavior if product-market demand falls. The reduced labor's marginal revenue product does lead the firm to lay off employees only if the new marginal revenue product lies below the contractual wage. As the employees' remuneration is depressed by the fall in total revenues and the absence of layoffs, employees might be inclined to quit. But if the decline in product demand occurs economy-wide, moving to a new job may be difficult. If, however, a bonus under a profit sharing system is not paid according to a predetermined formula but purely ad hoc the profit sharing system loses its employment stabilizing effects (Gerlach 1997).

The significant amount of income risk exposed by profit sharing is an important counterargument. In the *implicit contract* literature (cf. e.g. Azariadis 1975 and Baily 1974) the workers' ability to borrow against their future income is limited and workers are risk averse while employers are risk neutral. Therefore both employees and employers can gain from fixed wage contracts. Additionally, risk adverse agents prefer a diversified portfolio. Because of that reason, workers are not inclined to invest in financial capital of their own firm, because their human capital is already tied up in the enterprise (Blanchflower and Oswald 1987).

Viscusi (1993) has pointed out that the most important explanatory variable in the determination of *compensating wage* differentials is the subjective assessment of the risk associated with a job by both the worker and the firm. This uncertainty may lead to an increase of the likelihood of quitting once the employees have learned about the properties of a job and have revised their prior risk beliefs. However, from Weitzman's employment theory it can be inferred that the likelihood of unemployment for profit-sharing employees could decrease, thus their layoff risk should be smaller.

To summarize, from the perspective of both the human capital theory and the new training literature profit sharing schemes tend to stabilize employment relationships. The same applies to Weitzman´s employment theory, because wages and profit shares can be

regarded as substitutes. The efficiency wage theory expects that profit sharing supports the instrumental function of wages to achieve a higher productivity or better morale of the insider. Different subjective assessment of the risk associated profit shares and its compensation could lead risk adverse employees to leave an establishment introducing profit sharing schemes and conversely attract risk lover thus increasing the turnover. However, if also the likelihood of unemployment decreases, the associated risk declines and the probability of a layoff is smaller.

3. Previous Empirical Studies

In accordance with the individual- and establishment-level data available for the authors of the empirical studies concerning the impact of profit sharing schemes on employment stability different variables are used. Blakemore, Low and Ormiston (1987) considered the firms' ability to pay bonuses in order to reduce their employees' turnover. With a sample from the Panel Study of Income Dynamics the authors found a negative effect which was significant at the 8 % level. Chelius and Smith (1990) had access to data published by the Profit Sharing Council of America and the National Federation of Independent Businesses. Their results reveal an employment stabilizing effect of profit sharing schemes – however, at borderline statistical significance. Wilson, Cable and Peel (1990) investigated the determinants of quits on the basis of a relatively small panel of firms producing within a narrow range of the UK engineering industry. Although controls for a large number of firm-level variables could be included in the regression model, profit sharing and share option schemes had a significant (and consistently) negative impact on quits.

Using the German Socioeconomic Panel Hart and Hübler (1990a) found that the mean tenure of profit-sharing employees was 13.2 years compared with 10.3 years for non-profit-sharing employees. However, the coefficients of both the incidence and the level of profit sharing were insignificant in their analyses. Azfar and Danninger (2001) took data form the National Longitudinal Survey of Youth and estimated the tenure profile for total separations, as well as for quits and layoffs separately. They consistently found lower separation, quit and

layoff rates for profit-sharing firms. The authors also demonstrated that profit sharing was related to higher wage growth, so that they were inclined to conclude that a fast rate of skill accumulation was associated with profit sharing. Based on information of the British Household Panel Survey Gielen (2007) showed that profit sharing increases training investments due to the reduction in the separation probability.

Thus, the presented literature partly corroborates the theoretical expectations of the human capital, employment theory and to a lesser extent the efficiency wage theory. It should be mentioned that it is not possible in this article to discriminate between these different theories. As the empirical studies discussed did not concern the introduction of profit sharing schemes, it is hardly surprising that there were no indications of significantly negative impact of profit sharing on employment stability as expected from the mobility of individuals with different risk attitudes, although some of the results are at borderline statistical significance.

4. Data and Model Specification

The empirical analysis is based on the data from the IAB Establishment Panel (cf. Fischer et al. 2008). Since 1993 this survey is conducted annually and covers all industries and establishment sizes. The population of the IAB Establishment Panel consists of all establishments with at least one employee liable to social security as of 30 June of the previous year. The basis for sampling is the establishment file of the Federal Employment Service. The survey is generally carried out in the form of face-to-face interviews in the establishments by employees of TNS Infratest (Munich). Letters of recommendation from the chairman of the Federal Employment Agency's executive board and the president of the German Employers' Association contribute to the response rate of 81 % to 84 % for interviews with establishment participating continuously. Currently in the IAB Establishment Panel approx. 16,000 establishments are surveyed on a large number of subjects, e.g. employment development and structure, business policy and development, investment activities, innovations in the establishment, public funding, employment policy, initial vocational and further training, recruitment, wages and salaries, working time issues and general information on the establishment. The survey also includes varying focal topics every year. In the year 2000, 2001 and 2005 questions concerning the existence of profit sharing

and capital ownership as well as the number of employees covered by these schemes were asked[1]. As data from the waves 2000, 2001 and 2005 are used for our investigations, the regression analyses could be based on approximately 26 000 establishments. The number of cases is reduced in some analyses, because of item non response. E.g., in case of the conditional difference-in-difference matching the total number of cases in the treatment and control group is approximately 1700.

The measurement for the different aspects of employment stability takes advantage of the IAB Establishment Panel which allows to distinguish between voluntary and involuntary labour turnover. Additionally, we are able to use the number of persons who are either hired, laid off or quit the establishment. Thus, our dependent variables in the regressions are simply the logarithm oft the odds a particular hiring, layoff or quit decision was made (Pindyck and Rubinfeld 1982, 291; Frick 1996)[2]:

hiring density: $\ln((hirings / employees) / (1-(hirings / employees)))$,

quit density: $\ln((quits / employees) / (1-(quits / employees)))$ and

layoff density: $\ln((layoffs / employees) / (1-(layoffs / employees)))$.

And as composite measures of employment stability we use the number of separations and total turnover which is the sum of hirings and separations:

separation density: $\ln((separations / employees) / (1-(separations / employees)))$ and

turnover density:

$$\ln(((hirings + separations) / employees) / (1-(hirings + separations / employees))).$$

For the econometric analysis of the association of the profit sharing schemes, on the one hand, and several measures of employment stability, on the other hand, we adopt the

[1] In the IAB Establishment Panel 2007 the question concerning the existence of profit sharing and capital ownership schemes was raised but not the question concerning the number of employees covered. Therefore we do not use these data for our analyses.

[2] In many cases firms do not report any mobility. In this case one is added to avoid indefinite logarithm values.

following strategies: First, we estimate a cross-section time-series OLS regression model using the information about profit-sharing schemes from the years 2000, 2001 and 2005 of the IAB Establishment Panel. We are interested in the effect of the proportion of employees covered by profit sharing schemes as the explanatory variable, because profit sharing schemes are quite different with respect to the extent they are adopted by the establishments. Secondly, we assign establishments *without* profit sharing schemes according to their observed characteristics (e.g. firm size, sector, legal status, collective wage agreement and personnel structure) to the control group in order to compare them with the members of the treatment group among the establishments *with* profit sharing schemes. In the third and last step we employ a conditional difference-in-difference matching estimator. This procedure makes use of both observed and unobserved characteristics of the establishments in the comparison between the treatment and the control group.

In the cross-section time-series regressions we estimate the effect of the proportion of employees covered by profit sharing schemes on the hiring, separation and total turnover density controlling for several variables which characterize the establishments' economic situation (measured as profitability, sales per employee, development of expected revenue, export and investment activities), employment structure (proportion of qualified employees, proportion of women and whether or not there are temporary employees), the size of establishments (number of employees) and its change caused by certain reorganizational measures (outsourcing, insourcing, spin-offs, partial plant closing) and whether or not the establishment was founded after 1990, industrial relations (existence of a works council and collective wage agreements), the wage level, subsidies and whether or not the establishment is in West Germany. Last but not least dummy variables control for the status of the establishment within the firm, the legal status, sector affiliation and the respective year.

For a causal interpretation of the effect of profit sharing matching techniques are adopted. Therefore, we wish to compare those establishments using profit sharing schemes (PS=1) and with the establishments which do not use the schemes (PS=0), with ES as the employment stability variable of interest we estimate the so called average treatment effect on the treated (ATT). The ATT is defined as the difference between the expected

employment stability with and without the adoption of a profit sharing scheme for the effective adopters:

(1) $\Delta_{ATT} = E(\Delta \mid PS = 1) = E(ES^1 \mid PS = 1) - E(ES^0 \mid PS = 1)$

with E (ES^1) as the expected employment stability of the establishment using profit sharing schemes and E (ES^0) is the corresponding expected value for non-users. The second term on the right hand side of equation (1) describes the hypothetical employment stability without profit sharing for establishments which actually used profit sharing schemes and is therefore unobservable. Under the condition that $E(ES^\circ \mid PS = 1) = E(ES^\circ \mid PS = 0)$, the non-users serve as an adequate control group.

The control group is adequately formed if both the assumptions of conditional independence and common support are fulfilled. In our analysis the assignment of the establishments into the treatment group cannot be regarded as at random, because we are not able to use data from an experimental setting. However, non-random treatment assignment may be at random given a set of covariates X. Thus, our construction of a valid control group via matching is based on the identifying assumption that conditional on all relevant covariates X, the potential outcomes are independent of assignment. In other words it is important that the relevant determinants for the assignment of the establishments into the treatment group of profit-sharing establishments are included in the selection equation (Rubin 1991).

The second necessary assumption is a positive probability to be in the treatment or in the control group to avoid comparing non-comparable establishments. This assumption might be critical if e.g. in the evaluation of labour market programmes it could be the case that certain programmes are directed to certain groups of establishment. However, because the public support for profit sharing in Germany is not very large, such a restriction is not valid in our study and the common support assumption is likely to hold. We construct a control group using a propensity score matching estimator. The propensity score is the conditional probability of receiving a treatment given the pre-treatment variables X_i for the i-th establishment:

(2) $p(X_i) = p(D_i = 1 \mid X_i) = E(D_i \mid X_i)$.

There are some different propensity score matching methods. The most straightforward one is nearest neighbour matching (Heckman et al. 1999), according to which we seek to find for

each profit-sharing establishment the corresponding non-profit-sharing establishment with the closest propensity score.

Additionally, in order to control for unobserved differences between establishments, we employ a conditional difference-indifference matching estimator to assess the effect of the introduction of a profit sharing scheme in 2001 on various measures of employment stability (ES). The comparison between the treatment and the control group are the difference between the employment stability between 2000 on the one side and 2001, 2002 and 2003 on the other side. Thereby we restrict our sample to those establishments which reported that they did not use a profit sharing scheme in 2000 and remained in the IAB Establishment Panel until 2005[3]. The difference-in-difference estimator compares the development of the dependent variable ES for two points in time (T=1 and T=0) and the treatment and the control group (D=1 and D=0):

(3) $$\left[E(ES \mid D=1, T=1) - E(ES \mid D=1, T=0)\right] - \left[E(ES \mid D=0, T=1) - (E(ES \mid D=0, T=0)\right].$$

That approach can be employed by a regression model, in which time dummies for the years 2001, 2002, 2003 and 2004 (T_1=1, if year=2001; T_2=2, if year 2002; T_3=3, if year 2003 and T_4=4, if year 2004), a group dummy (1, if treatment group and 0, if control group) and interaction terms, constructed by the products of the time dummies and the group dummy (Schank et al. 2007) are included:.

(4) $$\begin{aligned} ES &= a_0 + a_1 \cdot T_1 + a_2 \cdot T_2 + \alpha_3 \cdot T_3 + \alpha_4 \cdot T_4 + \alpha_5 D \\ &\quad + a_6 \cdot (T_1 \cdot D) + \alpha_7 \cdot (T_2 \cdot D) + \alpha_8 (T_3 \cdot D) + \alpha_9 (T_4 \cdot D) + \varepsilon \end{aligned}.$$

The treatment effect is expressed by the coefficient of the interaction variable, because we employ a linear specification of the regression model.

[3] In a balanced panel framework the establishments are assigned to the treatment group if the establishment reported to adopt profit sharing schemes both in 2001 and 2005. Similarly, they are assigned to the control group if they reported that they have not implemented profit sharing systems in 2000, 2001 and 2005.

5. Empirical Results

OLS Estimation

For the econometric analyses of the association between profit sharing schemes and various measures of employment stability we start with OLS regression models. The dependent variables are the hiring, separation and total turnover density. According to the results presented in Table 2, the coefficient of the proportion of employees covered by profit sharing is significantly positive only in the hiring density equation. With the exception of some of the scores of the establishments assessment of profitability, the sales per employee and the outsourcing variable the control variables are significant. Additionally, in the regressions with the separation density and the turnover density as the dependent variables the percentage of sales exported, the proportion of women and the insourcing variable are not significant at a conventional level. The expected revenue increase is not significant in the separation density regression.

Therefore, in the next step we split up the separation densities and distinguish between layoff and quit densities (Table 3). Whereas the impact of the proportion of employees covered by profit sharing is still insignificant in the quit density equation, the coefficient of this variable becomes significantly negative in the layoff density equation. Again most of the control variables are significant. Exceptions are in the quit density regression some scores of the establishments´ assessment of profitability, sales and wage per employee, the proportion of women, partial plant closing and the works council variable. In the layoff density equation the following variables are insignificant: some scores of the establishments´ assessment of profitability, sales per employee, expected revenue increase, the percentage of sales exported, the temporary employees, insourcing and works council variables.

Summarizing, we find the profit sharing schemes are associated with more hirings and less layoffs. As these effects exert their influence into different directions, the insignificant effect of profit sharing on total turnover density is hardly surprising.

In contrast to most of the empirical studies discussed in the last section our results do not show a significant effect of profit sharing on quits, but corroborate the significantly negative impact of profit sharing on layoffs as reported by Azfar and Danninger (2001).

Propensity Score Matching

The basic idea of the matching approach is to find in a large group of establishments without profit sharing those establishments which are similar to the establishments with profit sharing in almost all aspects except for the fact that they have *not introduced* a profit sharing scheme. Therefore, we restrict our sample to those establishments which reported in 2000 that they have not adopted a profit sharing scheme. Then, the members of the control group are selected from the non-profit-sharing establishments according to the nearest neighbour principle applied to the propensity score estimated from a probit equation explaining the selection of establishments into profit sharing schemes. Thereby we choose a parsimonious specification because Imbens (2004) has argued that only such covariate should be included in the selection equation which are correlated with the outcome and treatment indicators.
Table 4 presents the probit estimates for the introduction of profit sharing. Highly significant coefficients are obtained for the percentage of sales exported, the establishment size proxied by the number of employees, the proportion of qualified employee, the existence of a collective agreement, dummies of West Germany, the independence and the legal status of the establishment.

In order to test the quality of the matching we compare our establishment-level variables for those establishments without profit sharing and those which have introduced profit sharing schemes. The means of these two groups of establishments are considered before and after the matching in table 5. It can be inferred that almost all means of the variables are significantly different *before* the matching is applied. Exceptions are some variables of the legal status (partnership and public corporation). *After* the implementation of the matching the differences of the means have substantially decreased and are not significant any more. There results confirm the quality of the matching performed.

Table 6 displays the ATT resulting from the nearest neighbour matching methods. In other words the difference between the means of the various measures of employment stability is compared for the establishments with and without introduction of profit sharing schemes in 2001. For the years 2001 until 2004 the general picture is not really consistent and the differences between the means of the treatment and the control group are not significant at least at the 10%-level of significance.

In order to take into account the impact of relevant unobservable differences between establishments for the development of the various indicators of employment stability we estimate OLS regression models with several time dummies, the treatment variable and interaction variables constructed by the products of the time dummies and the treatment variable. The treatment effects are expressed by the coefficients of the interaction variables. Table 7 reveals no significant treatment effects for the years 2001, 2002, 2003 and 2004. F-Tests for the common significance for the four treatment effects also reveal insignificant impacts. Our cautious interpretation of the findings from the matching analyses is that on the level of establishments the impact of profit sharing schemes on various measures of employment stability is rather small. This result differs substantially compared to that obtained by the adoption of pooled cross-section time-series regressions in the case of the hiring and the layoff densities.

6. Conclusions

The highly controversial discussion around profit sharing has neglected almost totally the effect of these schemes on employment stability. Human capital theory and the new training literature as well as the efficiency wage theory have pointed out that it may be attractive for firms to share the returns from business success with their employees. As profit sharing schemes are applied by a minority of firms only, selectivity effects may arise which cast some doubts on the reliability of studies demonstrating the effect of profit sharing on various measures of employment stability. In our study we use the data of the IAB Establishment Panel in order to estimate OLS regression and the treatment effect using some state-of-the-art matching techniques that explicitly account for observed and unobserved heterogeneity.

The results obtained from the pooled cross-section time-series OLS regressions reveal a statistically significant positive effect of the share of covered employees in profit sharing schemes on establishments' hirings and statistically significant negative effect on establishments´ layoffs.

These results are in accordance with the human capital, employment and to a lesser extent the efficiency wage theory. They corroborate the significant negative effect of profit sharing on layoffs as reported by Azfar and Danninger (2001). However, our estimates of the treatment effect using several matching techniques are insignificant at least at the 10 %-level of significance. Therefore, our cautious interpretation of the findings form the matching analyses is that the impact of profit sharing schemes on employment stability is rather small.

As the data of our study are based on a time period with very moderate economic growth it seems to be of special interest to extend our study to the year 2009 with probably the deepest recession in Germany since 1949. Therefore, we will include questions concerning both the incidence and coverage of profit sharing schemes in the wave 2009 of the IAB Establishment Panel. Furthermore a longer observation period appears to be more appropriate to theoretical consideration following the human capital and efficiency wage theory. The investigation of profit sharing using a longer panel and the use of recently developed matching approaches which allows the analysis of the effect of continuous treatment variables will also enrich our research.

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Table 1: Means and standard deviations of firms with and without profit sharing

	profit sharing			
	no		yes	
	mean	std.dev.	mean	std.dev.
	(1)	(2)	(3)	(4)
hiring density (log.)	-2.08	1.393	-2.76	1.390
separation density (log.)	-2.07	1.294	-2.74	1.191
turnover density (log.)	-1.66	1.230	-2.16	1.165
quit density (log.)	-2.50	1.501	-3.46	1.461
layoff density (log.)	-2.57	1.615	-3.68	1.612
profitability (very good=1; insufficient=5)	3.14	1.080	2.818	1.123
sales per employee (in 1000)	224.030	1544.51	358.39	1021.29
expected revenue decrease (1=yes)	0.26	0.437	0.21	0.408
expected revenue increase (1=yes)	0.24	0.429	0.40	0.489
percentage of sales exported	0.06	0.165	0.14	0.242
investment in ICT (1=yes)	0.52	0.500	0.78	0.415
no. of employees (log.)	2.95	1.655	4.22	1.743
proportion of qualified employees	0.61	0.289	0.70	0.256
further training (1=yes)	0.52	0.499	0.82	0.381
proportion of women	0.37	0.301	0.34	0.260
temporary employees (1=yes)	0.29	0.455	0.53	0.499
year of business start up (after 1990; 1=yes)	0.44	0.496	0.38	0.486
partial plant closing (1=yes)	0.02	0.129	0.02	0.156
outsourcing (1=yes)	0.01	0.121	0.03	0.180
spin-off (1=yes)	0.01	0.081	0.01	0.121
insourcing (1=yes)	0.02	0.155	0.06	0.231
works council (1=yes)	0.24	0.425	0.50	0.500
collective wage agreement (1=yes)	0.47	0.499	0.57	0.495
wage per employee	2.64	1.71	3.65	1.99
wage subsidies (1=yes)	0.26	0.440	0.37	0.483
West Germany (1=yes)	0.58	0.494	0.72	0.448
status of the establishment	1.28	0.658	1.69	0.892
legal status	2.32	1.123	2.92	0.877
10 sector dummies included	5.04	2.378	4.92	2.277
year dummies	2.01	0.817	2.18	0.762
Number of observations	22792		4607	

IAB Establishment Panel 2000, 2001, 2005

Table 2: Cross-sectional time-series regression models: effects of profit sharing on employment stability

	dependent variables					
	hiring density (log.)		**separation density (log.)**		**turnover density (log.)**	
explanatory variables	coefficient	t-value	coefficient	t-value	coefficient	t-value
	(1)	(2)	(3)	(4)	(5)	(6)
profit sharing (% of employees)	**0.052****	**2.05**	**-0.009**	**-0.39**	**-0.011**	**-0.46**
profitability (very good=1)						
2	-0.039	-1.39	0.044	1.64	-0.03	-0.10
3	-0.094***	-3.34	0.080***	2.98	-0.016	-0.55
4	-0.075**	-2.56	0.141***	5.02	0.043	1.42
insufficient (=5)	-0.146***	-4.74	0.274***	9.11	0.117***	3.63
sales per employee (in 1000)	0.000	-1.30	-0.000	-0.50	-0.000	-1.53
expected revenue decrease (1=yes)	0.279***	18.82	-0.011***	-0.83	0.172***	11.44
expected revenue increase (1=yes)	-0.104***	-7.53	0.141	10.47	0.053***	3.50
percentage of sales exported	0.093**	2.26	0.052	1.34	0.025	0.62
investment in ICT (1=yes)	-0.042***	-3.28	-0.062***	-5.02	-0.055***	-3.87
no. of employees (log.)	-0.584***	-63.86	-0.532***	-63.60	-0.403***	-45.20
proportion of qualified employees	-0.368***	-13.49	-0.363***	-14.35	-0.392***	-13.58
further training (1=yes)	-0.087***	-6.27	-0.065***	-5.10	-0.082***	-5.40
proportion of women	-0.073***	-2.78	-0.018	-0.70	-0.062**	-2.20
temporary employees (1=yes)	0.385***	21.54	0.089***	5.75	0.318***	17.54
year of business start up (after 1990; 1=yes)	0.214***	14.92	0.149***	11.01	0.220***	14.52
partial plant closing (1=yes)	-0.132**	-2.53	0.392***	7.37	0.313***	5.76
outsourcing (1=yes)	-0.027	-0.52	0.514***	9.16	0.340***	6.42
spin-off (1=yes)	0.145*	1.90	0.451***	5.50	0.358***	4.32
insourcing (1=yes)	0.313***	7.32	0.020	0.56	0.229***	5.86
works council (1=yes)	-0.177***	-7.99	0.064***	3.10	-0.100***	-4.27
collective wage agreement (1=yes)	-0.068***	-4.86	-0.025*	-1.89	-0.068***	-4.50
wage per employee (in 1000)	-0.023***	-4.05	-0.019***	-3.67	-0.021***	-3.48
wage subsidies (1=yes)	0.121***	7.66	0.101***	7.05	0.129***	8.13
West Germany (1=yes)	0.098***	6.03	0.113***	7.59	0.112***	6.55
number of observations	26569		26400		25982	
R^2	0.596		0.587		0.418	

IAB Establishment Panel 2000, 2001, 2005. Not presented are the intercept and the effects of status of the establishment, legal status, sector and year dummies.
*, **, *** indicates significance at the level of 10%, 5%, 1%.

Table 3: Cross-sectional time-series regression models: effects of profit sharing on employment stability

	dependent variables			
	quit density (log.)		**layoff density (log.)**	
	coefficient	t-value	coefficient	t-value
explanatory variables	(1)	(2)	(3)	(4)
profit sharing (% of employees)	**0.023**	**1.13**	**-0.060*** **	**-3.30**
Profitability (very good=1)				
2	-0.002	-0.07	0.012	0.59
3	0.008	0.35	0.050**	2.41
4	0.045*	1.94	0.071***	3.28
insufficient (=5)	0.085***	3.49	0.196***	8.04
sales per employee (in 1000)	-0.000	-0.45	0.000	0.80
expected revenue decrease (1=yes)	0.036*	3.29	0.004***	0.33
expected revenue increase (1=yes)	0.018***	1.78	0.087	7.96
percentage of sales exported	0.078**	2.45	-0.018	-0.59
investment in ICT (1=yes)	-0.061***	-6.61	-0.030***	-3.14
no. of employees (log.)	-0.773***	-109.67	-0.841***	-118.53
proportion of qualified employees	-0.267***	-13.31	-0.301***	-14.27
further training (1=yes)	-0.043***	-4.50	-0.054***	-5.36
proportion of women	0.025	1.27	-0.087***	-4.54
temporary employees (1=yes)	0.042***	3.47	0.008	0.66
year of business start up (after 1990; 1=yes)	0.107***	10.15	0.076***	7.31
partial plant closing (1=yes)	0.049	1.27	0.355***	6.87
outsourcing (1=yes)	0.128***	3.01	0.236***	4.96
spin-off (1=yes)	0.267***	3.85	0.183***	2.71
insourcing (1=yes)	0.066*	1.94	0.045	1.40
works council (1=yes)	-0.012	-0.72	-0.012	-0.69
collective wage agreement (1=yes)	-0.067***	-6.54	-0.023**	-2.22
wage per employee (in 1000)	-0.007	-1.45	-0.035***	-8.33
wage subsidies (1=yes)	0.041***	3.56	0.055***	4.66
West Germany (1=yes)	0.208***	18.87	-0.031***	-2.68
number of observations	26702		26613	
R^2	0.818		0.838	

IAB Establishment Panel 2000, 2001, 2005. Not presented are the intercept and the effects of status of the establishment, legal status, sector and year dummies.
*, **, *** indicates significance at the level of 10%, 5%, 1%.

Table 4: ML-probit estimation of the introduction of profit sharing

explanatory variables	coefficient (1)	z-value (2)
percentage of sales exported	0.450**	2.04
no. of employees (log.)	0.261***	7.76
proportion of qualified employees	0.885***	5.20
collective wage agreement (1=yes)	-0.260***	-2.83
West Germany (1=yes)	0.236***	2.62
status of the establishment (ref: independent firm)		
head quarter	-0.029	-0,20
branch	0.381***	3.47
legal status (ref: single firm)		
partnership	-0.119	-0.47
limited liability company	0.144	1.14
joint stock company	0.520**	2.51
public corporation	-0.585	-1.27
others	0.421	1.63
number of observations	3332	
Wald Chi (20)	234.15***	

IAB Establishment Panel 2000, 2001, 2005. Estimation is performed with robust standard errors. Not presented are the intercept and the effects of sector dummies. Establishments with profit sharing schemes are defined as follows. They introduced these schemes in 2000/2001 and used it until 2005.
*, **, *** indicates significance at the level of 10%, 5%, 1%.

Table 5: Means of the variables for profit-sharing and non-profit-sharing establishments before and after nearest neighbour matching

	* before matching *			* after matching*		
	profit-sharing	non-profit-sharing	|t| diff~=0	profit-sharing	non-profit-sharing	|t| diff~=0
	(1)	(2)	(3)	(4)	(5)	(6)
percentage of sales exported	0.16	0.05	10.29***	0.16	0.16	-0.33
no. of employees (log.)	4.71	2.92	15.48***	4.67	4.58	0.47
proportion of qualified employees	0.74	0.60	6.67***	0.74	0.74	0.14
collective wage agreement (1=yes)	0.61	0.50	2.86***	0.60	0.59	0.21
West Germany (1=yes)	0.61	0.48	3.42***	0.60	0.67	-1.31
status of the establishment (ref: independent firm)						
head quarter	0.12	0.06	3.77***	0.12	0.15	-0.61
branch	0.29	0.09	8.52***	0.27	0.30	0.58
legal status (ref: single firm)						
partnership	0.07	0.09	-1.06	0.07	0.04	1.38
limited liability company	0.69	0.46	5.93***	0.70	0.71	-0.23
joint stock company	0.12	0.02	8.54***	0.11	0.15	-1.09
public corporation	0.01	0.01	-0.58	0.01	0.00	1.00
others	0.04	0.02	1.92*	0.04	0.04	0.24

IAB Establishment Panel 2000. Establishments with profit sharing schemes are defined as follows. They introduced these schemes in 2000/2001 and used it until 2005.
*, **, *** indicates significance at the level of 10%, 5%, 1%.

Table 6: Means of the outcome variables (employment stability) in treated and non-treated establishments

	introduction of profit sharing (1)	no introduction of profit sharing (2)	|t| diff~=0 (3)
2001:			
hiring density (log.)	-3.01	-2.83	1.322
separation density (log.)	-2.90	-2.90	0.041
turnover density (log.)	-2.27	-2.28	-0.107
quit density (log.)	-3.70	-3.64	0.442
layoff density (log.)	-4.06	-4.00	0.493
2002:			
hiring density (log.)	-3.11	-3.01	0.640
separation density (log.)	-2.86	-2.85	0.104
turnover density (log.)	-2.33	-2.34	-0.038
quit density (log.)	-3.84	-3.77	0.448
layoff density (log.)	-4.00	-4.00	0.232
2003:			
hiring density (log.)	-3.06	-3.20	-0.891
separation density (log.)	-2.91	-2.91	0.030
turnover density (log.)	-2.29	-2.42	0.313
quit density (log.)	-3.98	-4.00	-0.137
layoff density (log.)	-3.92	-3.91	-0.059
2004:			
hiring density (log.)	-3.35	-3.28	0.435
separation density (log.)	-3.00	-3.05	-0.414
turnover density (log.)	-2.53	-2.64	-0.911
quit density (log.)	-4.07	-3.99	0.458
layoff density (log.)	-4.00	-3.93	0.439
No. of observations	180	180	

IAB Establishment Panel 2000, 2001, 2002, 2003, 2004. Establishments with profit sharing schemes are defined as follows. They introduced these schemes in 2000/2001 and used it until 2005.
*, **, *** indicates significance at the level of 10%, 5%, 1%.

Table 7: Conditional difference in difference matching 2001, 2002, 2003 and 2004

explanatory variables	dependent variable				
	hiring density (log.) (1)	**separation density (log.)** (2)	**turnover density (log.)** (3)	**quit density (log.)** (4)	**layoff density (log.)** (5)
year 2001	0.0804	-0.0528	-0.0308	0.1413	-0.06
	(0.46)	(-0.38)	(-0.23)	(0.80)	(-0.31)
year 2002	-0.0928	-0.0021	-0.1001	0.0082	-0.0349
	(-0.53)	(-0.01)	(-0.73)	(0.05)	(-0.18)
year 2003	-0.2865	-0.0597	-0.1806	-0.2241	0.0023
	(-1.65)	(-0.42)	(-1.32)	(-1.26)	(0.01)
year 2004	-0.3651**	-0.2085	-0.4046***	-0.2122	-0.0126
	(-2.11)	(-1.49)	(-2.97)	(-1.20)	(-0.06)
treated	-0.2212	-0.0293	-0.0018	-0.1558	-0.0428
	(-1.18)	(0.19)	(-0.01)	(-0.81)	(-0.20)
treatment effect 2001	0.4158	-0.0340	-0.0518	0.9162	-0.0408
	(0.17)	(-0.17)	(-0.27)	(0.37)	(-0.15)
treatment effect 2002	0.1222	-0.0424	0.0064	0.0851	0.0026
	(0.50)	(-0.22)	(0.03)	(0.34)	(0.01)
treatment effect 2003	0.3591	-0.0332	0.1299	0.1776	0.0324
	(1.48)	(-0.17)	(0.68)	(0.72)	(0.12)
treatment effect 2004	0.1509	0.0223	0.1096	0.0826	-0.0325
	(0.62)	(0.11)	(0.58)	(0.33)	(-0.12)
F-statistic of the joint significance of the treatment effects	0.76	0.05	0.41	0.13	0.03
number of observations	1673	1667	1655	1677	1674
R^2	0.0110	0.0035	0.0123	0.0090	0.0007

IAB Establishment Panel. Not presented is the intercept.
*, **, *** indicates significance at the level of 10%, 5%, 1%.