Evaluation of publicly financed training programs in Germany: Their impact in general and the impact of the Hartz reforms

Very preliminary version

Marton Csillag (University of Toulouse I)
Hilmar Schneider (IZA, DIW Berlin)
Arne Uhlendorff (DIW Berlin, IZA)
Zhong Zhao (IZA)

Abstract

In 2003 a reform of the German active labor market policy was introduced. With respect to public sector sponsored training for unemployed individuals the reform mainly consists of the introduction of a voucher system for program participants and a stricter selection of participants and program types by the case workers. The aim of this reform is to increase the competition on the supply side of the "training market" and thereby to increase the quality of the training programs as well as to reach a better match of participants and programs. This paper analyses the employment effects of public sector sponsored training in Germany for unemployed individuals before and after the reform. Using a rich administrative data set for the years 2000 to 2004, we apply propensity score matching methods to estimate the average treatment effects on the treated and are able to distinguish between six different program types. The results show strong lock-in effects for all program types before and after the reform. For some of the programs we observe slightly but not sustainable positive effects on the employment probability. The treatment effects are heterogeneous and vary with the program type as well as with the previous unemployment duration. The reform seems to have a positive impact on the treatment effects.

JEL-Classification: J64, J68, H43
Keywords: Training programs, Voucher, Matching, reform effects

1 Introduction

In 2003 a reform of the German active labor market policy was introduced. With respect to public sector sponsored training for unemployed individuals the reform mainly consists of the introduction of a voucher system for program participants and a stricter selection of participants and program types by the case workers, relying on the expected reemployment probability of the participants. The aim of this reform is to increase the competition on the supply side of the "training market" and thereby to increase the quality of the training programs as well as to reach a better match of participants and programs. This paper analyses the employment effects of public sector sponsored training in Germany for unemployed individuals before and after the reform.

There exist several studies on the effectiveness of publicly financed training programs in Germany. Depending on the method, the investigation period and the underlying data set either negative, non-significant or positive results have been reported. Examples for insignificant or even negative effects are Lechner (1998, 1999, 2000), Hujer and Wellner (2000), Schneider et al. (2000) or Hujer, Thomsen and Zeiss (2004). Examples for papers that find inconclusive results are Hübler 1997 and Kraus, Puhani and Steiner (1999) and examples for positive findings are Fitzenberger and Prey (1998, 2000) or Lechner et al. (2005a, 2005b). Summarizing the literature it can be stated that positive effects mainly occur, if at all, in the long run and that studies finding long-term positive effects are reporting negative short-term effects.

Using a rich administrative data set for the years 2000 to 2004, we apply propensity score matching methods to estimate the average treatment effects on the treated. In contrast to other studies we distinguish between six different program types and between five regional types. Moreover we compare the pre-reform period to the post-reform period before and after January 2003.

We apply non-parametric estimation methods, i.e. a comparison of employment and unemployment probability differences between participants and non-participants over the time, and we additionally apply parametric methods. These proportional hazard rate models imply several parametric assumptions and are therefore more restrictive than the non-parametric estimators, but the results give us a more detailed insight in the processes on the labour market, i.e. on the average treatment effect on the job finding processes of the participants. This allows a differentiation between lock-in effect and the treatment effect after

the program, which is especially useful for long programs and relatively short observation periods.

The results show strong lock-in effects for all program types before and after the reform. For some of the programs we observe slightly but not sustainable positive effects on the employment probability. The treatment effects are heterogeneous and vary with the program type as well as with the previous unemployment duration. The reform seems to have a positive impact on the treatment effects.

Section 2 of this paper gives a short description of relevant labor market reforms and section 3 provides information on the data. Section 4 presents the applied methods, section 5 discusses the results and section 6 concludes.

2 Reforms of Further Vocational Training in Germany

A sweeping reform of further vocational training schemes was introduced in Germany in order to improve the (re-)integration of the unemployed into the labor market. Different instruments were set up as new devices to achieve this aim in a more effective way: (*i*) the introduction of a compulsory education voucher as a new allocation instrument to match those who are entitled to participate and the respective providers should initiate a considerable enhancement of the quality of continuing training by means of competition among the providers; (*ii*) a reinforced quality management by certifying the providing institutions and their respective FbW-programs; (*iii*) a modification of accessing rules.

The changes conducted in the course of the reforms concern access to measures as well as benefit payments came into force in staggered stages starting in the beginning of 2003.[1] However, the largest cut was made in early 2003 in the wake of the reorganization of access procedures to further vocational training measures, brought about by the statutory introduction of education vouchers and the introduction of a new quality management in the course of the administration reform of the FEA.

(*i*) Education Vouchers

All eligible schemes of further vocational training were to be maintained after the reform. Nevertheless, former access-rules were abolished. According to the new regulations which have been in force since January 2003, job-seekers have to make use of education vouchers to choose an FbW-course provider by their own choice. The chosen provider will then directly

1 The so called "Job-AQTIVE" law came into force already on January 1, 2002 and concerned regulations of maintenance allowances of further vocational training. The practice of setting-off residual unemployment benefit claims against maintenance allowance continuity payments was introduced then.

charge the FEA for the training fees. The selected educational institution is to present the education voucher to the FEA before the measure commences. Which kind of program-scheme is selected depends on the decision of the FEA case-worker. However, the decision is a result of a profiling-process where the potential candidate has to participate. The maximum duration of the further vocational training measure, the educational target and its main focus are documented by the voucher. Thus, the former twofold relationship where the FEA case-worker sent the unemployed individual directly to a specific provider without allowing for any active contribution of the unemployed – is now substituted by a triangular approach, which additionally contains the preferences of the unemployed with regard to the FbW-provider.

However, in the first two months of 2003 a *de facto* double tracked admission practice for further vocational training measures had been established due to the seamless introduction of education vouchers. Further vocational training measures which had still been approved in 2002 according to the former allocation practice as well as further vocational training measures allocated by education voucher coexisted during this early period. Therefore, the exclusive allocation of further vocational training measures via education vouchers is said to have started seriously with March 2003.

(*ii*) Quality Management

The goal of quality enhancement of the schemes should not solely be driven the unemployed who make use of vouchers. Thus, an additional quality management was set up. Since 2003 only those measures can be approved for further vocational training measures that have an overall continuance forecast of at least 70 percent for participants. In this case this is the time-related continuance rate of prior training measures (percentage of graduates whose unemployment spell ended within six months after the measure). Furthermore, the development of the regional labor market and expected labor demand are relevant for the rating of a measure. The measure-related continuance rate is also an indicator for the quality control of measures and educational institutions by the FEA, which is incorporated in the Agency's annual training target schedule.

The training target schedule of the Labor Agencies, which for the first time had been adopted for the year 2004 on October 31, 2003, will once a year record the results of the quality check of measures and providers of measures conducted by the Labor Agencies. The training target schedule is thus to facilitate the institutionalization of the above mentioned 70 percent regulations.

Since the middle of 2004, when the "Approval and Admission Ordinance of Continuing Training" went into effect on July, 1 2004, a third party certification agency has to certify that educational institutions and offers of further vocational training comply with legal requirements. Employment offices fulfilled this task themselves before. The ordinance provides that the transition to the new certification and approval procedure will be finished by the end of 2005. This ensures that providers of continuing training and certifiers have reasonable time to prepare for the new procedure. The labor agencies pay maintenance allowances and training fees for further vocational training only if the expert third party certification agency has ascertained that the educational institution and its training offers are in keeping with legal requirements. The independent, private third party certification agencies may award an educational institution a certificate after a successful assessment of its training offers and said institution itself, which may include an on site inspection. The ordinance governs details of the certification process and particularly substantiates the requirements in terms of quality of the educational institution and its training offers. Moreover, it facilitates and quickens the approval for training courses of educational institutions which have quality management at their disposal. The qualification and independence of the certification agencies must be checked and confirmed by an approval department with the FEA. The approval department gets support from an advisory board, which may express recommendations concerning the approval and certification process.

(*iii*) Modification of Accessing Rules

Beside the regulations regarding quality management which also could be described as a kind of detailed approach of selecting the FbW-schemes and their providers,

The 70 percent regulations refer to both an individual integration forecast and a measure-related continuance rate. First, the result of the individual integration forecast must be that it is "very likely" that a participant will find adequate employment after the completion of a specific measure. Although a rate of 70 percent is often mentioned in this context, such a rule is usually not being observed in daily practice since no empirical experiences with the individual case forecast exist. Instead, the responsible official draws on the qualifications of the participants, the conditions of the local labor market and the kind of further training intended and condenses them to a subjective success forecast based on his own professional experience. The integration forecast is prepared in a compulsory counseling interview with an employment counselor or job placement officer in which information gathered during

profiling may also be used. An examination by the medical or psychological service of the FEA may ensue after the interview.

3 Data

The data of our analysis are drawn as a random sample of the population of administrative records of the so-called “Integrated Employment Biographies” (IEB). This rich data set is a combination of individual records from the program participants’ master data set (MTG), the employees’ history (BeH), the benefit recipients’ history (LeH), and the job seekers’ data base (ASU/BewA).

The MTG contains basic information about participation in active labor market programs (including further vocational training) as well as important individual characteristics. Entries into ALMPs are identified from January 2000 on. The BeH comprises remuneration notifications of employers about employment subject to social contributions. This information is included in the IEB from 1990 on, but is incorporated in the IEB with a time lag of about 18 months. The LeH comprehends information about phases of benefit receipt from 1990 and onwards. Those benefits mainly include unemployment benefits, unemployment assistance, and maintenance allowances.

The IEB easily allows identifying specific groups of unemployed individuals. For instance, one can construct subgroups of participants in different further vocational training measures. The random sample of the IEB has been drawn conditional both on quarterly stratification with regard to participation in six different types of further vocational training and on a stratification related to previous duration of unemployment, sex and information on the region.. Hence, individuals had to be unemployed prior to participation in the further vocational training measure and information on the labor market region, on sex as well as on the type of further vocational training had to be available. Additionally, an age restriction was applied (17 to 65 years of age). Moreover, every participant could only be drawn once per quarter. Thus, multiple FbW-program entries of a person within a given quarter are not accounted for. According to these rules, only a marginal number of cases were excluded. Therefore, this IEB-random sample can be considered as representative.

With an annual sample of 1.100 participants per FbW-program type, the size of the random sample of the IEB was selected to be appropriately large enough to account for heterogeneities with respect to program types, individual characteristics of participants, and labor market regions. Furthermore, as the observation window already starts in January 2000, the staggered stages of the reforms of further vocational training were adequately covered. In

sum, our data comprises information about 29,700 entrants into six different types of further vocational training for 18 quarters from January 2000 until June 2004.

In order to apply the matching approach as described below, 80 non-participants were drawn per participant. Those individuals had to be in the same labor market status as the corresponding participant prior to program entry, i.e. normally they had to be previously unemployed for the same duration. Note that unemployment is defined here as being *not* regularly employed.[2] Furthermore, non-participants are required to not having participated in the respective further vocational training measure within the given reference quarter.[3] In sum, our data includes information on 2,376,000 non-participants that serve as control group.

Individual records are observed up to June 2004 with respect to unemployment and up the December 2003 with respect to gainful employment in our data. Therefore we face a substantial problem of right censoring for the post-reform period. Hence, the average observation window is substantially shorter in the post-reform period as compared to the pre-reform phase, especially if we want to evaluate the effects on employment probabilities.

4 Methodology

Our analysis is conducted by comparing employment and unemployment probabilities of participants and matched non-participants. For this purpose we follow the participants and the matched non-participants from the entrance of the participants into the programs onwards. Our evaluation strategy is twofold: First we compare the employment and unemployment probabilities based on a matched sample non-parametrically. The main advantage of this approach is that we do not need any functional form assumptions.

However, in the context of training programs, there often exist strong lock-in effects. For the evaluation of long programs or for evaluation studies with a relatively short observation period this may lead to wrong conclusions if one relies on the non-parametrical comparison of employment probabilities only. Therefore we additionally analyze the transition process of participants and non-participants from unemployment to employment applying parametric duration models. For this approach we use the matched sample of participants and non-participants, which ensures that the program participation can be assumed as exogenous. The duration model approach allows us to analyze whether the transition probabilities changed after the reform and we are able to compare the impact of the lock-in effect and the treatment effect after the program participation.

---

2 Hence, according to this definition e.g. also individuals employed in job creation schemes (JCS) are considered as unemployed.

3 We do not rule out that non-participants also enter further vocational training measures later in time.

Matching Approach

Evaluation generally has to deal with a serious problem if the effects of participating in a specific program should be quantified compared to that what would have been without doing so. This problem naturally arises because it is impossible to observe individuals in two different states of nature (participation and non-participation) at the same time and place. Therefore, it is the principle task of any evaluation study to find a credible estimate for the counterfactual state of nature (the so called evaluation problem).

Moreover, participants in active labor market programs are a selection of the unemployed in two regards. They both have been selected by an agent of the FEA and have selected themselves into the program under consideration. Therefore, a selection bias is supposed to result because participants are *not* a random sample of unemployed persons, but may instead differ systematically in important individual characteristics that are considered to be important determinants of labor market prospects.

When the selection bias is only due to observables, matching is a useful tool to estimate treatment effects and to solve the evaluation problem. Compared to regression type estimators, the most attractive feature of matching is its non-parametric nature. Matching neither imposes functional form restrictions such as linearity nor assumes a homogeneous treatment effect in the population.

Using covariate matching to correct the bias due to observables is intuitive, since the source of the bias is the difference of observables between treatment and comparison group. Matching on covariates by definition removes this difference and hence the bias. When there are many covariates, it is impractical to match directly on covariates because of the *curse of dimensionality*. Rosenbaum and Rubin (1983) have shown that while covariate is the finest balancing score, propensity score is the coarsest balancing score. Therefore, matching on covariates and matching on the propensity score will both make the distribution of the covariates in the treatment group the same as in the comparison group.

Formally, in the potential outcome framework, each individual has two potential outcomes (Y_{0i}, Y_{1i}) depending on the treatment status (e.g. participation vs. non-participation in further vocational training). Y_{1i} denotes the outcome if individual i is treated, and Y_{0i} is the outcome if individual i is not treated. Besides, let $T_i = 1$ indicate that individual i is treated, and $T_i = 0$

otherwise. With (Y_{0i}, Y_{1i}) we can define different treatment effects, such as those in Heckman and Vytlacil (1999), as follows:

$\Delta_i = Y_{1i} - Y_{0i}$	Treatment effect for individual i
$\Delta_{ATE} = E[\Delta_i]$	Average treatment effect for the population (ATE)
$\Delta_S = E[\Delta_i \mid i \in S]$	Average treatment effect for the sub-population S

Therefore, when $S=\{i:T=1\}$ Δ_s is the treatment effect on the treated (TT), denoted as Δ_{TT}.

The average treatment effect at the population (or sub-population) level can be estimated without bias by observational data if the selection bias is only due to observables. However, that the selection bias is in fact only due to observables is formally characterized by the following two assumptions:

[*CIA*]	$(Y_0, Y_1) \perp T \mid X$	Conditional independence assumption
[*CSA*]	$0 < prob(T = 1 \mid X) < 1$	Common support assumption

The symbol $\perp$ is the notation for statistical independence. The *CIA* is also commonly referred to as unconfoundedness assumption or exogeneity assumption.

Hence, it follows under *CIA* and *CSA*:

$$\begin{aligned}\Delta_{TT} &= E_{x|T=1}\{E[Y_1 \mid T=1, X=x] - E[Y_0 \mid T=1, X=x]\} \\ &= E_{x|T=1}\{E[Y_1 \mid T=1, X=x] - E[Y_0 \mid T=0, X=x]\} \qquad (1)\end{aligned}$$

Unbiased estimates of $E[Y_1 \mid T=1, X=x]$ and $E[Y_0 \mid T=0, X=x]$ can be obtained from the data and, thus, Δ_{TT} can also be estimated without bias. The same holds for Δ_{ATE} and Δ_S.

The so called balancing property formally looks as follows:

$$prop(X_i \mid T_i = 1, p(X_i) = p) = prob(X_i \mid T_i = 0, p(X_i) = p) = prob(X_i \mid p)$$

Using this property, Rosenbaum and Rubin (1983) have shown that *CIA* and *CSA* imply

[*CIA'*] $(Y_0, Y_1) \perp T \mid p(X)$

[*CSA'*] $0 < prob(T = 1 \mid p(X)) < 1$

It follows from *CIA'* and *CSA'*:

$$\begin{aligned}\Delta_{TT} &= E_{p|T=1}\{E[Y_1 \mid T=1, p(X)=p] - E[Y_0 \mid T=1, p(X)=p]\} \\ &= E_{p|T=1}\{E[Y_1 \mid T=1, p(X)=p] - E[Y_0 \mid T=0, p(X)=p]\} \qquad (2)\end{aligned}$$

Unbiased estimates of $E[Y_1 \mid T=1, p(X)=p]$ and $E[Y_0 \mid T=0, p(X)=p]$ can be obtained if $p(X)$ is known. The advantage of equation (2) over equation (1) is that instead of controlling for a high-dimensional vector X, formula (2) only needs to control for the scalar p.

The ratio of 1 to 80 between the number of treatment and control group observations ensures a sufficiently large matching potential to apply conditional propensity score matching here. This approach combines exact matching on a number of covariates with consecutive one-dimensional propensity score matching.

First, propensity scores for each of the six types of further vocational training are estimated by using the whole sample of non-participants (2,376,000 observations) and applying different specifications.[4] The choice of the appropriate specification was then based on balancing and Hotelling tests. Therefore, we allowed the number and nature of covariates for estimating the propensity score to differ between the types of further vocational training.

Subsequently, participants and non-participants are matched *within* cells. These cells include individuals that are homogeneous with respect to previous unemployment duration, labor market region, and gender. Hence, we ensure that matched pairs of participants and non-participants have exactly the same gender, are from the same labor market region, and have been previously unemployed for exactly the same period. Additionally, matched non-participants are not replaced, i.e. after a participant is matched with his or her nearest non-participant, the respective non-participants are no longer part of the matching pool.

Duration Models

The process of leaving unemployment in favor of paid labor can appropriately be modeled by a transition rate approach. Two potential destination states *q* are considered reflecting transitions to employment (*q=1*) and alternative transitions like for example other labor market policy measure or retirement (*q=2*). The hazard rate is defined as the limit of the conditional probability for the ending of a spell in interval [*t*;*t*+ *t*[given that no transition occurred before the start of this interval:

$$\lambda(t) = \lim_{\Delta t \to 0} \frac{P(t \le T < t + \Delta t \mid T \ge t)}{\Delta t} \qquad (3)$$

where *T* denotes the length of a spell. *T* is assumed to be a continuous, non-negative random variable. We assume proportional transition rates with covariates causing proportional

[4] For the implementation of all propensity score estimations the tool `psmatch2.ado` by Edwin Leuven and Barbara Sianesi is used.

shifts of a so-called baseline transition rate and interval constant covariates. The hazard rate $\lambda(t|x(t))$ corresponds to the sum of the two transition rates

$$\lambda(t|x(t)) = \sum_{q=1}^{2} \lambda_q(t|x(t))$$

with the transition probability to destination state *q* corresponding to

$$\lambda_q(t|x(t)) = \lambda_{0q}(t)\exp(x(t)\beta_q + \eta_q) \text{ with } (\eta_1, \eta_2) \sim N(0,0,\sigma_1^2,\sigma_2^2,\rho). \qquad (4)$$

$\lambda_{oq}(t)$ denotes the destination specific baseline transition rate, *x(t)* a time variant row vector of covariates, β_q a column vector of parameters and η_q a time invariant individual and destination specific error term, representing the joint influence of unobserved heterogeneity. We assume these error terms or random intercepts to be bivariate normally distributed with expected values 0, which allows for dependent competing risks.

Discrete-time measurement leads to the simplifying consequence that instead of continuous levels of $\gamma_{oq}(t)$ and *x*(*t*) only their interval specific mean levels have to be taken into account. Assumed that the time axis is divided into intervals of unit length, a given spell consists of a number of *k* intervals, in the following referred to as subspells. The *j*th subspell covers a range from *t* = *j*-1 to *t* + 1, but excluding *t* + 1. The interval specific means of $\gamma_{oq}(t)$ and *x*(*t*) are then denoted as $\gamma_{oq}(j)$ and x_j.

For the survivor function this implies:

$$S(j) = \exp\left(-\sum_{q=1}^{2}\sum_{k=1}^{j}\exp(x_{qk}\beta_k + \gamma_{qk} + \eta_q)\right) \text{ with } \gamma_{qk} = \ln\left(\int_{t_{k-1}}^{t_k} \lambda_{0q}(\tau)d\tau\right) \qquad (5)$$

The survivor function *S(j)* describes the probability that a spell lasts at least *j* intervals. The γ parameters are capturing the duration dependence of the baseline transition function. They may be interpreted as an interval specific mean of the baseline transition rate, which is equivalent to an interval specific constant baseline transition rate.

Following from this, the probability *f* of a transition to state *r* at a given interval *j* is given by the difference of two survivor functions multiplied by the share of the risk-specific transition rate at interval *j* related to the hazard rate at interval *j*.

$$f_r(j) = \frac{\exp(x_{rj}\beta_r + \gamma_{rj} + \eta_r)}{\sum_{q=1}^{2}\exp(x_{qj}\beta_q + \gamma_{qj} + \eta_q)}\left[S(j-1) - S(j)\right]. \qquad (6)$$

The likelihood contribution of a spell corresponds to

$$L(\beta,\gamma,\eta_1,\eta_2)=\frac{\exp(x_{1j}\beta_1+\gamma_{1j}+\eta_1)^{c_1}\exp(x_{2j}\beta_2+\gamma_{2j}+\eta_2)^{c_2}}{\sum_{q=1}^{2}\exp(x_{qj}\beta_q+\gamma_{qj}+\eta_q)}\left[cS(j-1)-(2c-1)S(j)\right] \quad (7)^5$$

whereby $c_1=1$ and $c_2=1$ indicate a transition to risk 1 and risk 2 in interval j, respectively, and c corresponds to the maximum of c_1 and c_2. It implies that right-censored spells are assumed to be censored at the end of the related interval, but that transitions may occur somewhere between j-1 and j. The likelihood contribution is not separable into destination-specific components as suggested by Narendranathan and Stewart (1993b) because we do not assume that transitions can only occur at the interval boundaries (see Roed and Nordberg 2003 or Jenkins 2004 for similar approaches). Therefore we can not estimate destination specific models separately, even in a model without unobserved heterogeneity.

[5] The corresponding likelihood is solved by applying Gauss-Hermite quadrature.

5 Results

In general, our analysis reveals quite heterogeneous effectiveness of the different types of publicly financed vocational training. But the general dilemma all program types are faced with is that the lock-in effect has to compensated by improvement of employment chances after participation. The lock-in effect consists of two parts: The probability of leaving a program and the duration of the programs. The reform goes along with a shortening of program duration, which has weakened the overall lock-in effects. On the other hand the probability of leaving the program has decreased after the reform, indicated by an increase in the coefficients of the lock-in effects in the estimated hazard rate models for some program types. This indicates that the fit between participants and programs has been improved, i.e. it seems to be more attractive for the participants to finish the training program after the reform. This may be due to a higher quality of the programs or due to a better match of the preferences of participants and programs.

Some of the analysed program types failed with respect to employment probabilities, while other were moderately successful. However, the analogous observation of the probability of unemployment suggests that most measures had no significant, positive effect before the reform. The phenomenon of increasing the probability of employment without decreasing the probability of unemployment is explained by the fact that participation in a training measure managed to cause persons, who otherwise would have withdrawn from the labor force, to return into employment.

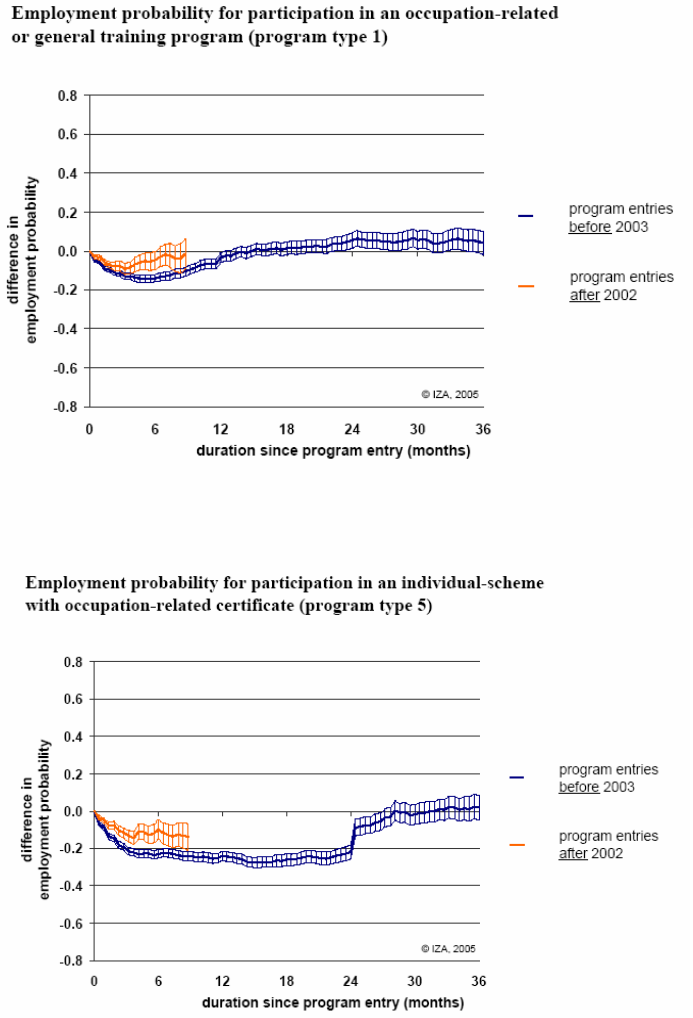
Due to the reform, the effects of measures concerning the probability of employment as well as of unemployment have noticeably improved for most of the six program types. The reform effect seems to be strongest, when program entries take place between the 4th and 12th month of unemployment.

Selected results for two program types

Figure 1 presents the non-parametric estimation results of one short program type, “occupation-related or general training program” (program type 1), and one long program type, “individual-scheme with occupation-related certificate” (program type 5). The development of the differences between participants’ and matched non-participants’ probability of employment is being observed, starting from the point of the participant’s entry into a measure. For the shorter program before the reform we observe a significantly positive effect after 24 months. The magnitude is about 5 percentage points and the effect seems to be not sustainable. For the long program type we do not observe any positive effect. However,

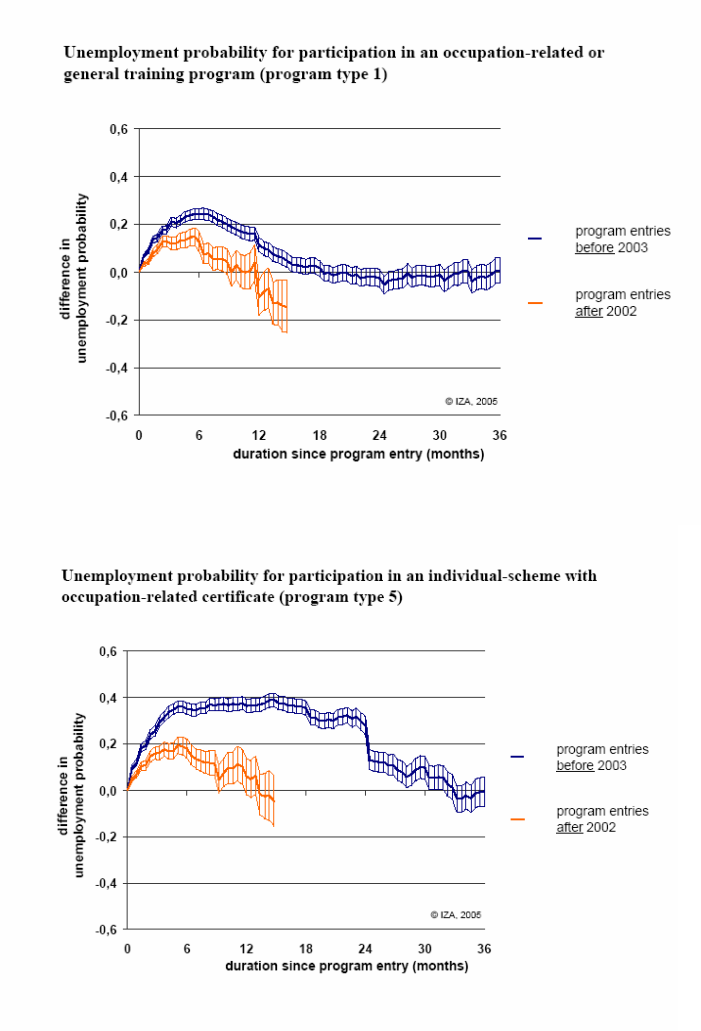
this program type lasts in general for two years. In Figure 2 the corresponding unemployment probabilities are presented. Participation in program type 1 does not decrease the probability of unemployment, although we observe an increased employment probability. Parcitipation in program type 1 seems to increase the employment probability of individuals who would otherwise leave the labour market, i.e. would not be employed nor unemployed.

Figure 1: Employment effects for selected program types



The reform increases the probability of employment for both program types during the first nine months. The unemployment probability is observed for a longer period (15 months) and a total reduction of the unemployment risk by around 10 percentage points is observed for program type 1 after the reform, 15 months after program entrance. For program type 5 we do not observe any positive effect but the reform leads to a clear decrease in the unemployment probability difference between participants and the control group.

Figure 2: Unemployment effects for selected program types



[to be completed: further discussion of treatment effects for several subgroups and program types]

[to be completed: Tables and Figures presenting results and descriptive statistics]

6 Conclusion

In 2003 a reform of the German active labor market policy was introduced. With respect to public sector sponsored training for unemployed individuals the reform mainly consists of the introduction of a voucher system for program participants and a stricter selection of participants and program types by the case workers, relying on the expected reemployment probability of the participants. The aim of this reform is to increase the competition on the supply side of the "training market" and thereby to increase the quality of the training programs as well as to reach a better match of participants and programs. This paper analysis the employment effects of public sector sponsored training in Germany for unemployed individuals before and after the reform.

Using a rich administrative data set for the years 2000 to 2004, we apply propensity score matching methods to estimate the average treatment effects on the treated. In contrast to other studies we distinguish between six different program types and between five regional types. Moreover we compare the pre-reform period to the post-reform period before and after January 2003.

The results show strong lock-in effects for all program types before and after the reform. For some of the programs we observe slightly but not sustainable positive effects on the employment probability. The treatment effects are heterogeneous and vary with the program type as well as with the previous unemployment duration. The reform seem to have a positive impact on the treatment effects. In order to address the long-term effects of the reform as well as long-run effects of the different program-types, new data for 2004/2005 will be used.

Literature

Fitzenberger, B. und H. Prey (1998): Beschäftigungs- und Verdienstmöglichkeiten von Weiterbildungsteilnehmern im ostdeutschen Transformationsprozess: Eine Methodenkritik. In: Pfeiffer, F. und W. Pohlmeier (Hrsg.): Qualifikation, Weiterbildung und Arbeitsmarkterfolg. ZEW Wirtschaftsanalysen, Bd.31, Baden Baden: Nomos, S. 39-96.

Fitzenberger, B. und H. Prey (2000): Evaluating Public Sector Sponsored Training in East Germany, Oxford Economic Papers, 497-520.

Heckman, James J., and Edward J. Vytlacil (1999): "Local Instrumental Variables and Latent Variables Models for Identifying and Bounding Treatment Effects", *Proceedings of the National Academy of Sciences*, 96, 2, pp. 4730 – 4734.

Hübler, O.(1997): Evaluation beschäftigungspolitischer Maßnahmen in Ostdeutschland, Jahrbücher für Nationalökonomie und Statistik, 216, 21-44.

Hujer, R. und M. Wellner (2000): Berufliche Weiterbildung und individuelle Arbeitslosigkeitsdauer in West- und Ostdeutschland: Eine mikroökonometrische Analyse, Mitteilungen aus der Arbeitsmart- und Berufsforschung, 33, S.405-419.

Hujer, R., S.L. Thomsen und C. Zeiss (2004): The Effects of Vocational Training Programmes on the Duration of Unemployment in Eastern Germany. mimeo.

Jenkins, Stephen P. (2004): Independent competing risks models for interval-censored survival time data. Unpublished Paper, ISER, University of Essex

Lechner, M. (1998): Training the East German Labour Force. Microeconometric Evaluations of Continuous Vocational Training after Unification. Heidelberg: Physica-Verlag.

Lechner, M. (1999): Earnings and Employment Effects of Continuous Off-the-Job Training in East-Germany after Unification, Journal of Business Economic Statistics, 17, 74-90.

Lechner, M. (2000):An Evaluation of Public-Sector-Sponsored Continuous Vocational Training Programs in East Germany, Journal of Human Resources, 35, 347-375.

Lechner, M., R. Miquel und C. Wunsch (2005a): The Curse and Blessing of Training the Unemploymed in a Changing Economy. The Case of East Germany After Unification, IAB Discussion Paper No.14/2005.

Lechner, M., R. Miquel und C. Wunsch (2005b): Long-Run Effects of Public Sector Sponsored Training in West Germany, IAB Discussion Paper No.3/2005.

Narendranathan, Wiji, and Mark .B. Stewart (1993): Modeling the Probability of Leaving Unemployment: Competing Risks Models with Flexible Base-line Hazards, *Applied Statistics*, 42, 63-83.

Roed, Knut and Morten Nordberg (2003): Temporary layoffs and the duration of unemployment, *Labour Economics*, 10, 381-398.

Rosenbaum, Paul R., and Donald B. Rubin (1983): "The Central Role of the Propensity Score in Observational Studies for Causal Effects", *Biometrika*, 70, pp. 41 – 55.