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An Evaluation Study for Saxony

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Abstract

This paper investigates whether and to what extent employment policy measures (co-) financed by the *European Social Fund* in Germany meet their objective. Specifically, it is analyzed whether qualification programs for employed workers in the German state of Saxony were effective in terms of employment protection. To this end, a control function approach is implemented which utilizes a unique firm-level dataset. This model explicitly accounts for unobserved heterogeneity between participating and non-participating companies by modeling the participation decision process. Our results suggest a positive effect of program participation. However, this positive treatment effect varies considerably across different sub-groups of the treatment as well as the comparison group.

JEL-Classification: H43, J68

Keywords: Employment Policy, European Social Fund, Firm-Level Data

*Rheinisch-Westfälisches Institut für Wirtschaftsforschung, Hohenzollernstraße 1/3, D-45128 Essen, and IZA, Bonn. The author is grateful to Thomas K. Bauer, Marco Puxi and Christoph M. Schmidt for helpful comments. All correspondence to Michael Fertig, RWI, Hohenzollernstr. 1-3, 45128 Essen, Germany, Fax: +49-201-8149236, e-mail: fertig@rwi-essen.de.

1. Introduction

At the Luxembourg Jobs Summit in November 1997 the European Commission initiated a set of coordinated policies which have become known as the *Luxembourg Process*. The Amsterdam Treaty introduced a new Employment Title and thus raised employment issues to the same status as other key goals in the formulation of EU economic policy. This treaty represents a major step in the development of a comprehensive European approach to labor market policy, the *European Employment Strategy*. Active labor market policies (ALMP) – including job search assistance, subsidized training and direct job provision in the public sector – are an important element of this European Employment Strategy. While such policies have been in use for many years, unemployment still remains persistently high throughout most EU-countries, raising the question as to the actual effect of employment promotion.

An interesting example in this context is Germany. Every year Germany spends several billions of Euro on active measures of employment promotion with the explicit aim to reduce unemployment (Fertig, Schmidt 2000). However, unemployment has been a persistent problem throughout the last two decades and until today only insufficient systematic attempts to evaluate the effectiveness and efficiency of these measures have been undertaken. Recently, inspired by a growing body of international evaluation literature (e.g. the pioneering work of Rubin 1974, 1986), a handful of studies evaluate the labor market impact of some measures of ALMP (mainly training measures) implemented in the context of and financed by German labor laws (*Sozialgesetzbuch* III)[1]. The evidence of these studies concerning the efficacy of ALMP interventions is rather mixed. Most of them, as well as the majority of the international studies, show a rather small, if any, positive effect of employment promotion measures on the individual level[2].

This paper investigates whether and to what extent employment policy measures initiated in the context of and (co-) financed by the *European Social Fund* (ESF) in Germany meet their objective. Specifically, it is analyzed whether qualification programs for employed workers in the German state of Saxony were effective in terms of employment protection. To this end, we implement a control function approach (Heckman 1979) utilizing a unique firm-level dataset. This model explicitly accounts for unobserved heterogeneity between participating and non-participating companies by modeling the participation decision process.

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1 See e.g. Fitzenberger, Prey 2000; Hübler 1997; Hujer et. al. 1999; Lechner 1998; 1999; 2000. Kluve, Schmidt 2002 provide an overview for Europe.

2 Only a small number of studies addresses the efficacy of ALMP on the aggregate level; see e.g. Calmfors, Skedinger 1995 for Sweden or Fertig et al. 2002; Hujer et al. 2002 for Germany.

The rest of the paper is organized as follows. Section 2 provides a brief description of the intervention under investigation, i.e. ESF-funded qualification measures for employed workers. Section 3 explains the conceptual framework of the evaluation study and the identification strategy utilized. In Section 4 the dataset as well as the empirical results are presented and Section 5 offers some conclusions regarding the policy implications of the analysis conducted here.

2. ESF-Funded Qualification Measures for Employed Workers

The ESF is the second largest of the four *Structural Funds* in the EU[3]. The Structural Funds are the main financial instruments of the EU aiming at the reduction of the gap in living standards between regions and to the general promotion of economic and social cohesion within the EU. They are supposed to achieve at least one of several objectives. With the reform of 1999 the number of objectives was reduced from seven to three. For the case at hand, the relevant objective is *Objective* 1. This objective mainly aims at promoting regions where GDP *per capita* is below 75% of the EU average. It is financed by all four structural funds and accounts for around 70% of total Structural Funds spending.

Regarding ESF activities, there are five main areas or policy fields: (i) developing and promoting ALMPs, (ii) promoting equal opportunities for all in accessing the labor market, (iii) promoting and improving training, education and counseling as part of a life-long learning policy, (iv) promoting a skilled, trained and adaptable workforce, and (v) improving women's access to and participation in the labor market. Irrespective of the activity area, a principal requirement for ESF-funding is the availability of matching funds at the national, regional or community level.

Specifically, the ESF complements activities of the Member States in these policy fields by supporting the so-called *National Action Plans for Employment*, set up by the member states every year as a part of the European Employment Strategy. The principle of joint financing (or co-funding), i.e. the requirement that the financial resources provided by the ESF have to be complemented by resources from the member states, allows them to supplement their own labor market policy measures by other initiatives according to EU guidelines.

In the period from 1994 to 1999, Germany[4] received more than 7,400 Mill. ECU from the ESF for all objectives. Approximately some 57% of these funds

[3] The other three structural funds are the European Regional Development Fund (ERDF), the Financial Instrument of Fisheries Guidance (FIFG) and the European Agricultural Guidance and Guarantee Fund (EAGGF).

[4] See http://europa.eu.int/comm/employment_social/esf/en/member/ms/germany/gersf.htm.

Table 1

Key Characteristics of Saxony During Funding Period
1995–1999

	Total population	Total employment	GDP in prices of 1995	Growth rate of real GDP
	in 1,000		in Bn €	in %
1995	4,575	1,997	67.0	5.7
1996	4,556	1,998	68.9	2.9
1997	4,536	1,971	68.9	–0.1
1998	4,506	1,970	68.8	–0.1
1999	4,475	1,984	70.2	2.0
All years (average)	4,530	1,984	68.8	2.1

Data source: Statistisches Landesamt Sachsen.

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were allocated to *Objective* 1. From this pool, the *Objective* 1 region of Saxony received around 906 Mill. € which were mainly spent for vocational and further training measures for employed as well as unemployed workers. Together with own financial contributions, total spending in Saxony amounted to more than 1,400 Mill. € during this time period.

In this paper, the effectiveness of qualification measures for *employed* workers is under investigation. This ESF-(co-)funded program explicitly aims at increasing the competitiveness of companies, secure existing jobs and create new employment opportunities. Funding is provided to institutions offering qualification measures (*Maßnahmeträger*). This follows the idea that these institutions design their qualification measures in close co-operation with companies interested in training their employees. Some 80% of the cost of such measures are refunded from public resources (of which 65% are from ESF-funds and 35% are co-funding from the state of Saxony) and 20% have to be borne by participating companies.

These measures are originally targeted at small and medium sized enterprises (less than 250 employees). However, there were also larger firms among the participating companies. Furthermore, from the survey among companies – which was conducted for the purpose of evaluation – it became transparent that some of them were not actively involved in the participation of their employees in these qualification measures. Those companies which participated actively did so in several forms. For instance, qualification measures for their employees comprise external and internal courses/seminars, qualification at the workplace (training-on-the-job), participation in workshops/conferences as well as self-controlled learning utilizing new media.

The ESF-funded measures of ALMP were implemented in an environment which was characterized by only moderate growth rates of real GDP (Table 1).

Table 2

Labor Market Characteristics in Saxony During Funding Period
1995–1999

	Unemployment rate, in %	Long-term unemployed in % of all unemployed	Number of workers in ALMP measures	Number of workers in early retirement scheme
1995	14.4	30.6	156,095	117,607
1996	15.9	28.0	137,910	68,450
1997	18.4	27.6	112,985	44,652
1998	18.8	33.5	125,437	32,007
1999	18.6	33.7	130,763	29,568
All years (average)	17.2	30.7	132,638	58,457

Data source: Statistisches Landesamt Sachsen and Sächsisches Ministerium für Wirtschaft und Arbeit. RWI ESSEN

On average, in the second half of the 1990s the growth rate of real GDP in Saxony was around 2% per annum with stagnation in 1997 and 1998. Furthermore, Table 1 demonstrates that Saxony experienced a small loss of people during this period and relatively constant total employment.

From Table 2 it becomes transparent that unemployment rates were substantial and persistently high during the second half of the 1990s. On average, the number of registered unemployed relative to the civilian labor force amounted to more than 17%. Furthermore, unemployment was almost constantly rising during these years and the share of registered unemployed with an unemployment spell of more than 12 months (long-term unemployed) was almost one third.

In addition to the substantial number of registered unemployed, a considerable share of workers were participating in measures of ALMP, like public employment schemes and long-term training measures, and early retirement schemes. Since these workers are not registered as unemployed, the genuine number of workers out of employment was substantially higher. On average, more than 190,000 individuals participated in such measures/schemes during 1995–1999.

The program which is under investigation in this paper is somewhat different from these measures. It is targeted at small- and medium-sized companies with the explicit aim to train their existing workforce. In this endeavor, the primary objective was to secure their jobs. Against the background of the rather disillusioning macroeconomic and labor market situation in Saxony during this time, the question, whether the program succeeded as an employment protection measure will be tackled in the next sections.

3. Conceptual Framework for Evaluation

To conceptualize ideas, it is helpful to embed our study into the received literature on the evaluation of public interventions. Key element of any evaluation study is the *counterfactual question* "What would have happened to a suitably defined outcome measure if the intervention had not taken place?" Clearly, the implied *counterfactual situation* is unobservable. To this end we would have to observe the participating firms after the treatment period both with and without treatment. The latter situation is unobservable. This central evaluation problem induces the necessity to construct an observable counterpart for this unobservable situation by invoking suitable *identification assumptions*. These assumptions have to hold *a priori* since they are not statistically testable. Their validity, which has to be judged upon economic reasoning alone, however, is decisive for the validity of the derived results.

In the modern literature on the evaluation of public interventions (e.g. Heckman et al. 1999) *matching* estimators are the most prominent identification strategy. Yet, the central problem of such non-parametric identification strategies is that they are very data demanding and that they rest upon the so-called *conditional independence assumption* (CIA). This means that conditional on observable characteristics, treatment and comparison groups do not differ in any dimension other than the treatment itself. In other words, there is no unobserved heterogeneity between both groups. Typically, evaluation studies on the level of e.g. individual workers justify this assumption by controlling for the history of the outcome measure prior to the intervention (pre-treatment outcomes). If both groups differ in unobserved characteristics this should be reflected in the values of the outcome measure prior to treatment as well. These pre-treatment outcomes can then serve as a proxy for unobserved characteristics provided that these characteristics remain persistent over time and thus repeated measurement of the outcome variable reveals information about them.

In the case at hand, the data set comprises information on the *companies* participating in qualification measures for their employees. Therefore, unobserved heterogeneity might well be a severe problem, since at the level of firms potentially important characteristics like the innovative potential of the management or the motivation of the workforce remain unobserved. Unfortunately, our dataset (see also Section 4) is limited with respect to the number of observations and does not allow to control for a sufficiently long history of pre-treatment outcomes. Furthermore, companies are in all likelihood much more volatile in their unobserved characteristics than individual workers. Therefore, controlling for pre-treatment outcomes alone seems to be no promising approach.

An alternative approach to circumvent the problem of unobserved heterogeneity is to model the participation decision right around the time it is made, i.e. in the cross-section. Therefore, we implement a control function approach (Heckman 1979) which is similar to an instrumental variable model (Vella, Verbeek 1999). Additionally, this framework enables us to control for the level of the outcome measure at one point in time prior to treatment.

The intuitive idea of this control function approach is to model the participation process as an economic decision problem by assuming that companies base their decision process on observable as well as unobservable (to the analyst) characteristics. Those firms participating in the measure although their observable characteristics would suggest the contrary must consequently display unobserved characteristics increasing their propensity to participate. This insight can be exploited to assess the sign and magnitude of a summary measure of unobserved heterogeneity, and to use it as an explanatory factor purging the estimate of interest from bias.

The central identification assumption necessary to proceed in such a way is to assume that unobserved differences between the treatment and the comparison group are fully reflected by an estimated correction term from an auxiliary estimation step which decisively depends on a parametric assumption (see below). Furthermore, since the complete approach rests on a linear regression model, it is necessary to assume that there exists a linear relationship between the outcome measure and the explanatory variables and that the latter are strictly exogenous.

More specifically, we estimate a dummy treatment effect model. This model specifies a fixed treatment effect which captures the impact of the treatment on any observation unit randomly selected from the population. The ultimate aim of such models is to estimate the $(K\times1)$-vector β and the scalar δ of the following multivariate linear regression model for companies indexed by $j=1,\ldots,N$,

$$y_j = x_j'\beta+\delta z_j+\varepsilon_j. \tag{1}$$

In this equation y_j denotes the outcome measure (in our case employment at the firm-level) and x_j is a $(K\times1)$-vector of observable variables characterizing the company. z_j is a binary indicator variable taking the value of 1 if company j decided to participate in ESF-funded qualification measures and zero otherwise. The unknown parameter δ captures the (causal) effect of program participation and the vector β the impact of the confounding factors summarized in x. The random variable ε denotes the error term of the model. Typically, this model cannot be estimated consistently by OLS, since this error term is correlated with the unobservable factors influencing the participation decision, and thus with the program indicator z_j.

The strategy pursued here for circumventing this problem is to address the participation decision as an auxiliary first step. The decision to participate is modeled by equation (2) as

$$z_j^* = w_j'\gamma + u_j. \tag{2}$$

The latent variable z_j^* denotes the propensity to participate in ESF-funded qualification measures. This propensity is not directly observable. However, it is assumed to depend on a set of observable firm characteristics *w*. The vector γ captures the effect of these characteristics and *u* denotes the error term of equation (2).

Observable to the analyst is only the actual decision of company *j* whether to participate in ESF-funded qualification measures denoted by z_j, where the relationship between z_j^* and z_j is

$$z_j = \begin{cases} 1 & \text{if } z_j^* > 0 \quad \Leftrightarrow \text{participation} \\ 0 & \text{otherwise} \quad \Leftrightarrow \text{participation} \end{cases} \tag{3}$$

For an application of this approach it is necessary to assume that the error terms ε and *u* are bivariate normally distributed with expected value zero and covariance matrix Σ, i.e.

$$\Sigma = \begin{bmatrix} \sigma & \rho \\ \rho & 1 \end{bmatrix} \tag{4}$$

For $\rho = 0$ the covariance of both error terms is zero and both equation are uncorrelated. In that case, equation (1) can be estimated consistently by OLS. In general, this requirement is not fulfilled. The parameter λ (the so-called inverted Mills-Ratio) with

$$\lambda = \rho\sigma. \tag{5}$$

captures the effect of self-selection. Following Maddala (1983) the parameters β and δ can be estimated by the following two-step estimation procedure. The first step comprises the estimation of a probit model for equation (2), i.e.

$$\Pr(z_j = 1 | w_j) = \Phi(w_j\gamma) \tag{6}$$

where Φ denotes the cdf. of the standard normal distribution. This yields an estimate of the so-called hazard h_j for each observation unit, i.e. an estimate of the expected value that company *j* exceeds the threshold for participation in the program

$$\hat{h}_j = \begin{cases} \phi(w_j\hat{\gamma})/\Phi(w_j\hat{\gamma}) & \text{for } z_j = 1 \\ -\phi(w_j\hat{\gamma})/[1-\Phi(w_j\hat{\gamma})] & \text{for } z_j = 0 \end{cases} \tag{7}$$

ϕ denotes the density of a standard normally distributed random variable and $\hat{\gamma}$ is the estimated value of γ from equation (6). With this estimated hazard in hand, one can now extend the model from equation (1) and estimate it by OLS. That is, in the second step we estimate the following linear regression model

$$y_j = x_j\beta + \delta z_j + \lambda\hat{h}_j + v. \tag{8}$$

The parameter δ captures the effect of participation on the outcome measure y and the presence of $\hat{h}_j$ eliminates any correlation between $(x_j z_j)$ and v. A statistically significant estimate for λ suggests that the treatment group is self-selected. The following section contains our empirical application of this approach utilizing a dataset at the firm level for Saxony.

4. Data and Results

The population of companies for the treatment group comprises firms in Saxony participating in ESF-funded training measures between June 1999 and December 2000 for their employees. The comparison group was drawn from the population of companies which did not participate in ESF-funded qualification during this period. That is, some companies in the comparison group implemented qualification measures for their employees without public funding. In sum, we have four groups of firms, (i) companies participating in ESF-funded qualification alone, (ii) companies combining ESF-funded and non-funded (commercial) qualification activities, (iii) companies utilizing only non-funded training opportunities for their employees and (iv) companies abstaining from any qualification measure. The first two groups form the treatment group, whereas the comparison group consists of the latter two.

The final sample comprises 1,675 companies with complete information on all relevant variables, of which 38–40% (depending on the specific outcome variable) participated in ESF-funded qualification (Table A1 in the appendix). 15–17% of these companies utilized ESF-funded qualification measures only, whereas approximately 23% combined funded with non-funded qualification opportunities. More than 30% of the companies in the final sample participated in non-funded qualification alone and around 30% did not engage in any form of training measures.

For the estimation of our model from Section 3 we utilize the following firm-specific employment variables as outcome measures:

- *Outcome measure (i)*: number of employees subject to social security payments in 2001;
- *Outcome measure (ii)*: total number of employees (including employees not subject to social security regulations) in 2001.

For the purpose of evaluating the effectiveness of ESF-funded qualification measures for employed workers, we perform several comparisons to provide answers to the following questions:

a) Did participating firms perform better in terms of employment compared to non-participants?
   a1) Did participants utilizing *only* ESF-funded measures perform better than non-participants?
   a2) Did participants *combining* ESF-funded and non-funded measures perform better than non-participants?

These questions concern the effectiveness of ESF-funded qualification measures (alone or together with non-funded activities) if participating companies are compared to *all* members of the comparison group. Since in the case at hand the comparison group comprises two different sub-groups of companies – those abstaining from qualification and those utilizing only non-funded opportunities – one might then be interested if the answers to question a) differ significantly once the comparison group is broken down into its sub-groups. From a policy point of view, the comparison with companies without any qualification activity is especially interesting since funding is targeted to small and medium sized enterprises with the explicit aim to support them in qualifying their workforce. This program focus is motivated by the idea that without funding these firms would abstain from training their employees. Therefore, the next set of questions comprises:

b) Did participants in ESF-funded qualification perform better than companies *abstaining* from any qualification measure for their workers?
   b1) Did participants utilizing *only* ESF-funded measures perform better than companies abstaining from any qualification measure for their workers?
   b2) Did participants *combining* ESF-funded and non-funded measures perform better than companies abstaining from any qualification measure for their workers?

c) Did participants in ESF-funded qualification perform better than companies engaging solely in *non-funded* qualification measures?
   c1) Did participants utilizing *only* ESF-funded measures perform better than companies engaging solely in non-funded qualification measures?

c2) Did participants *combining* ESF-funded and non-funded measures perform better than companies engaging solely in non-funded qualification measures?

Finally, for the purpose of implementing future funding programs it is interesting to know if there are differences in the performance of companies within the treatment group. That is, whether companies utilizing *only* ESF-funded qualification measures perform better or worse than enterprises combining them with non-funded (commercial) training opportunities. Therefore, the final question addressed in this paper is:

d) Are there differences in the performance between the two sub-groups of participating companies?

Consequently, the set of comparisons conducted in this paper starts with the *full sample* and compares the value of the outcome measure between companies participating in ESF-funded qualification measures (treatment group) and those which did not (comparison group). This provides an answer to question a). Since both treatment and comparison group comprise two different sub-groups of companies, we then break down this first comparison further by *restricting the sample*.

Specifically, in a next step we break down the treatment group and compare companies utilizing *only* ESF-funded qualification and enterprises *combining* funded and non-funded training for their employees separately with *all* firms in the comparison group providing answers to questions a1) and a2). After that we break down the comparison group into the two sub-groups of companies without qualification and with only non-funded qualification, respectively. These two sub-groups are then compared in their employment development with the complete treatment group and separately with both sub-groups of the treatment group. This provides answers to questions b), b1), b2), c), c1) and c2). Finally, we compare the performance of both sub-groups of the treatment group directly as an answer to question d).

In sum, we consequently have the following treatment indicator variables:

– ESF(*-funded qualification*): Dummy variable taking the value of 1 if company *j* participated in ESF-funded qualification measures; 0 otherwise.

  This group comprises two different *sub-groups* of companies, i.e.

  Only *ESF-funded qualification measure*: Dummy variable taking the value of 1 if company *j* participated in ESF-funded qualification measures *only*; 0 otherwise.

  Combination with commercial qualification: Dummy variable taking the value of 1 if company *j* participated in ESF-funded qualification

measures *together* with programs by commercial providers; 0 otherwise.

Furthermore, the *comparison* group is indicated by:

– *Not-ESF*: Dummy variable taking the value of 1 if company *j* did not participate in ESF-funded qualification programs; 0 otherwise.

Again this group comprises two different s*ub-groups,* i.e.

Only commercial qualification: Dummy variable taking the value of 1 if company *j* participated in qualification programs by commercial providers *only*; 0 otherwise.

No qualification measures: Dummy variable taking the value of 1 if company *j* did not participate in any qualification measure; 0 otherwise.

For all those comparisons several observable characteristics are jointly implemented as control variables for observed heterogeneity between the firms. Specifically, we have

– *Social security insured employment 1999*

– *Total employment 1999*

– *Newly established business*: Dummy variable taking the value of 1 if company *j* has been established in 1996 or later; 0 otherwise.

– *Industry Sector:* Dummy variable taking the value of 1 if company *j* belongs to the industry sector; 0 otherwise.

– *Service Sector*: Dummy variable taking the value of 1 if company *j* belongs to the service sector; 0 otherwise.

– *Craftsmen*: Dummy variable taking the value of 1 if company *j* belongs to the crafts industry; 0 otherwise.

– *Self-employed*: Dummy variable taking the value of 1 if company *j* belongs to the group of self-employed; 0 otherwise.

– *Independent company*: Dummy variable taking the value of 1 if company *j* is an independent company; 0 otherwise.

– *Increased investment in 1998/1999*: Dummy variable taking the value of 1 if company *j* reported an increase of investment for 1998/1999; 0 otherwise.

– *Decreased investment in 1998/1999*: Dummy variable taking the value of 1 if company *j* reported a decrease of investment for 1998/1999; 0 otherwise.

Finally, although the parameters of the model from Section 3 are in principle identified due to the non-linearity in the auxiliary estimation step, many applications demonstrate that robust estimation results require an exclusion restriction (see Vella 1998 for a survey). That is, we are searching for a variable

that explains the participation decision process but does not impinge upon the outcome measure of equation (1). In the case at hand, we argue that this variable is

– *Innovations planned in future*: Dummy variable taking the value of 1 if company *j* reported to aim at the introduction of product, process or organizational innovations in 2002/2003; 0 otherwise.

This variable is assumed to have an impact on the decision of companies to participate in qualification measures for their employees but not on current outcomes. The idea behind this is that companies planning to innovate their production and/or organization processes in the near future do not adjust their employment in advance but are more likely to invest into the qualification level of their employees to cope with future challenges. Table A1 in the appendix provides some descriptive statistics for our sample. From these figures it becomes transparent that both outcome measures did not change substantially over time. However, the variation across companies was substantial.

Table 3 provides a summary of the estimation results. The full set of estimation results are reported in Tables A2–A11 in the appendix. The left panel of Table 3 contains the *raw differentials* (unconditional group means) of the several comparisons conducted in this paper. The *conditional differentials* are provided in the left panel. The results reported in this part of Table 3 refer to the two-step estimation procedure if the self-selection coefficient is statistically significant and to the OLS results otherwise.

The estimation results demonstrate that there are substantial differences in both outcome measures between the different (sub-) groups of companies. Furthermore, it becomes transparent that controlling for observable characteristics of the companies changes the estimated differentials substantially in qualitative as well as quantitative terms. Our results suggest that participating in ESF-funded qualification measures exhibits a strong positive effect on both employment outcomes (first (1) row of Table 3). Furthermore, this positive treatment is highly significant for both sub-groups of the treatment group (rows (2) and (3)). However, it is larger for companies utilizing *only* ESF-funded training than for those firms which *combined* funded and non-funded qualification activities.

Once this comparison is broken down into the two sub-groups forming the comparison group, estimation results reveal that these positive effects stem from different sources. The row (4) of Table 3 indicates a statistically significant *positive* effect of funded qualification compared to companies with no qualification activities. This effect is, however, considerably smaller in quantitative terms. Moreover, this small positive effect is driven by enterprises combining funded with non-funded training opportunities for their workforce

Table 3

Summary of Results

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	Raw Differentials				Conditional Differentials			
	Outcome Measure (i)		Outcome Measure (ii)		Outcome Measure (i)		Outcome Measure (ii)	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
a) Comparison of participants with non-participants:								
(1) ESF vs. Not-ESF	6.97	1.56	6.47	1.41	35.67*	2.35	35.30*	2.40
a1) Participants in funded measures only								
(2) Only ESF-funded qualification vs. not-ESF	–11.12	–3.90	–12.99	–4.69	39.70*	4.42	48.99*	4.68
a2) Participants in funded and non-funded measures								
(3) Combination ESF/comm. vs. Not-ESF	23.88	4.17	26.49	4.40	25.24*	3.68	28.45*	3.94
b) Comparison of participants with non-participants abstaining from qualification:								
(4) ESF vs. no qualification	15.65	2.58	16.36	2.64	1.84	2.72	1.96	2.72
b1) Participants in funded measures only								
(5) Only ESF-funded qualify. vs. no qualification	–2.44	–1.43	–3.10	–1.87	1.43	2.17	0.79	1.26
b2) Participants in funded and non-funded measures								
(6) Combination ESF/comm. vs. no qualification	31.38	4.01	35.05	4.30	2.37	2.68	2.94	3.06
c) Comparison of participants with non-participants engaging in non-funded qualification:								
(7) ESF vs. commercial qual.	–0.56	–0.09	–2.46	–0.39	0.47	0.70	0.44	0.57
c1) Participants in funded measures only								
(8) Only ESF-funded qual. vs. commercial qual.	–18.64	–5.20	–21.92	–6.25	33.01*	4.01	44.30*	4.26
c2) Participants in funded and non-funded measures								
(9) Combination ESF/comm. vs. only commercial qual.	16.91	2.15	18.19	2.18	1.25	1.44	1.91	1.91
d) Comparison of both participant sub-groups:								
(10) Only ESF-funded qual. vs. combination ESF/comm.	–33.81	–3.13	–38.12	–3.61	–11.33*	–1.98	–1.20	–1.09

Notes: *Results of two-step estimation procedure since coefficient of self-selection is significant; OLS results otherwise.

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(row (6)), firms participating in ESF-funded qualification measures only do not perform significantly different from companies without qualification (row (5)).

Furthermore, we observe no significant difference in both outcome measures between companies in the treatment group and enterprises utilizing non-funded training opportunities only (row (7)). However, this zero effect is the weighted average of a statistically significant *positive* effect for companies utilizing *only* ESF-funded training and a zero effect for firms combining it with non-funded activities (row (9)). Finally, row (10) of Table 3 suggests that companies combining both forms of qualification opportunities slightly outperform firms which utilize *only* ESF-funded qualification for outcome measure (i). There is, however, no significant difference between both sub-groups of the treatment group for outcome measure (ii).

Regarding the other covariates, the full set of estimation results reported in Tables A2–A11 indicate that, unsurprisingly, the level of employment in 1999 has a positive impact on the value of outcome measures in 2001. Furthermore, in almost all regressions increased investment activities in 1998/1999 display a positive effect on employment in 2001 and companies in the industry sector experience higher outcomes. Moreover, in some comparisons newly established businesses perform worse than more mature firms. Finally, the full set of estimation results also indicates that the group of companies utilizing *only* ESF-funded qualification measures, is negatively selected on unobservables compared to the group utilizing only non-funded qualification activities.

Estimation results for the first step decision equation suggest that newly established businesses and self-employed individuals are significantly more likely to participate in ESF-sponsored training for their employees, whereas the propensity to engage in qualification is significantly lower in the industry sector and among craftsmen. Those companies planning innovations in the future (exclusion restriction) are either more likely to participate or do not differ from other firms.

5. Conclusions

This paper analyzed whether qualification programs for employed workers co-funded by the European Social Fund in Saxony and targeted to small and medium sized enterprises were effective. To this end, we performed several comparisons between participating and non-participating companies in a control function approach utilizing a unique firm-level dataset. In sum, the estimation results indicate a *positive* effect of participation in ESF-funded qualification measures on both employment outcomes and, therefore, suggest that in general the program was effective.

However, against the background of the explicit aim of the program to support firms that otherwise would have abstained from training their employees, our results suggest a more differentiated picture. Companies utilizing *only* ESF-funded qualification measures do *not* outperform firms abstaining from training their workforce, whereas enterprises combining ESF-funded with non-funded activities display higher employment levels than those without qualification.

Furthermore, the direct comparison of companies with ESF-funded activities *alone* and firms with *combined* training measures reveals that the latter perform better, at least with respect to social security insured employment. An explanation for this finding might be that firms combining both forms of training have to bear higher costs and are therefore more carefully in choosing the specific kind and content of qualification for their employees.

With respect to the implementation of future funding programs, our results suggest that training workers while they are employed is a promising way to secure existing jobs. This implies that the program should be retained although – due to lacking data – we are not able to evaluate its cost-efficiency. However, it seems advisable for the design of future funding initiatives to provide incentives for participating companies to interact more intensively with the providers of qualification measures to ensure a more careful and problem-directed selection of the form and contents of training activities for their employees.

Table A1

Descriptive Statistics

	Outcome Measure (i)		Outcome Measure (ii)	
	Mean	Standard deviation	Mean	Standard deviation
Social security insured employment 2001	24.86	87.94	–	–
Total employment 2001	–	–	26.95	94.83
Social security insured employment 1999	25.25	89.86	–	–
Total employment 1999	–	–	27.00	96.45
Only ESF-funded qualification measure	0.15	0.36	0.17	0.38
Combination with commercial qualification	0.23	0.42	0.23	0.42
Only commercial qualification	0.34	0.47	0.32	0.47
No qualification measures	0.29	0.46	0.29	0.45
Newly established business	0.13	0.34	0.13	0.34
Industry sector	0.20	0.40	0.19	0.39
Service sector	0.44	0.50	0.45	0.50
Craftsmen	0.35	0.48	0.34	0.47
Self-employed	0.11	0.31	0.12	0.33
Independent company	0.93	0.25	0.93	0.25
Increased investment in 1998/1999	0.39	0.49	0.39	0.49
Decreased investment in 1998/1999	0.09	0.29	0.09	0.29
Innovations planned in future	0.22	0.42	0.21	0.41

Author's calculations.

Table A2

Complete Results – ESF-funded Qualification vs. Not-ESF

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
ESF-funded qualification	1.05	1.87	35.67	*2.35*	1.10	1.79	35.30	*2.40*
Control Variables:								
Newly established business	–0.09	–0.12	–6.74	*–2.08*	–0.35	–0.42	–7.15	*–2.21*
Industry sector	4.11	*5.13*	11.95	*3.21*	4.29	*4.84*	12.31	*3.29*
Service sector	0.31	0.49	4.50	*2.08*	0.86	1.25	5.12	*2.37*
Craftsmen	–1.11	–1.77	1.21	0.80	–1.27	–1.84	0.74	0.52
Self-employed	0.09	0.10	–6.95	*–2.00*	–0.23	–0.25	–9.17	*–2.21*
Independent company	–0.55	–0.52	0.71	0.35	–2.57	*–2.19*	–1.44	–0.72
Increased investment in 1998/1999	3.14	*5.62*	1.42	1.13	3.10	*5.07*	1.68	1.43
Decreased investment in 1998/1999	–3.45	*–3.70*	–3.39	*–2.01*	–3.67	*–3.58*	–3.30	–1.95
Employment 1999	0.97	*325.70*	0.96	*145.07*	0.97	*321.26*	0.96	*155.36*
Constant	–0.91	–0.76	–16.44	*–2.31*	1.16	0.87	–14.41	*–2.05*
Decision Equation:								
Innovations planned in future	–	–	0.13	1.70	–	–	0.13	1.68
Newly established business	–	–	0.52	*5.53*	–	–	0.55	*6.08*
Industry sector	–	–	–0.69	*–6.76*	–	–	–0.71	*–7.16*
Service sector	–	–	–0.33	*–4.28*	–	–	–0.35	*–4.64*
Craftsmen	–	–	–0.18	*–2.26*	–	–	–0.15	*–2.03*
Self-employed	–	–	0.56	*5.15*	–	–	0.72	*7.19*
Independent company	–	–	–0.05	–0.38	–	–	–0.05	–0.35
Increased investment in 1998/1999	–	–	0.13	1.89	–	–	0.11	1.62
Decreased investment in 1998/1999	–	–	–0.01	–0.05	–	–	–0.03	–0.30
Employment 1999	–	–	0.00	*2.00*	–	–	0.00	*2.30*
Constant	–	–	–0.21	–1.40	–	–	–0.19	–1.30
Selection coefficient	–	–	–21.12	*–2.29*	–	–	–20.87	*–2.33*
Number of observations:			*1,675*				*1,811*	

Author's calculations.

Table A3

Complete Results – Only ESF-funded Qualification vs. Not-ESF

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
Only ESF-funded qualification	1.38	*2.09*	39.70	*4.42*	0.63	0.90	48.99	*4.68*
Control Variables:								
Newly established business	0.11	0.14	–6.26	*–2.97*	0.09	0.11	–8.62	*–3.32*
Industry sector	3.42	*4.40*	9.45	*4.67*	3.29	3.86	11.16	*4.53*
Service sector	1.00	1.59	4.33	*3.06*	1.37	2.02	5.26	*3.19*
Craftsmen	–0.87	–1.44	0.24	0.20	–1.02	–1.55	0.33	0.23
Self-employed	0.77	0.82	–4.77	*–2.19*	0.60	0.61	–10.09	*–3.29*
Independent company	–0.53	–0.48	–1.13	–0.54	–0.84	–0.69	–2.70	–1.05
Increased investment in 1998/1999	2.34	*4.29*	2.38	*2.32*	2.09	3.52	2.71	*2.17*
Decreased investment in 1998/1999	–2.91	*–3.26*	–2.26	–1.34	–2.95	–3.05	–1.90	–0.93
Employment 1999	1.01	*146.99*	1.04	*70.25*	1.01	142.82	1.05	*62.17*
Constant	–1.99	–1.57	–11.47	*–3.54*	–1.34	–0.97	–12.91	*–3.39*
Decision Equation:								
Innovations planned in future	–	–	0.12	1.20	–	–	0.11	1.17
Newly established business	–	–	0.51	*4.39*	–	–	0.54	*4.91*
Industry sector	–	–	–0.67	*–4.80*	–	–	–0.67	*–5.02*
Service sector	–	–	–0.32	*–3.21*	–	–	–0.28	*–3.04*
Craftsmen	–	–	–0.11	–1.07	–	–	–0.10	–1.02
Self-employed	–	–	0.43	*3.09*	–	–	0.63	*5.07*
Independent company	–	–	0.09	0.45	–	–	0.19	0.98
Increased investment in 1998/1999	–	–	0.00	0.05	–	–	–0.03	–0.40
Decreased investment in 1998/1999	–	–	–0.06	–0.40	–	–	–0.08	–0.54
Employment 1999	–	–	–0.01	*–3.44*	–	–	–0.01	*–3.48*
Constant	–	–	–0.67	*–3.07*	–	–	–0.74	*–3.46*
Selection coefficient	–	–	–21.98	*–4.32*	–	–	–28.04	*–4.67*
Number of observations:				*1,319*				*1,423*

Author's calculations.

Table A4

Complete Results – Combination ESF/Commercial vs. Not-ESF

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
Combination with commercial qualifi.	1.79	*2.51*	25.24	*3.68*	2.46	*3.11*	28.45	*3.94*
Control Variables:								
Newly established business	–0.51	–0.52	–3.69	*–2.33*	–0.79	–0.74	–4.64	*–2.63*
Industry sector	4.34	*4.75*	7.75	*4.95*	4.88	*4.76*	8.92	*5.11*
Service sector	0.40	0.53	2.60	*2.18*	1.21	1.45	4.03	*3.00*
Craftsmen	–0.99	–1.35	1.22	1.05	–1.04	–1.28	1.16	0.94
Self-employed	–0.22	–0.20	–4.58	*–2.37*	–0.77	–0.65	–6.84	*–2.99*
Independent company	–0.32	–0.27	2.02	1.16	–2.34	–1.76	0.45	0.24
Increased investment in 1998/1999	3.32	*5.06*	1.15	1.06	3.40	*4.66*	1.12	0.98
Decreased investment in 1998/1999	–4.08	*–3,78*	–5,20	*–3.53*	–4.42	*–3.67*	–5.33	*–3.33*
Employment 1999	0.97	*301.34*	0.96	*183.66*	0.97	*295.44*	0.96	*181.21*
Constant	–1.37	–0.99	–10.35	*–3.25*	.39	0.26	–9.90	*–2.85*
Decision Equation:								
Innovations planned in future	–	–	0.21	*2.42*	–	–	0.22	*2.54*
Newly established business	–	–	0.41	*3.72*	–	–	0.45	*4.18*
Industry sector	–	–	–0.57	*–4.93*	–	–	–0.59	*–5.29*
Service sector	–	–	–0.30	*–3.26*	–	–	–0.34	*–3.91*
Craftsmen	–	–	–0.29	*–3.17*	–	–	–0.25	*–2.83*
Self-employed	–	–	0.56	*4.53*	–	–	0.70	*5.94*
Independent company	–	–	–0.15	–1.02	–	–	–0.19	–1.36
Increased investment in 1998/1999	–	–	0.27	*3.42*	–	–	0.26	*3.32*
Decreased investment in 1998/1999	–	–	0.15	1.18	–	–	0.11	0.87
Employment 1999	–	–	0.00	*4.55*	–	–	0.00	*4.90*
Constant	–	–	–0.52	*–3.13*	–	–	–0.47	*–2.95*
Selection coefficient	–	–	–14.05	*–3.47*	–	–	–15.59	*–3.65*
Number of observations:			*1,397*				*1,478*	

Author's calculations.

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Table A5

Complete Results – ESF vs. Not-ESF

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
ESF-funded qualification	1.84	*2.72*	1.11	0.31	1.96	*2.72*	0.92	0.24
Control Variables:								
Newly established business	–0.39	–0.43	–0.27	–0.26	–0.63	–0.66	–0.45	–0.39
Industry sector	3.81	*3.84*	3.63	*2.76*	4.11	*3.85*	3.85	*2.72*
Service sector	–0.47	–0.59	–0.53	–0.63	0.00	0.00	–0.10	–0.11
Craftsmen	–1.34	–1.69	–1.35	–1.71	–1.34	–1.60	–1.35	–1.62
Self-employed	–0.26	–0.25	–0.11	–0.09	–0.46	–0.45	–0.20	–0.14
Independent company	3.06	*2.25*	3.00	*2.15*	–0.32	–0.22	–0.42	–0.28
Increased investment in 1998/1999	3.16	*4.52*	3.24	*4.03*	3.20	*4.34*	3.31	*3.95*
Decreased investment in 1998/1999	–3.95	*–3.48*	–3.95	*–3.50*	–4.23	*–3.52*	–4.25	*–3.54*
Employment 1999	0.96	*304.09*	0.96	*281.55*	0.96	*309.11*	0.96	*284.46*
Constant	–4.23	*–2.76*	–3.77	–1.40	–1.03	–0.63	–0.36	–0.12
Decision Equation:								
Innovations planned in future	–	–	0.38	*3.70*	–	–	0.37	*3.73*
Newly established business	–	–	0.47	*4.13*	–	–	0.54	*4.89*
Industry sector	–	–	–0.80	*–6.48*	–	–	–0.83	*–6.84*
Service sector	–	–	–0.22	*–2.25*	–	–	–0.27	*–2.90*
Craftsmen	–	–	–0.02	–0.16	–	–	0.00	–0.03
Self-employed	–	–	0.69	*5.14*	–	–	0.85	*6.81*
Independent company	–	–	0.03	0.15	–	–	–0.02	–0.10
Increased investment in 1998/1999	–	–	0.26	*3.07*	–	–	0.24	*2.95*
Decreased investment in 1998/1999	–	–	–0.02	–0.16	–	–	–0.05	–0.42
Employment 1999	–	–	0.01	*4.75*	–	–	0.01	*4.85*
Constant	–	–	–0.08	–0.42	–	–	–0.01	–0.05
Selection coefficient	–	–	0.46	0.21	–	–	0.66	0.28
Number of observations:	*1,104*				*1,224*			

Author's calculations.

Table A6

Complete Results – Only ESF-funded Qualification vs. No Qualification

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
Only ESF-funded qualification	1.43	*2.17*	–3.19	–0.55	0.79	1.26	–5.78	–0.96
Control Variables:								
Newly established business	–0.61	–0.69	0.26	0.18	–0.51	–0.60	0.85	0.55
Industry sector	3.38	*3.62*	2.33	1.43	3.40	*3.69*	1.83	1.06
Service sector	–0.01	–0.01	–0.35	–0.39	0.09	0.12	–0.39	–0.45
Craftsmen	–0.99	–1.33	–0.95	–1.24	–0.84	–1.17	–0.77	–1.01
Self-employed	0.25	0.24	1.23	0.75	0.24	0.25	2.09	1.06
Independent company	2.13	1.47	2.28	1.53	1.27	0.88	1.68	1.07
Increased investment in 1998/1999	2.57	*3.86*	2.78	*3.80*	2.48	*3.84*	2.69	*3.80*
Decreased investment in 1998/1999	–2.69	*–2.60*	–2.85	*–2.64*	–2.74	*–2.74*	–3.01	*–2.78*
Employment 1999	0.93	*63.36*	0.92	*59.71*	0.91	*68.51*	0.91	*64.34*
Constant	–3.04	–1.89	–1.50	–0.59	–1.76	–1.11	0.33	0.13
Decision Equation:								
Innovations planned in future	–	–	0.35	*2.76*	–	–	0.34	*2.76*
Newly established business	–	–	0.51	*3.64*	–	–	0.57	*4.32*
Industry sector	–	–	–0.76	*–4.74*	–	–	–0.79	*–5.05*
Service sector	–	–	–0.20	–1.65	–	–	–0.20	–1.80
Craftsmen	–	–	0.05	0.42	–	–	0.05	0.42
Self-employed	–	–	0.59	*3.53*	–	–	0.78	*5.23*
Independent company	–	–	0.08	0.33	–	–	0.16	0.69
Increased investment in 1998/1999	–	–	0.13	1.20	–	–	0.09	0.89
Decreased investment in 1998/1999	–	–	–0.08	–0.47	–	–	–0.11	–0.67
Employment 1999	–	–	0.00	–0.95	–	–	0.00	–0.43
Constant	–	–	–0.49	–1.89	–	–	–0.53	*–2.11*
Selection coefficient	–	–	2.82	0.80	–	–	4.02	1.10
Number of observations:		*748*				*836*		

Author's calculations.

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Table A7

Complete Results – Combination ESF/Commercial vs. No Qualification

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
Combination with commercial qualification	2.37	*2.68*	4.33	1.26	2.94	*3.06*	6.87	1.85
Control Variables:								
Newly established business	–1.13	–0.90	–1.39	–1.05	–1.46	–1.07	–2.07	–1.41
Industry sector	3.58	*2.92*	3.90	*2.91*	4.31	*3.21*	5.00	*3.36*
Service sector	–0.92	–0.89	–0.78	–0.73	–0.08	–0.08	0.31	0.27
Craftsmen	–1.48	–1.44	–1.35	–1.28	–1.41	–1.27	–1.18	–1.04
Self-employed	–0.80	–0.56	–1.24	–0.77	–1.35	–0.91	–2.41	–1.36
Independent company	2.16	1.33	2.46	1.45	–2.19	–1.24	–1.49	–0.79
Increased investment in 1998/1999	3.67	*4.03*	3.33	*3.08*	4.20	*4.26*	3.52	*3.02*
Decreased investment in 1998/1999	–4.52	*–3.15*	–4.62	*–3.21*	–4.97	*–3.19*	–5.12	*–3.27*
Employment 1999	0.96	*266.73*	0.96	*244.63*	0.97	*267.10*	0.96	*241.80*
Constant	–3.15	–1.69	–4.20	–1.63	0.60	0.30	–1.64	–0.57
Decision Equation:								
Innovations planned in future	–	–	0.45	*3.94*	–	–	0.45	*4.01*
Newly established business	–	–	0.40	*2.96*	–	–	0.47	*3.64*
Industry sector	–	–	–0.68	*–4.91*	–	–	–0.71	*–5.21*
Service sector	–	–	–0.19	–1.73	–	–	–0.27	*–2.59*
Craftsmen	–	–	–0.16	–1.41	–	–	–0.12	–1.16
Self-employed	–	–	0.72	*4.73*	–	–	0.86	*5.99*
Independent company	–	–	0.02	0.08	–	–	–0.07	–0.39
Increased investment in 1998/1999	–	–	0.41	*4.19*	–	–	0.40	*4.19*
Decreased investment in 1998/1999	–	–	0.13	0.86	–	–	0.08	0.55
Employment 1999	–	–	0.01	*6.01*	–	–	0.01	*6.18*
Constant	–	–	–0.50	*–2.35*	–	–	–0.41	*–1.98*
Selection coefficient	–	–	–1.27	–0.59	–	–	–2.54	–1.10
Number of observations:	896				936			

Author's calculations.

Table A8

Complete Results – ESF vs. Only Commercial Qualification

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
ESF-funded qualification	0.47	0.70	–28.62	–1.13	0.44	0.57	–18.97	–1.02
Control Variables:								
Newly established business	0.64	0.67	6.54	1.22	0.19	0.18	3.84	1.03
Industry sector	4.45	*4.34*	–2.87	–0.44	4.58	3.91	–0.35	–0.07
Service sector	0.17	0.21	–4.35	–1.06	0.84	0.97	–1.96	–0.68
Craftsmen	–1.39	–1.78	–4.79	–1.49	–1.73	–1.95	–3.75	–1.69
Self-employed	0.04	0.04	4.63	1.07	–0.34	–0.30	3.53	0.89
Independent company	–2.08	–1.61	–2.45	–1.17	–4.47	–3.07	–4.46	*–2.50*
Increased investment in 1998/1999	3.25	*4.71*	3.36	*3.03*	3.12	4.01	2.97	*3.09*
Decreased investment in 1998/1999	–3.20	*–2.67*	–2.91	–1.50	–3.36	–2.47	–3.37	*–2.03*
Employment 1999	0.97	*307.17*	0.97	*184.44*	0.97	293.56	0.97	*232.11*
Constant	0.98	0.66	19.44	1.20	3.60	2.15	15.86	1.33
Decision Equation:								
Innovations planned in future	–	–	–0.03	–0.36	–	–	–0.04	–0.50
Newly established business	–	–	0.56	*5.01*	–	–	0.54	*5.07*
Industry sector	–	–	–0.66	*–5.55*	–	–	–0.67	*–5.78*
Service sector	–	–	–0.42	*–4.62*	–	–	–0.40	*–4.59*
Craftsmen	–	–	–0.31	*–3.49*	–	–	–0.28	*–3.28*
Self-employed	–	–	0.44	*3.51*	–	–	0.59	*4.99*
Independent company	–	–	–0.03	–0.21	–	–	0.00	0.02
Increased investment in 1998/1999	–	–	0.01	0.10	–	–	–0.02	–0.31
Decreased investment in 1998/1999	–	–	0.02	0.18	–	–	0.00	–0.03
Employment 1999	–	–	0.00	0.43	–	–	0.00	0.49
Constant	–	–	0.36	*2.20*	–	–	0.36	*2.28*
Selection coefficient	–	–	17.89	1.15	–	–	11.96	1.04
Number of observations:			*1,178*				*1,279*	

Author's calculations.

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Table A9

Complete Results – Only ESF-funded vs. Commercial Qualification

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
Only ESF-funded qualification	1.34	1.91	33.01	*4.01*	0.39	0.48	44.30	*4.26*
Control Variables:								
Newly established business	1.54	1.63	–5.17	*–2.10*	1.30	1.21	–7.55	*–2.48*
Industry sector	3.23	*3.29*	10.35	*4.00*	2.78	*2.40*	12.62	*3.78*
Service sector	1.28	1.71	5.83	*3.20*	1.64	1.89	7.09	*3.20*
Craftsmen	–0.81	–1.10	2.00	1.29	–1.26	–1.47	2.56	1.28
Self-employed	1.15	1.06	–2.81	–1.25	0.73	0.61	–7.92	*–2.47*
Independent company	–3.19	*–2.44*	–3.97	–1.62	–3.43	*–2.23*	–6.04	–1.85
Increased investment in 1998/1999	2.22	*3.40*	3.67	*2.88*	1.71	*2.22*	4.50	*2.60*
Decreased investment in 1998/1999	–2.15	–1.91	–1.87	–0.89	–2.00	–1.52	–1.33	–0.48
Employment 1999	1.03	*141.11*	1.07	*59.47*	1.02	*126.49*	1.09	*48.47*
Constant	–0.08	–0.05	–14.14	*–3.09*	1.01	0.57	–17.99	*–3.11*
Decision Equation:								
Innovations planned in future	–	–	–0.06	–0.49	–	–	–0.07	–0.64
Newly established business	–	–	0.54	*3.87*	–	–	0.52	*3.97*
Industry sector	–	–	–0.64	*–3.92*	–	–	–0.63	*–3.98*
Service sector	–	–	–0.45	*–3.85*	–	–	–0.38	*–3.43*
Craftsmen	–	–	–0.30	*–2.54*	–	–	–0.28	*–2.51*
Self-employed	–	–	0.27	1.66	–	–	0.47	*3.20*
Independent company	–	–	0.18	0.76	–	–	0.31	1.36
Increased investment in 1998/1999	–	–	–0.12	–1.19	–	–	–0.17	–1.69
Decreased investment in 1998/1999	–	–	–0.02	–0.12	–	–	–0.04	–0.24
Employment 1999	–	–	–0.01	*–4.72*	–	–	–0.01	*–4.98*
Constant	–	–	–0.06	–0.23	–	–	–0.15	–0.61
Selection coefficient	–	–	–19.31	*–3.92*	–	–	–26.92	*–4.31*
Number of observations:			*822*				*891*	

Author's calculations.

Table A10

Complete Results – Combination ESF/Commercial vs. Only Commercial

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
Combination with commercial qualification	1.25	1.44	74.71	1.81	1.91	1.91	73.66	*1.99*
Control Variables:								
Newly established business	0.35	0.28	–11.86	–1.51	–0.14	–0.10	–11.55	–1.67
Industry sector	4.86	*3.88*	17.96	*2.18*	5.55	3.81	18.89	*2.43*
Service sector	0.33	0.32	10.77	1.64	1.42	1.24	11.73	1.94
Craftsmen	–1.25	–1.28	10.65	1.46	–1.50	–1.32	9.00	1.47
Self-employed	–0.34	–0.24	–12.98	–1.58	–1.02	–0.65	–16.15	–1.85
Independent company	–2.01	–1.31	5.33	0.86	–4.44	–2.54	2.47	0.44
Increased investment in 1998/1999	3.60	*4.12*	–1.32	–0.35	3.62	3.58	–0.40	–0.12
Decreased investment in 1998/1999	–4.22	*–2.79*	–10.60	–1.84	–4.58	–2.60	–9.46	–1.85
Employment 1999	0.97	*274.17*	0.95	*66.11*	0.97	258.86	0.95	*73.86*
Constant	0.43	0.24	–42.44	–1.72	2.58	1.26	–39.54	–1.78
Decision Equation:								
Innovations planned in future	–	–	0.07	0.65	–	–	0.07	0.71
Newly established business	–	–	0.46	*3.44*	–	–	0.44	*3.49*
Industry sector	–	–	–0.52	*–3.91*	–	–	–0.55	*–4.18*
Service sector	–	–	–0.39	*–3.69*	–	–	–0.40	*–3.91*
Craftsmen	–	–	–0.43	*–4.16*	–	–	–0.38	*–3.79*
Self-employed	–	–	0.47	*3.24*	–	–	0.59	*4.24*
Independent company	–	–	–0.20	–1.24	–	–	–0.20	–1.26
Increased investment in 1998/1999	–	–	0.17	1.91	–	–	0.14	1.62
Decreased investment in 1998/1999	–	–	0.23	1.45	–	–	0.17	1.13
Employment 1999	–	–	0.00	*1.97*	–	–	0.00	*2.29*
Constant	–	–	0.13	0.70	–	–	0.14	0.78
Selection coefficient	–	–	–45,24	–1.79	–	–	–44.21	–1.95
Number of observations:			*904*				*950*	

Author's calculations.

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Table A11

Complete Results – Only ESF-funded Qualification vs. Combination

	Outcome Measure (i)				Outcome Measure (ii)			
	OLS		Two-step procedure		OLS		Two-step procedure	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Outcome Equation:								
Treatment Indicators:								
Only ESF-funded qualification	–0.42	–0.41	–11.33	*–1.98*	–1.20	–1.09	–3.21	–0.55
Control Variables:								
Newly established business	0.43	0.34	1.29	0.89	–0.01	0.00	0.13	0.09
Industry sector	3.72	*2.35*	2.63	1.47	4.12	*2.33*	3.96	*2.18*
Service sector	–1.75	–1.51	–1.69	–1.36	–0.69	–0.56	–0.60	–0.48
Craftsmen	–2.43	*–1.97*	–1.41	–0.99	–2.30	–1.72	–2.13	–1.49
Self-employed	–0.87	–0.61	–1.03	–0.67	–0.75	–0.51	–0.76	–0.52
Independent company	–0.05	–0.03	1.83	0.80	–5.81	*–2.72*	–5.38	*–2.18*
Increased investment in 1998/1999	3.68	*3.48*	2.24	1.65	3.99	*3.47*	3.70	*2.61*
Decreased investment in 1998/1999	–3.46	–1.93	–4.82	*–2.34*	–3.48	–1.76	–3.71	–1.79
Employment 1999	0.96	*264.62*	0.96	*225.77*	0.97	*257.09*	0.97	*235.89*
Constant	1.41	0.69	4.58	1.67	6.92	*3.05*	7.43	*2.75*
Decision Equation:								
Innovations planned in future	–	–	–0.10	–0.77	–	–	–0.09	–0.78
Newly established business	–	–	0.10	0.78	–	–	0.08	0.66
Industry sector	–	–	–0.10	–0.54	–	–	–0.03	–0.18
Service sector	–	–	–0.02	–0.13	–	–	0.11	0.98
Craftsmen	–	–	0.14	1.08	–	–	0.14	1.11
Self-employed	–	–	–0.18	–1.21	–	–	–0.15	–1.11
Independent company	–	–	0.37	1.52	–	–	0.48	*2.06*
Increased investment in 1998/1999	–	–	–0.32	*–2.83*	–	–	–0.34	*–3.22*
Decreased investment in 1998/1999	–	–	–0.32	–1.67	–	–	–0.29	–1.57
Employment 1999	–	–	–0.01	*–4.40*	–	–	–0.01	*–4.56*
Constant	–	–	–0.21	–0.81	–	–	–0.33	–1.33
Selection coefficient	–	–	6.97	*1.96*	–	–	1.29	0.35
Number of observations:			*633*				*718*	

Author's calculations.

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