

Who pays for training of fixed-term workers? Empirical evidence for Germany using selection correction

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Abstract: This study deals with investments in human capital of temporary workers. While it is widely accepted that temporary workers receive less work-related training, it can be argued that they have incentives to invest in human capital themselves, e.g. to force the transition to permanent jobs or to compensate for lower employer-sponsored investments. Therefore, the effects of fixed-term contracts on participation and the financing of training are estimated. With regard to selection effects, this study uses a bivariate probit model to measure the effects of temporary employment properly.

Keywords: training, fixed-term contracts, simultaneous probit estimation

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1 Introduction

In Germany, the share of fixed-term contracts has increased remarkably within the last years (see *figure 1*). Fixed-term contracts are heavily used especially for new employment relationships. However, besides positive effects of temporary work, such as increased flexibility of the labour market, concerns have arisen on the increasing share of temporary workers. It is argued that temporary work lowers upward job mobility, that especially low-skilled temporary workers have lower transition rates to permanent jobs, and that temporary workers are less satisfied with their jobs compared to permanent workers. In addition, there is a negative nexus between temporary work and work-related training.¹ From the theoretical perspective it is not clear why temporary workers receive less training compared to permanent workers. While most theories indicate lower firms' investments in human capital of temporary workers, temporary workers themselves may have incentives to invest in human capital, e.g. to force the transition to permanent contracts.

This study analyses the effect of fixed-term contracts on participation and financing of work-related training. We especially distinguish between employer- and employee-financed training in order to allow diverging invest-

¹See among others Arulampalam and Booth (1998), Booth, Francesconi and Frank (2000), Wallete (2005), and OECD (2002).

ment patterns of worker and firm. Because training participation as well as holding a fixed-term contract can be driven by unobservable factors, we control for selection correction to yield unbiased estimates.

The remainder of this paper is as follows: *section 2* summarises the theory on work-related training and draws implications for training of workers with fixed-term contracts. *section 3* contains method, data and descriptive statistics, while the estimation results are presented in *section 4*.

2 Theory and previous evidence

Following the seminal study of Becker (1962; 1993), investments in human capital are classified in general and firm-specific human capital. Assuming complete information, investments in firm-specific human capital are shared between employer and employee, depending on labour turnover (Hashimoto, 1981). Because investments in general human capital increase the worker's marginal product in all firms and perfect information is assumed, firms do not invest in general human capital. Recent theoretical models relax the assumption of perfect competition and explain firms' investments in general human capital by compressed wages Acemoglu and Pischke (1999).² Intensely discussed reasons for compressed wages are transaction

²See Leuven (2005) for a survey on theoretical models.

costs (Acemoglu, 1997), and asymmetric information. The latter occurs if incumbent firms have superior information about their employees' human capital and training (Katz and Ziderman, 1990), or "outside" firms observe training intensity, but not ability (Acemoglu and Pischke, 1999). Autor (2001) models training choice by workers as a screening device that induces self-selection of high-ability workers.³

With exception of Autor's model, theoretical models on investments in human capital do not deal with fixed-term contracts. However, there are arguments for positive as well as for negative effects of fixed-term contracts on investments in human capital: first, fixed-term workers could participate in training less compared to permanent workers because expected job duration of fixed-term workers and thus the discount period for employer's and employee's investments is shorter (Arulampalam, Booth and Bryan, 2005). If fixed-term workers are hired "on-call" for particular jobs, they are specifically trained for this job and thus there is no need for firms to offer training to them (Walette, 2005). Second, fixed-term workers could even participate in training more, if they invest in training, e.g. to obtain particular skills for on-call jobs, to compensate for lesser firm investments, to increase the

³Other market imperfections that result in compressed wages are complementary between general and firm-specific human capital (Acemoglu and Pischke, 1998) and trade unions (Acemoglu and Pischke, 1999).

probability of receiving a permanent job, or to show loyalty towards their employer. Another argument comes from Autor (2001): in order to elicit private information (ability), firms offer training for screening purposes and self-selection. Third, theory offers arguments that there is no or no definite effect of contract type on investments: because employment of fixed-term workers is faced by higher turnover, workers finance investments indirectly by lower wages (OECD, 2002, p. 156). Even if fixed-term workers are hired as on-call workers, they may need training to perform well in their jobs, similar to new workers with permanent contracts. Of course, investments could also be determined by other factors such as technical developments and not by the contract type.

Similar to the theoretical literature, there are only a few empirical studies on training of temporary workers. For Germany, Wilkens and Leber (2003) include a dummy variable for individuals holding a fixed-term contract and find a significant negative effect on training participation.⁴ Similar, they find a negative effect of part-time work. Regarding different types of temporary jobs, Wallette (2005) finds heterogeneous effects for (temporary) replacement, project, on-call and probation jobs in Sweden. Another important result comes from Albert, García-Serrano and Hernanz (2005), who isolate

⁴A positive effect for fixed-term contracts is found by McIntosh (1999). However, incidence of training is very sensitive with regard to the training questions in the survey.

the effect of being enrolled in a firm that offers training from being selected to participate in training within this firm. They find that workers with fixed-term contracts are less likely to be employed in “training firms” and if so, receive less training compared to permanent workers.

For the analysis of the effects of fixed-term contracts on training participation, it is important to know why firms offer fixed-term contract besides permanent contracts: first, if firing costs of permanent contracts are higher than those for fixed-term contracts, fixed-term contracts can be used to ease adjustment and thus to lower adjustment costs (Hunt, 2000). Second, fixed-term contracts can be seen as prolonged probation in order to allow screening (Autor, 2001). Then, low-ability workers could be dissolved less costly (Boockmann and Hagen, 2005). Third, fixed-term contracts can induce self-selection of “good” workers (Loh, 1994).

The German legislation on permanent and fixed-term contracts is characterised by a high level of employment protection of permanent contracts,⁵ while the use of fixed-contracts has gradually been deregulated since 1985. Fixed-term contracts are legally allowed if employers can either satisfactorily show to have “objective reasons” or if a fixed-term job are temporary

⁵Hunt (2000) notes, that individual and collective dismissals of workers with permanent contracts are costly in “terms of either time, money or procedural complexity”. Though, employment protection for permanent workers was deregulated for small and start-up establishments (Jahn, 2005).

limited. Temporary limited fixed-term contracts can be renewed at most three times with a maximum length of two years. If objective reasons can be proven, iterative fixed-term contract spells are legally allowed.⁶

3 Estimation strategy, data, and descriptive statistics

This paper analyses the effect of worker's employment contract, i.e. fixed-term versus permanent contracts, on participation and financing of work-related training. The empirical analysis is accomplished in two steps: first, we analyse the effect on participation in training. In the second step, we test whether there are differences with regard to financing work-related training.

3.1 Estimation strategy

When estimating the effect of contract type on participation in training, it is necessary to regard for potential selection effects. If the occurrence of fixed-term contracts is not random but rather driven by unobserved factors, estimation without selection correction would produce biased estimators. Previous empirical studies on training that controlled for fixed-term contracts, mostly include a dummy variable for temporary employment into the esti-

⁶For further details, see *appendix A.1*.

mation equation. In contrast to these studies, we argue that unobservable effects bias the occurrence of fixed-term contracts. With detailed information on worker's and firm's characteristics, a large part of the variation in training can be explained. However, (unobserved) ability can be correlated to fixed-term contracts because of self-selection (Loh, 1994). Firms may use fixed-term employment relationships in order to screen their temporary workers (Autor, 2001). Finally, we can not observe whether temporary workers are on-call workers that may need less firm-provided training.

Since both the decision to participate in training and the decision on being employed on a fixed-term contract are dichotomous, the bivariate probit model (Van de Ven and Van Praag, 1981; Maddala, 1983) is the appropriate econometric method. It consists of two equations where the first equation is the equation of interest and the second equation is the sample selection equation with training participation (y_{1i}) and occurrence of fixed-term contracts (y_{2i}), respectively, as the dependent variables. It is a recursive simultaneous-equations model since (y_{2i}) enters the training equation:

$$y_{1i}^* = \mathbf{x}'_{1i}\boldsymbol{\beta}_1 + \gamma y_{2i} + \varepsilon_{1i} \quad \text{with} \quad y_{1i} = \begin{cases} 1 & \text{if } y_{1i}^* > 0, \\ 0 & \text{else.} \end{cases} \quad (1)$$

$$y_{2i}^* = \mathbf{x}'_{2i}\boldsymbol{\beta}_2 + \varepsilon_{2i} \quad \text{with} \quad y_{2i} = \begin{cases} 1 & \text{if } y_{2i}^* > 0, \\ 0 & \text{if else.} \end{cases} \quad (2)$$

Subscript i denotes the individuals, y_{1i}^* and y_{2i}^* are latent variables, and regressors in vectors \mathbf{x}_{1i} and \mathbf{x}_{2i} , respectively, include worker's and firm's characteristics. Error terms ε_{1i} and ε_{2i} are assumed to have following properties:

$$\begin{aligned} E(\varepsilon_{1i}|\mathbf{x}_{1i}, \mathbf{x}_{2i}) &= E(\varepsilon_{2i}|\mathbf{x}_{1i}, \mathbf{x}_{2i}) = 0, \\ Var(\varepsilon_{1i}|\mathbf{x}_{1i}, \mathbf{x}_{2i}) &= Var(\varepsilon_{2i}|\mathbf{x}_{1i}, \mathbf{x}_{2i}) = 1 \text{ and} \\ Cov(\varepsilon_{1i}, \varepsilon_{2i}|\mathbf{x}_{1i}, \mathbf{x}_{2i}) &= \rho. \end{aligned}$$

If the error terms ε_{1i} and ε_{2i} are uncorrelated, i.e. $\rho = 0$, the two equations can be estimated separately using the probit method. If $\rho \neq 0$, the bivariate probit model is the appropriate method to regard for selection effects.

The model is identified, if either the error terms of both equations are independent from each other ($\rho = 0$) or if each equation contains at least one regressor that is excluded from the other equation (Maddala, 1983, p. 122). Indeed, most regressors appear in both equations. However, there are some regressors that are neither of theoretical importance nor significant in probit regressions.

3.2 Data

The data used in this study is taken from the German Socio-Economic Panel (GSOEP).⁷ The GSOEP is a representative longitudinal household dataset with an overall number of individuals of about 22,000 in 2004. The GSOEP was started in 1984 and expanded by various “filling” samples. The questionnaire consists of annually collected information and supplementary modules that are not collected in every wave. The latter case applies for the module “training”. It has been collected in 1989 (Pischke, 2001; Pannenberg, 1997), 1993, 2000 (Wilkins and Leber, 2003) and 2004.

The information on work-related training is collected retrospectively for a period of three years prior to the interview. The questions on training were posed to all respondents aged 16 to 64. The interview sequence is related to work-related training courses and workshops and explicitly excludes the reading of technical literature, and the attendance at trade fairs and congresses. Respondents that have been participated in at least one workshop or training course are asked in detail about the start date, duration, goals, whether it was during work hours or leisure, own costs, who arranged the training, whether they received financial support and by whom, whether the course was certified, and whether the contents of training can be applied in

⁷For a recent documentation of GSOEP, see Group (2001) or Haisken-DeNew and Frick (2005).

other establishments as well. This information is gathered for the last three training courses and workshops prior to the interview.⁸

In order to analyse investments in human capital within employment relationships, the sample in this study is restricted to all respondents in dependent employment in 2004.⁹ We use training data from the 2004 wave of the GSOEP. Taking advantage of the GSOEP's panel structure, other variables are taken from the training's start date.¹⁰ It is crucial to do so because otherwise the current employment status could be the result of past training. Then, variables would be biased. For non-participants, we use data from the 2004 wave. *Figure 2* shows the distribution of training starts of training participants from the 2004 wave:

[*figure 2 about here*]

3.3 Dependend and identifying variables

We use different dummy-variables to analyse the effect of worker's contract on training. The first, and most obvious variable for the training equation is participation in work-related training within the last three years prior to the interview. However, the use of this variable may hide two divergent effects:

⁸As mentioned by Pischke (2001), the questions on training are related to relatively formal courses.

⁹Persons in subsidized employment are excluded because subsidized employment may be subject to legal selection processes.

¹⁰For a similar procedure, see Pischke (2001) and Wilkens and Leber (2003).

the theoretical discussion shows that firm and temporary workers may have contrary incentives (not) to invest in a temporary worker's human capital. Therefore, we defined two variables to explain different financing patterns: the variable "employer financed training" covers all work-related training within three years prior to the interview if the training is on-the-job,¹¹ if there is financial assistance by the employer, or both. To analyse employee-sponsored training, we defined a variable that includes work-related training if the employee had direct costs related to the training. Unfortunately, we are not able to measure indirect cost participation, such as temporary or permanent wage cuts to finance training.

Though most regressors have to be included in both equations, there are three variables that we can use for identifying purposes. We include the variables "risk aversion" and "working overtime" in the training equation, but not in the fixed-term contract equation. To identify the fixed-term contract equation, we use a dummy that is one if the employment relationship has started after January, 2001. At this date, the last major change in legislation that enters the data took place. It is argued that this has an effect on the use of fixed-term contracts, but not on the participation in training. Neither theory nor previous empirical studies have found that

¹¹We assume that on-the-job training is a kind of "indirect" financing by the employer. Costs are temporary productivity loss or direct training costs.

these variables explain fixed-term contracts and training, respectively. This procedure is underlaid by probit regressions in *table 3*, where the estimates for “risk aversion” and “working overtime” are insignificant.

3.4 Descriptive statistics

On the descriptive level (see *tables 1* and *2*), participation in training shows some interesting results: while there is only a minor difference between participation in training among permanent workers (31.4%) and workers with fixed-term contracts (30.6%), training and financing characteristics clearly show diverging patterns. Workers with fixed-term contracts that participate in training receive their training more often “off” the job, i.e. not during working time (23.6% vs. 18.9%). This pattern is complemented by the figures of own payments for training: while permanent workers that participate in training invest 112 Euro, it is 129 Euro among workers with fixed-term contracts (*table 2*). Unfortunately, there is no data on what the firm pays for workers. We defined two further variables, employer-financed training and employee-financed training (see *subsection 3.3*), in order to roughly account for “assistance” by firms, e.g. through training during working time. According to this measure, it is 72.8% of temporary workers that participate in training financed (at least partly) by their employer, whereas it is 83.9%

among permanent workers. In contrast, the figures for employee-financed training, i.e. if employees paid for training through direct costs, are 19.7% and 15.4%, respectively. Descriptive statistics on the aims of training support theoretical considerations on training of temporary workers: 31.0% of temporary workers with training aim at doing career advancement, whereas it is only 23.5% among workers with permanent contracts.

Regarding firm's and worker's characteristics and the participation in training in general, descriptive statistics show that part-time and marginal part-time workers participate in training clearly less compared to workers with fixed-term or permanent contracts. Regarding formal qualification and skill level in the current job, it is obvious that low- and medium-skilled blue collar workers as well as low-skilled white collar workers receive less training, whereas especially high-skilled white collar workers participate more in training.¹² The larger share of workers with training in large firms can be explained by economies of scale within providing training.

Similar to the occurrence of training, fixed-term contracts are more widespread among low-skilled blue collar workers, medium- and high-skilled white collar workers as well as workers with no occupational degree. With

¹²The definition of high- medium- and low-skilled is taken from Blossfeld (1989). This classification, which is widely used in labour market research, stratifies employees into groups that are homogeneous with respect to their occupational tasks and educational and occupational qualification.

respect to firm characteristics, workers within the agricultural as well as the service sector are employed on a temporary basis more often. Due to data restrictions, we are not able to differentiate between seasonal and non-seasonal fixed-term employment. There are no differences regarding firm size: small firms (< 10 employees) are legally allowed to employ workers on a fixed-term basis, but at the same time they are not faced by dismissal protection.

4 Estimation results

The main aim of this paper is to analyse the effect of the worker's type of contract (fixed-term vs. permanent) on participation and financing of training. We apply the bivariate probit method (see *subsection 3.1*) in order to regard potential selection effects. To analyse different financing patterns between worker and firm, we use different dependent variables.

4.1 The effect of fixed-term contracts

Within the first estimation (*table 4*, column 2 and 3), we use a dummy variable with work-related training participation within the last three years prior to the interview, independently of who financed the training and when the training took place. Fixed-term employment has a significant negative

effect on participation of training. Among all dummy variables included in the regression, it is the most important factor for the probability of receiving training. This first evidence suggests that there is indeed an overall negative effect of the temporary character on training. Similar, but weaker results can be found for part-time and marginal part-time employees.¹³

The second dependent variable is training within the last three years prior to the interview that is either directly financed by the employer or indirectly if training takes place during working time. The result for workers with fixed-term contracts is slightly stronger compared to the coefficient for training in general. This supports the hypothesis that firms are less willing to finance work-related training if workers have fixed-term contracts. Though the dependent variable does not exclude the possibility that fixed-term workers pay directly by higher payments (see *table 2*), the effect is even stronger. Thus, firms do not pay lower wages in order to finance training and potential sunk costs, and temporary workers do not compensate for lower firm investments. However, there are other arguments for lower wages of temporary workers, such as specific investments like search costs.

In contrast to the dependent variable “employer-sponsored training”, we use “employee-sponsored training” as the third dependent variable (*table*

¹³It should be noted that marginal part-time plays a minor role within the regression sample ($N = 343$).

4, column 6 and 7). This variable contains training that is at least partly financed by the worker through direct costs by the employee. The effect of this variable is weaker compared to the overall effect, but still negative. From this result, we follow that there is a “compensation” effect. Workers with fixed-term contracts invest in training more compared to permanent workers because firms are not willing to do so.

Of course, since we are not able to observe whether the firm pays lower wages to finance investments in human capital, we can not determine the actual costs related to training. Thus, distinguishing between employer-, employee- and shared-financing remains incorrect.

4.2 Selection effects

This study explicitly uses a selection correction mechanism, namely the bivariate probit model. Selection effects may arise because the decision to participate in training as well as the decision whether to have a fixed-term contract may not be random but determined by unobservable factors, such as screening or ability. The correlation term $\rho = Cov(\varepsilon_{1i}, \varepsilon_{2i} | \mathbf{x}_{1i}, \mathbf{x}_{2i})$ indicates whether selection correction is appropriate. If $\rho = 0$, estimating single-equation probit is sufficient. Within all models, we find correlation terms that are significantly different from zero.

This result has two implications: first, as proposed by theoretical models (Loh, 1994; Autor, 2001), there are selection effects. Second, previous results of studies neglecting this relationship should be interpreted carefully with respect to the effect of contract type.

4.3 Further results

The results of the other explaining variables are similar to those found in previous studies¹⁴ and are similar across the estimated models.¹⁵ First, age has a positive effect, squared age a negative. This result can be interpreted with diminishing information asymmetries of the firm towards the employee but also of the worker's knowledge about his own ability and thus about expected returns from training. Job tenure within current firm has a significant negative effect and can be explained by investments in the beginning of the employment relationship. In accordance with human capital theory, risk aversion affects investments negatively. However, the strength is surprising as risk aversion should affect only the worker's investments. Working regularly overtime has a positive impact on training participation. Gerfin, Leu and Nyffeler (2003) explain this as a positive signal towards the em-

¹⁴See Pischke (2001) and Büchel and Pannenberg (2004, in German) for an comprehensive overview on training in Germany.

¹⁵Pischke (2001) also finds that similar results for employer-sponsored as well as for training participation in general.

ployer. Regarding firm size, it is argued that larger firms yield returns to scale in providing training (Zwick, 2005). Within the estimation of training in general and employer-sponsored training, this result holds and workers in larger firms indeed participate in training more compared to smaller firms. Results for skill groups are very clear: workers in medium- and high-skilled jobs participate in training more (see also Pischke (2001), (Büchel and Pannenberg, 2004), and (Wilkins and Leber, 2003)). This can be due to higher returns from investments, because they are aware of their ability, or because their skills complement capital investments, such as investments in information and communication technologies (Bartel and Lichtenberg, 1987).

Regarding the probability of being employed on a fixed-term contract, the results are quite similar across the estimated models: age as well as job tenure within the current firm has a negative effect. This result is not surprising because younger workers are more faced by employment relationships with fixed-term contracts.¹⁶ Similar, shorter employment relationships (after January, 2001) have a higher probability of being temporary. Regarding firm size, the effect can be observed, that larger firms rather use fixed-term contracts. This result can be explained by the fact that small firms are not bound to legal dismissal protection.

¹⁶However, other studies find negative effect of age on the occurrence of fixed-term contracts (Boockmann and Hagen, 2005, for men).

5 Conclusions

This study dealt with the effect of fixed-term contracts on participation and financing of training. Using data from the German Socio-Economic Panel (GSOEP) from 1997 to 2004, we found that holding a fixed-term contract lowers the probability of participating in work-related training. This contradicts the argument that workers with fixed-term contracts finance their training by lower wages. We found evidence that temporary workers invest more compared to permanent workers. However, these compensating investments do not balance the negative effect from lower firm investments.

In order to measure the effect accurately, we used a recursive, simultaneous-equation model to take selection effects into account. The results indicated that probit regression yield biased estimates when estimating the effect of fixed-term contracts on training participation.

These results have important implications for labour market policy. Of course, when employment protection of permanent workers is high, fixed-term contracts allow the firms more flexibility (Hagen, 2003), or can be used as a sorting mechanism (Boockmann and Hagen, 2005). However, if workers are employed on a fixed-term basis, repeated temporary employment can explain long-term negative effects. Temporary work gains importance as an

alternative to permanent employment and thus may have severe effects on the stock of human capital.

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A Appendix

A.1 Institutional Background for Germany

In Germany, workers can be dismissed only if the employer shows that there are either operational reasons or reasons that are caused by “the person or the person’s behaviour” (§2 (2) Employment Protection Act, KSchG). If dismissal is caused by operational reasons, the employer has to select a worker from a group of comparable workers for whom dismissal will have the least effect (“Sozialauswahl”). Then, periods of notice range from one to twenty month and depend on job tenure and age (§622 (2) German Civil Code, BGB). Dismissed workers are entitled to severance payments if the dismissal is unfairly (§9 (1) KSchG), e.g. if the objective reasons have turned out to be incorrect. Severance payments depend on age, job tenure, and previous earnings. In addition, employment protection on permanent contracts is regulated by the Works Constitution Act (BetrVG), by decisions of labour courts, and can depend on collective agreements. ?? Establishments with less than 10 employees as well as newly founded firms with less under 4 years are not bound to KschG.

Until the first major deregulation of fixed-term contracts in 1985, fixed-term contracts were allowed if the employer could satisfactorily show to have “objective reasons” (§14 (1) Part-time Work and Fixed-term Contracts Act, TzBfG). The main objective reasons are seasonal fluctuations or temporarily higher labour demand, temporary replacement, carrying out special tasks, and employment as probation. If objective reasons can be proven, iterative fixed-term contract spells are legally allowed. In addition to fixed-term contracts with objective reasons, fixed-term contracts can be applied if they are temporarily limited (“kalendermige Befristung”, §14 (2) TzBfG). Then, fixed-term contracts are limited to at most three renewals within the maximum length of two years.

A.2 Tables and figures

Figure 1: Share of workers with fixed-term contracts in Germany, 1991-2004

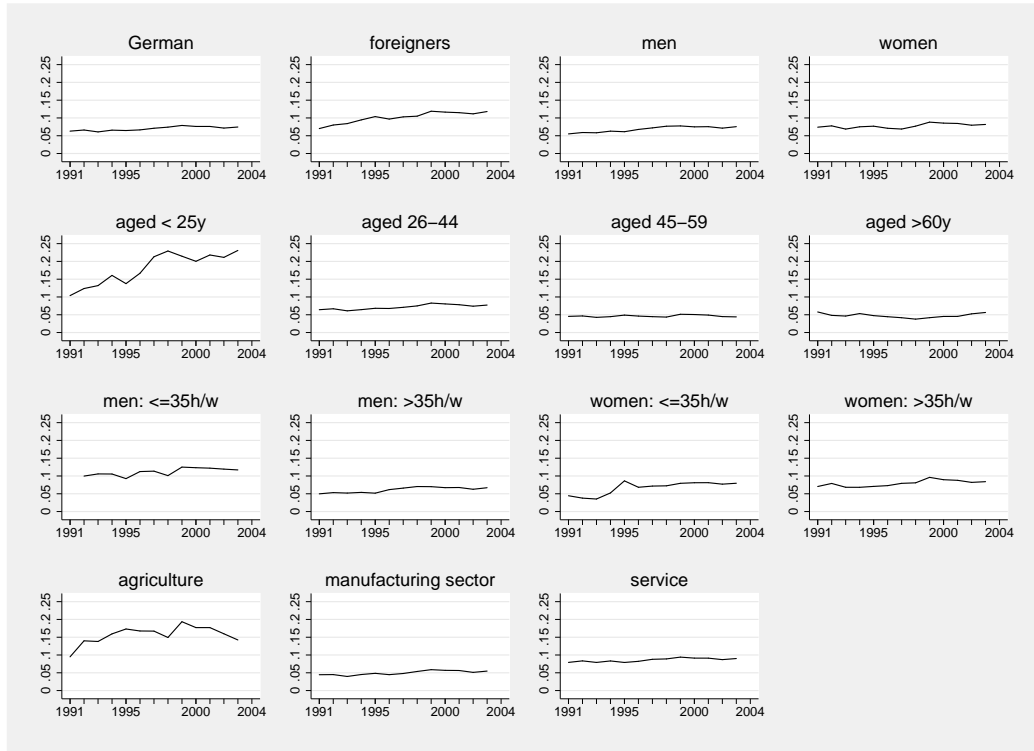


Figure 2: Start of training (year)

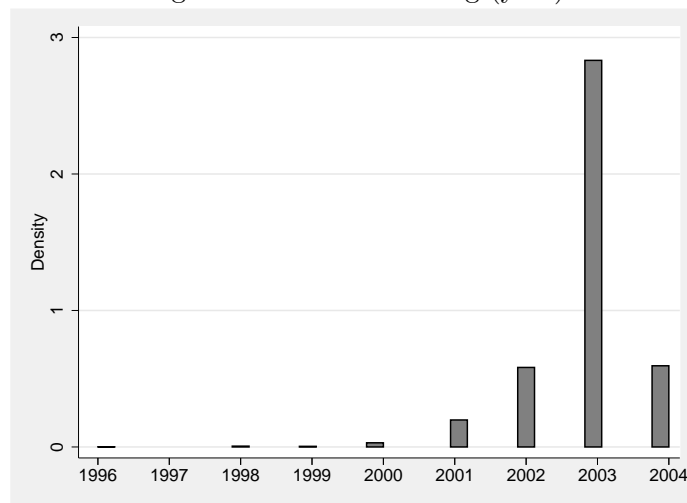


Figure 3: Duration of employment relationship, in years

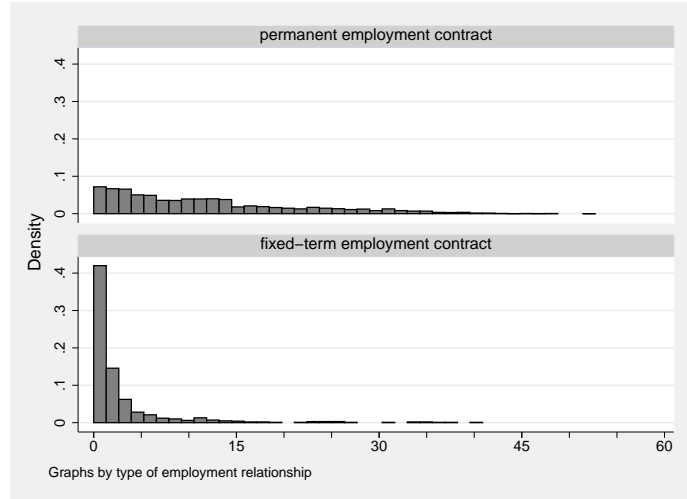


Table 1: Descriptive statistics (8363 observations)

	share	FTC	train.	age	<i>related to those with training</i>							
					number of courses	length				total (h)	general human cap.	with certificate
						< 10h/w	11-20h/w	21-30h/w	> 30h/w			
whole sample	1.000	0.830	0.313	41.7	3.754	0.467	0.216	0.131	0.185	18.483	2.766	0.752
temporary workers	0.083	1.000	0.306	34.8	3.784	0.429	0.172	0.084	0.314	46.460	2.905	0.789
permanent workers	0.917	0.000	0.314	42.4	3.751	0.471	0.220	0.136	0.174	16.020	2.754	0.748
full-time workers	0.757	0.075	0.337	41.5	3.816	0.443	0.218	0.138	0.200	17.955	2.766	0.757
part-time workers	0.201	0.085	0.267	43.1	3.549	0.565	0.214	0.103	0.118	19.948	2.773	0.728
marg. part-time workers	0.041	0.226	0.093	38.6	2.500	0.690	0.103	0.103	0.103	32.782	2.656	0.750
men	0.524	0.075	0.330	42.1	3.833	0.396	0.225	0.154	0.225	16.957	2.753	0.759
women	0.476	0.092	0.295	41.4	3.656	0.557	0.205	0.104	0.134	20.403	2.780	0.742
foreigner	0.075	0.081	0.154	40.4	3.762	0.412	0.259	0.106	0.224	26.845	2.845	0.750
German	0.925	0.083	0.326	41.8	3.754	0.469	0.214	0.133	0.183	18.169	2.762	0.752
East Germany	0.231	0.113	0.328	42.0	3.861	0.522	0.193	0.098	0.186	26.993	2.662	0.771
West Germany	0.769	0.074	0.309	41.6	3.720	0.450	0.223	0.142	0.185	15.837	2.799	0.745
<i>Occupation</i>												
Blue Collar Low Skilled	0.082	0.096	0.131	41.4	2.644	0.561	0.098	0.134	0.207	21.274	2.755	0.807
Blue Collar Medium Skilled	0.194	0.062	0.231	40.3	3.556	0.408	0.220	0.128	0.244	19.442	2.840	0.810
Blue Collar High Skilled	0.055	0.068	0.522	43.5	3.790	0.341	0.272	0.190	0.198	9.255	2.894	0.728
White Collar Low Skilled	0.240	0.084	0.189	41.9	3.116	0.529	0.201	0.101	0.170	17.319	2.632	0.751
White Collar Medium Skilled	0.290	0.069	0.397	41.5	3.742	0.502	0.225	0.117	0.156	21.524	2.758	0.719
White Collar High Skilled	0.139	0.142	0.493	44.2	4.483	0.445	0.203	0.157	0.195	17.045	2.766	0.770
<i>Education</i>												
no degree	0.119	0.133	0.126	39.2	2.880	0.570	0.158	0.096	0.175	13.762	2.872	0.766
vocational degree	0.617	0.071	0.287	40.9	3.570	0.473	0.213	0.123	0.191	21.403	2.746	0.753
university (former GDR)	0.034	0.063	0.495	48.0	3.780	0.496	0.223	0.132	0.149	19.317	2.604	0.809
university	0.229	0.091	0.455	44.3	4.187	0.438	0.228	0.153	0.182	14.086	2.810	0.738
<i>Sectors</i>												
agriculture	0.010	0.151	0.186	44.0	2.875	0.500	0.142	0.286	0.071	2.013	2.375	0.500
manufacturing	0.326	0.053	0.248	41.6	3.376	0.442	0.227	0.120	0.211	19.119	2.879	0.788
service	0.664	0.097	0.347	41.7	3.894	0.475	0.213	0.134	0.177	18.394	2.729	0.741
<i>Firm size</i>												
< 20 emp.	0.219	0.077	0.228	40.1	3.212	0.583	0.204	0.087	0.125	24.689	3.010	0.806
20–199 emp.	0.303	0.091	0.268	42.3	3.686	0.511	0.223	0.122	0.144	16.949	2.864	0.771
200–1999 emp.	0.234	0.081	0.347	42.4	3.990	0.467	0.236	0.129	0.169	15.313	2.653	0.750
> 2000 emp.	0.244	0.081	0.413	41.8	3.887	0.379	0.199	0.163	0.258	19.250	2.656	0.710

GSOEP 1997-2004. Figures above show unweighted data. For the construction of the dataset, see *section 3.2*.

* The variable “general human capital” is measured as “0” if it is completely firm-specific, and “4” if it is completely general.

Table 2: Types of training and worker's contract (2605 observations)

	whole sample	temp. workers	perm. workers	full-time	part-time	marg. part-time
employer-sponsored training	0.830	0.728	0.839	0.854	0.740	0.437
employee-sponsored training	0.157	0.197	0.154	0.151	0.184	0.188
On-the-job training	0.680	0.594	0.688	0.720	0.516	0.313
Off-the-job training	0.193	0.236	0.189	0.162	0.319	0.469
Off- and on-the-job training	0.118	0.142	0.117	0.110	0.156	0.125
<i>Aim of training</i>						
– occ. retraining	0.012	0.052	0.010	0.011	0.018	0.094
– adjustment to a new job	0.460	0.099	0.042	0.046	0.044	0.125
– for career advancement	0.241	0.310	0.235	0.263	0.142	0.125
– Adaption to new requirements	0.752	0.549	0.770	0.745	0.800	0.593
– without aim	0.119	0.146	0.116	0.115	0.128	0.250
<i>Financing</i>						
Worker's payment for training course (in Euro)	113.270	129.057	111.867	117.517	98.390	39.688
Financial assistance by...						
– employer	0.730	0.635	0.738	0.752	0.650	0.375
– employment office	0.090	0.023	0.008	0.008	0.011	0.094
– others	0.010	0.033	0.008	0.009	0.014	0.031
– no fin. assistance	0.251	0.308	0.245	0.231	0.325	0.500

GSOEP 1997-2004. Figures above show unweighted data. They are related to the respective group *with* training. For the construction of the dataset, see *section 3.2*. The number of observations is related to column “whole sample”.

Table 3: Probit estimates

Dependent variable	training	FTC
FTC	-.015 (0.061)	—
part-time	-.220*** (0.045)	0.127* (0.066)
marg. part-time	-.710*** (0.104)	0.356*** (0.096)
age	0.072*** (0.012)	-.091*** (0.015)
age (sq.)	-.001*** (0.0001)	0.001*** (0.0002)
job tenure	-.032*** (0.006)	-.164*** (0.008)
job tenure (sq.)	0.0008*** (0.0002)	0.003*** (0.0002)
male	0.166*** (0.038)	0.042 (0.058)
foreign	-.349*** (0.068)	0.056 (0.091)
East Germany	0.055 (0.037)	0.231*** (0.054)
firm size: 20-199 empl.	0.005 (0.046)	0.312*** (0.066)
firm size: 200-1999 empl.	0.189*** (0.049)	0.437*** (0.074)
firm size: > 2000 empl.	0.294*** (0.049)	0.463*** (0.076)
hired after January, 2001	-0.410*** (0.053)	—
risk aversion (0: low; 10: high)	—	0.013 (0.011)
working overtime	—	-.009 (0.007)
<i>sector and skill dummies are included</i>		
constant	-2.037*** (0.240)	0.553* (0.311)
Observations	8589	8325
Pseudo-R ²	0.124	0.268
χ^2	1322.345	1280.684

GSOEP 1997-2004. ***, **, and * denote significance at the 1%-, 5%-, and 10%-level, respectively. The regression is unweighted. Table presents coefficients, and standard errors in parantheses.

Table 4: Bivariate probit estimates

Dependent variables	training	fixed-term contracts	employer-sponsored training	fixed-term contract	employee-sponsored training	fixed-term contract
	FTC	-1.098*** (0.117)	—	-1.150*** (0.126)	—	-.851** (0.271)
part-time	-.156*** (0.045)	0.128** (0.065)	-.162*** (0.047)	0.116* (0.065)	-.134* (0.072)	0.107 (0.066)
marg. part-time	-.540*** (0.103)	0.385*** (0.095)	-.740*** (0.131)	0.365*** (0.095)	-.410** (0.185)	0.349*** (0.096)
age	0.052*** (0.012)	-.076*** (0.015)	0.051*** (0.012)	-.077*** (0.015)	0.026 (0.021)	-.082*** (0.016)
age (sq.)	-.0008*** (0.0001)	0.0008*** (0.0002)	-.0008*** (0.0001)	0.0008*** (0.0002)	-.0005** (0.0003)	0.0009*** (0.0002)
job tenure	-.026*** (0.006)	-.101*** (0.01)	-.020** (0.007)	-.105*** (0.01)	-.033** (0.014)	-.108*** (0.01)
job tenure (sq.)	0.0006*** (0.0002)	0.002*** (0.0003)	0.0005** (0.0002)	0.002*** (0.0003)	0.0008** (0.0003)	0.002*** (0.0003)
male	0.064* (0.038)	0.096* (0.056)	0.134*** (0.039)	0.089 (0.056)	-.040 (0.061)	0.077 (0.057)
foreign	-.331*** (0.066)	0.056 (0.09)	-.313*** (0.069)	0.055 (0.09)	-.424** (0.147)	0.08 (0.091)
East Germany	0.079** (0.037)	0.252*** (0.053)	0.048 (0.038)	0.248*** (0.053)	0.155** (0.057)	0.248*** (0.054)
risk aversion (0: low; 10: high)	0.04*** (0.007)	—	0.041*** (0.007)	—	0.022* (0.012)	—
working overtime	0.03*** (0.004)	—	0.025*** (0.004)	—	0.025*** (0.006)	—
Blue collar: low-sk.	-.212** (0.076)	0.285** (0.105)	-.271*** (0.081)	0.3** (0.105)	-.024 (0.141)	0.286** (0.106)
Blue collar: medium-sk.	0.077 (0.055)	0.064 (0.087)	0.061 (0.057)	0.052 (0.087)	0.051 (0.102)	0.051 (0.089)
Blue collar: high-sk.	0.661*** (0.072)	0.127 (0.121)	0.604*** (0.074)	0.124 (0.124)	0.212* (0.126)	0.097 (0.125)
White collar: medium-sk.	0.387*** (0.046)	-.082 (0.071)	0.334*** (0.048)	-.092 (0.071)	0.18** (0.083)	-.085 (0.072)
White collar: high-sk.	0.527*** (0.057)	0.368*** (0.083)	0.448*** (0.058)	0.369*** (0.083)	0.524*** (0.091)	0.36*** (0.085)
firm size: 20-199 empl.	0.072 (0.045)	0.317*** (0.065)	0.131** (0.048)	0.313*** (0.065)	-.091 (0.077)	0.319*** (0.067)
firm size: 200-1999 empl.	0.278*** (0.049)	0.426*** (0.074)	0.359*** (0.074)	0.422*** (0.074)	0.025 (0.084)	0.438*** (0.075)
firm size: > 2000 empl.	0.392*** (0.049)	0.482*** (0.075)	0.481*** (0.051)	0.475*** (0.074)	0.074 (0.084)	0.465*** (0.076)
hired after January, 2001	—	0.643*** (0.066)	—	0.619*** (0.066)	—	0.578*** (0.069)
<i>sector dummies are included</i>						
constant	-1.818*** (0.251)	-.314 (0.312)	-2.019*** (0.268)	-0.266 (0.312)	-2.010*** (0.461)	-.142 (0.316)
ρ	0.691***		0.712***		0.489**	
Observations	8363		8363		8363	
χ^2	2439.46***		2308.32***		-3175.375***	

GSOEP 1997-2004. ***, **, and * denote significance at the 1%, 5%, and 10%-level, respectively. The regression is unweighted. Table presents coefficients, and standard errors in parantheses.