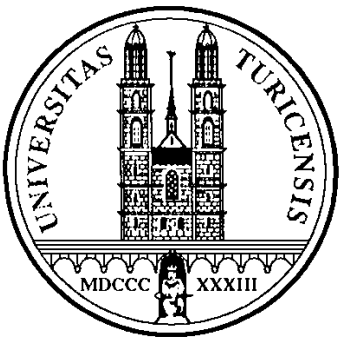

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The Impact of Active Labor Market Programs on the Duration of Unemployment

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Rafael Lalive[*], Jan C. van Ours[†] and Josef Zweimüller[‡§]

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Abstract

In 1997, the Swiss government introduced active labor market programs on a large scale to improve the job chances of unemployed workers. This paper evaluates the effect of these programs on the duration of unemployment. Our evaluation methodology allows for selectivity affecting the inflow into programs. We find that in most cases the programs do not reduce the duration of unemployment. The exception is the program of temporary wage subsidies which reduces unemployment, but only for foreign workers. From a cost-benefit point of view, temporary wage subsidies seem to be the only program worthwhile pursuing. (95 words).

Keywords: active labor market policy, treatment effect, multivariate duration model

JEL Classification: C14, C41, J64

[*]IEW, University of Zurich.

[†]CentER, Department of Economics, Tilburg University, IZA, CEPR, and Institute for Labor Studies (OSA), e-mail: vanours@kub.nl.

[‡]Corresponding Author. IEW, University of Zurich, IZA, and CEPR. Address: IEW, Blumlisalpstr. 10, CH-8006 Zurich, Tel. +41-1-634-3724, Fax. +41-1-634-4907, e-mail: zweim@iew.unizh.ch.

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1 Introduction

The aim of the present paper is to study the impact of active labor market policies (ALMPs) on the duration of unemployment in Switzerland. The new Swiss ALMPs reflect the increasing consensus among policy makers that actively assisting the unemployed in job search is preferable to simply providing them with passive income support. The danger is, so the argument goes, that reliance on passive income support may reduce work incentives and job-search activities and therefore increase the risk of long-term unemployment. ALMPs are seen by many as the key to minimize these risks.

Despite the agreed importance of ALMPs the success of the adopted programs has been mixed for most countries. In a recent overview of Swedish ALMPs Calmfors et al. (2001) concludes that the effects are rather disappointing. Swedish studies show for example that labor market training has no or negative employment effects, whereas many studies indicate that programs have a locking-in effect, which is the case if participants are not willing to exit from the programs before they are completed. Furthermore, it does not seem to be a good idea to use ALMPs as an income support measure (Calmfors et al., 2001). Martin and Grubb (2001) draw similar conclusions in their overview on what works and what does not work among ALMPs in OECD countries. They conclude, for example, that subsidies to employment and direct job creation have been of little success in helping unemployed get permanent jobs. Heckman et al. (1999) also give an overview of the dispersion in the effects of ALMPs.

The question how participation in ALMP-measures affects labor market histories of individuals has been the subject of substantial debate in the econometric literature. In this literature, the main problem usually concerns the possible endogeneity of ALMP-participation (See Heckman et al., 1999). The problem is that labor market outcomes for participants may be systematically different from non-participants for reasons (other than ALMP-participation as such) that are unobservable to the researcher. This is the well-known selection problem. In Switzerland, like

in most European countries, but unlike in the U.S., randomized social experiments are uncommon, so one has to deal with non-experimental data. In theory, several methods can be used to estimate the treatment effects on ALMPs. Each of these matters deals with the selection problem under different assumptions (Heckman et al., 1999). In the case of unemployment duration as variable of interest two methods are particularly useful. The first one is the '*method of matching*', the second one is the '*timing of events*' method.

The method of *matching* is based on the conditional independence assumption. That is, if many variables that influence both labor market outcomes and the selection process are observed, outcomes and selection are independent conditional on the observables. The identifying assumption is that, after accounting for many observable variables (including individual's past labor market performance), no unobserved heterogeneity correlated with labor market programs and program participation is left. Among the many studies that use the matching approach, the study of Gerfin and Lechner (2000) is of interest here as they also evaluate the effect of Swiss ALMPs on unemployment duration. They find that employment programs perform very poorly, vocational training programs show a rather mixed performance depending on the specific subprogram considered, whereas the temporary wage subsidy appears to be a successful program in terms of increasing the chances on the labor market.[1]

The present paper employs the *timing-of-events* method to study the impact of ALMPs on unemployment duration. This method applies a multivariate duration model in which both the inflow into an ALMP program and the outflow from unemployment are specified and allowed to interact. Generally, in multivariate duration models the variation in the durations at which treatment is administered to individuals, and data on the corresponding pre- and post-treatment durations can be exploited to identify the treatment effect. The identifying assumption is that transition processes can be modeled as mixed proportional hazards specifications. The intu-

[1]For a further matching study that also looks at the impact of ALMPs in Switzerland see Prey (2000).

ition is that, under this assumption, information on the correlations between the unobserved heterogeneity components in the exit from unemployment and the entrance into ALMPs can be obtained from (i) the duration until the program starts and (ii) the duration of unemployment. Because unobserved heterogeneity components are modelled explicitly, the treatment effect is estimated conditional on observed and unobserved variables taking into account that the unobserved variables may influence both processes. A formal proof of this is given in Abbring and Van den Berg (2000).[2]

We discuss identification issues of the timing-of-events method in more detail below. The main advantage is that for identification of the treatment effect it is *not necessary to have a valid instrument.* Given that economic theory does not suggest a natural instrument, this is a particularly useful feature of this approach.

The timing-of-events method is relatively new and has been applied in a small number of previous studies. Gritz (1993), for instance, considers the impact of training on the employment experience of American youths and Bonnal et al. (1997) study the effect of public employment policies set up in France during the 1980's. Both studies deal with the potential selectivity of the inflow into the treatment state by allowing related unobserved heterogeneity terms to affect both the inflow into treatment and the inflow into other labor market positions. In these studies, 'treatment' has been modeled as a separate labor market state. Other studies assume that the job finding rate shifts to another level at the moment a worker enters a program, a shift which Gritz (1993) calls an 'incidence effect'. Applications of this approach are Abbring et al. (1997) and Van den Berg et al. (1998) who study the effect of benefit sanctions on the transition rate from unemployment to employment. Both studies find a significant positive effect of benefit sanctions on the transition rate from unemployment to a job.[3]

[2]Van den Berg (2000) presents an overview of duration models and has a general discussion on the use of duration models in estimating treatment effects.

[3]In the study by Van den Berg et al. (1998) it is shown that if unobserved heterogeneity is not accounted for, no effect of sanctions is found. In Lubyova and Van Ours (2000) the effectiveness of temporary jobs in the

The plan of the paper is as follows. In the next section we describe the Swiss labor market policy in more detail. In Section 3 we provide specific information on our data set, a weighted random sample of entrants into unemployment in Switzerland over the four–months period December 1997 to March 1998. The data come from administrative records and contain detailed information not only on a standard set of individual characteristics but also on the timing and duration of ALMP-participation. Section 4 discusses the identification of the treatment effects in more detail and presents the empirical model. The results of our analysis are presented in Section 5. Section 6 concludes.

2 Labor market policy in Switzerland

The Swiss government enacted in 1997 a reform of unemployment insurance that constituted a change away from passive income maintenance towards active measures. The new law obliged the Swiss cantons to supply a minimum number of ALMP-places per year. Economy-wide, these requirements add up to a stock of 25,000 places. This compares to an average stock of unemployment of about 188,000 individuals in 1997 and about 140,000 in 1998. There are few strict guidelines regarding the allocation of job-seekers to ALMPs. An ALMP must aim at retraining the job seeker in skills that are directly useful for his or her occupation. Other than this, the actual selection process is characterized by heterogeneity. Employment service staff decides on participation based on subjective evaluation of the job-seekers employment prospects. A job-seeker is not allowed to refuse participation once he or she is assigned to participate in an ALMP. Refusal to participate results in withholding of benefit payments for a period of 1 to 30 days.[4]

Slovak Republic is investigated. If selectivity is accounted for, treatment has a positive effect on the transition from unemployment to a regular job. Van Ours (2001) extends this analysis by also examining the job separation rates for those unemployed that find a job after having entered a temporary subsidized. He also finds that it is important to account for initial selectivity of the inflow into these jobs.

[4]See Lalive, van Ours and Zweimüller (2002) for an evaluation of the Swiss sanction system.

The ALMP-measures supplied by the regional placement offices can be divided into three categories:

1. Training courses, of which several types can be distinguished:

   a. Courses to improve basic skills. These courses usually last 3 weeks and aim at improving the effectiveness of individual job search (how to write application letters, how to behave at job talks) and self-esteem. The courses try to provide unemployed workers with skills for finding jobs. Part of the courses is intended to give an overview of the available ALMPs.

   b. Language courses. These courses last about 2 months and include reading and writing skills. Language courses are more likely to be attended by foreigners but also native Swiss attend these courses frequently.

   c. Computer courses. These courses last about 3 weeks and refer to basic word processing and spreadsheet calculation.

   d. Other courses. These courses last about 2 months and concern a rather heterogeneous group of course types, including specific computer training, business administration, technical training, courses in the tourism and the health sector.

2. Employment programs. These refer to temporary jobs in the non-profit sector, which last about 5 months.

3. Temporary wage subsidies. This is a program that encourages job seekers to accept job offers that pay less than their unemployment benefits by compensating the difference such that the job seeker is slightly better off than without a subsidized job.

Table 1

Table 1 presents detailed descriptive statistics on the programs. These statistics, based on the dataset we describe in more detail in the next section, indicate that in terms of participants

training courses and temporary wage subsidies are the most important programs. Unemployed workers enter a program after about 3 months of unemployment but the variation is considerable as can be seen from the standard deviation of the elapsed unemployment duration at program entry. On the one hand there is no deterministic schedule when individuals can enter a program. On the other hand there were limitations in the supply of ALMPs which created variation in the unemployment duration at ALMP-entry.

An important feature of the training courses is that a large part of the participants attends a second program later on. Therefore, it could be the case that part of the unemployed workers on these courses already anticipate that they will enter a second program later on. Attending a second program is far less important for participants in employment programs and hardly occurs for those with temporary wage subsidies.

It is worth noting that various programs also differ in terms of hours spent on the program. Training courses typically require weekly hours equivalent to a part-time job, whereas the time-intensity of employment programs are equivalent to a full-time job. Jobs with a wage subsidy can be either full- or part-time. Finally, one should note that training courses and employment programs involve costs that go beyond the payment of individual benefits. This is not the case for temporary wage subsidies. Here, benefits are used only to supplement wage. In terms of costs the temporary wage subsidies are rather cheap.

The new law increased maximum benefit entitlement and, at the same time, created a close link between unemployment benefit entitlement and participation in an active measure. For a newly unemployed the maximum entitlement period is 104 weeks, up from originally 80 weeks.[5] This entitlement period is divided into two different parts. For at most 7 months the job-seeker can receive unemployment benefits, unconditional upon participation in an active measure. For the remaining 17 months unemployment benefits are paid only if the unemployed is willing to

[5]The above entitlement regulation holds for an individual who has been employed and has contributed to the insurance system for at least 6 within the last 24 months.

participate in a measure. The actual application of this rule is not as rigid and mechanic. If no appropriate ALMP-slots are available for an unemployed worker whose unconditional entitlement is exhausted, the unemployed continues to receive benefits subsequently.

As mentioned by the OECD (1996), the new Swiss unemployment insurance system is an ambitious one. Compared to other countries that require the unemployed to enter programs in order to be entitled to unemployment benefits, the Swiss rules are different in at least two important respects. First, the intervention takes place at a rather early stage of the unemployment spell, after seven months. And secondly, benefit payments are conditional upon ALMP-participation and this participation *does not* lead to a new benefit entitlement.

3 Data

The data set from which we drew our sample, covers all unemployment entrants in Switzerland over the period December 1997 to March 1998 and follows these individuals up to the end of May 1999. These data come from administrative records of the State Secretariat for Economic Affairs (AVAM- and ASAL-data base). Among the 70,445 workers who started an unemployment spell during the above period we concentrate our empirical analysis on a subsample of those workers for whom we could match the information of the AVAM- and ASAL-data base with information from social security records (AHV-data). The latter provide detailed information on the individuals' earnings and employment history over the last 10 years prior to the unemployment spell.

We had only limited access to the social security records. These sample available to us contains a 50% random sample of the inflow in December 1997, and a 30% random sample of the inflow from January 1998 to March 1998. In the analysis in section 5 we account for this by weighting each observation by the inverse of the probability of being in the random social security sample. The matched sample contains information on 23,562 unemployment spells. To guarantee uniform benefit entitlement, we excluded all job seekers who were not entitled to

unemployment benefits (2,719 spells), were re-entering unemployment within a period of two calendar years (2,443 spells) or were aged younger than 20 years or aged older than 49 years (2,083 spells). The second and third category of job seekers were excluded because for re-entrants the time until benefit exhaustion depends on the duration of the previous unemployment spell. Also, the duration of unconditional benefit exhaustion is longer for workers aged 50 or older. Job seekers who are younger than 20 are likely to be in between two spells of training and thus not comparable to the other part of the job seekers. Finally, to get a more homogeneous sample 268 disabled workers, 410 foreign workers with an asylum seeker or seasonal permit, and 2,143 workers whose employability was rated to be very poor were excluded.[6] The sample on which our empirical estimates are based contains 13,496 job seekers.

Figure 1

To account for heterogeneity in the programs we distinguish between training courses, (public) employment programs and wage subsidies. Figure 1 shows the monthly empirical hazard rates for transitions to jobs, training programs, employment programs, and wage subsidies.[7] The job hazard rate is increasing in the initial stage of the unemployment spell and reaches a high of 14 % after a duration of 3 months. Thereafter the hazard rate decreases and falls back to 5 % for the long-term unemployed. Both, the empirical entry-rate to classroom training courses and the entry-rate to wage subsidies have a shape similar to the job-exit rate, but at a lower level. The picture is less clear for employment programs where the empirical hazard rate varies relatively little with duration.

[6] Information on employability is from the official at the public employment service. This is a subjective rating of the job seeker by the program administrator which takes values 1 through 5. Levels 4 and 5 exhibit substantially worse employment chances than levels 1 through 3. We definded levels 4 and 5 to be poor employability and excluded those workers to get a homogeneous subsample.

[7] The transition rates are account for censoring by the Kaplan-Meier method.

4 Modelling treatment effects

4.1 Identification

We use the model of potential outcomes of Roy (1951) and Rubin (1974) to discuss the identification problem. Our focus is on the effect of participating in an ALMP (the 'treatment') on the exit rate out of unemployment to a regular job (the 'outcome'). We define $\theta_u^0(t)$ as the transition rate from unemployment to jobs without treatment, and $\theta_u^1(t)$ as the transition rate to jobs with treatment. Furthermore, we define D as the indicator variable that takes the value 1 if an individual is observed participating in the program before he or she exits to a regular job. If t_u is the time (unemployment duration) at which a transition to a job occurs, and t_p is the time at which treatment in the program starts, then $D \equiv I(t_p < t_u)$.[8] With these definitions, we can write the observed transition rate from unemployment to a job (the actual outcome) as $\theta_u(t) = D\ \theta_u^1(t) + (1 - D)\ \theta_u^0(t)$.

Note that programs are not considered to be separate states, but once an unemployed worker enters a program, we assume there is a shift in the transition rate from unemployment to a regular job. Note further that this shift combines a possible lock-in effect (lower search intensity *during* program attendance) with a possible skill-enhancement effect (better job chances *after* treatment).

An evaluation study usually aims at identifying the effect of a program on participants in that program. This is the *effect of treatment on the treated* which is defined as

$$\exp(\delta) = \frac{\theta_u^1(t|D=1)}{\theta_u^0(t|D=1)}. \tag{1}$$

So $\exp(\delta)$ is the shift factor by which the transition rate to jobs changes because of participation in a program.

[8] The indicator variable $I(.)$ takes value 1 if the expression is true and 0 otherwise.

The problem in every evaluation study is that the 'counterfactual' outcome for participants, $\theta_u^0(t|D=1)$, which is the outcome in the hypothetical state of non-participation cannot be observed (Holland, 1986). Hence the effect of treatment on the treated cannot be identified without further assumptions. A frequently used identifying assumption is the 'conditional independence assumption' (CIA), according to which the outcome, conditional on observed characteristics, is independent of the treatment status. In terms of hazard rates CIA implies $\theta_u^0(t|x, D=1) = \theta_u^0(t|x, D=0)$. If CIA holds, the effect of treatment on the treated can be identified by comparing hazard rates of individuals with identical observable characteristics.

CIA is the identifying assumption in the *method of matching*, to which we have referred in the introduction.[9] This non-parametric identification strategy is appealing because it imposes no functional form restrictions and allows for heterogeneity in the effect of treatment on the treated. The requirement is that the dataset is sufficiently rich such that, given the available data, all systematic differences between participants and nonparticipants can be accounted for. The ideal situation is one in which participation in ALMPs is determined randomly conditional on observables.

In Switzerland, the process of allocating job seekers to ALMPs is characterized by substantial heterogeneity on the part of the public employment service and on the part of the job seeker (Section 2). Job seekers meet once a month with the employment service to decide on participation. Thus, unobservable information that affects participation in the program and labor market chances may play a role (i.e. perceived program success). Second, in the dataset there is no information on objective variables that may be important in determining selection into ALMPs, the most important of these being education. Finally, the ALMP system was relatively new at the time of the present analysis. Thus, there is no information in the dataset on the previous training history by the job seekers. This is an important source of unobserved heterogeneity

[9] Heckman et al. (1997) discuss the properties of the matching estimator in detail

that determines participation as well as labor market success.

Thus it is unlikely that participants and nonparticipants do not differ with respect to unobservables that jointly determine participation in the program and unemployment duration. Therefore, we use the '*timing-of-events*' methodology which employs a semi-parametric identification strategy to address self-selection into programs. Doing this requires simultaneous modelling of the transition from unemployment to a job and the transition from unemployment to a program.

The presence of unobserved heterogeneity is captured by allowing for characteristics v_u that are unobserved but which affect the transition rate to jobs . The semi-parametric identification strategy is characterized, essentially, by two assumptions. The first assumption holds that, conditional on observables x *and* unobservables v_u, participation is independent of potential outcomes. This is the *independence*-assumption which implies that

$$\begin{aligned} \theta_u^0(t|x, D &= 1, v_u) = \theta_u^0(t|x, D = 0, v_u), \text{ and} \\ \theta_u^1(t|x, D &= 1, v_u) = \theta_u^1(t|x, D = 0, v_u). \end{aligned} \tag{2}$$

Potential outcomes are the same for treated and non-treated individuals, conditional on observables and unobservables. This restriction is less severe than the assumptions needed in order to identify the average effect of treatment. In particular, we only assume that participation conditional on observables *and unobservables* is independent of potential unemployment durations.

The second important assumption holds that the covariates x and v_u enter the hazard multiplicatively separable from elapsed duration t. This is the *mixed proportional hazard* assumption that is standard in duration analysis (Van den Berg, 2000) and which may be written as

$$\theta_u(t|x, D, v_u) = \lambda_u(t) \exp(x'\beta_u + \delta D + v_u). \tag{3}$$

$\lambda_u(t)$ captures the effect of elapsed duration and β_u is a parameter vector measuring the impact of observable characteristics on the transition rate to a job.

As mentioned above, addressing the problem of possible self-selection into programs requires simultaneous modelling of the transition rates both to a regular job and to programs. This is because self-selection means D and v_u are not independent. It is assumed that also the transition process from unemployment to an ALMP takes the proportional hazard form

$$\theta_p(t|x, v_p) = \lambda_p(t) \exp(x'\beta_p + v_p) \tag{4}$$

where θ_p denotes the transition rate from unemployment to program p, $\lambda_p(t)$ and β_p capture, respectively, the effect of elapsed duration and of observable characteristics, and v_p is the unobserved heterogeneity component of the inflow into the program. The joint distribution of the unobserved heterogeneity components is denoted by $G(v_u, v_p)$.

Abbring and van den Berg (2000) show that the model (3) and (4) is identified. The critical assumptions are the proportionality and independence assumptions mentioned above. Given the proportionality assumption, the semi-parametric identification strategy is more restrictive than the non-parametric identification strategy where no assumption about the functional form is needed. The independence-assumption, however, is *less* restrictive as this condition relates to observables *and unobservables.* Specifically, the model allows for different effects among individuals with identical *observable* characteristics due to possible differences along the *unobservable* dimension. Moreover, the semi-parametric identification strategy allows explicitly for the fact that participants may self-select into training based on information that is not observable to the econometrician.

Intuitively, the timing-of-events method uses variation in unemployment duration and in duration until the start of the first program (conditional on observed covariates) to identify

the unobserved heterogeneity distribution.[10] As mentioned above, this variation is due to two sources, as there is no deterministic rule when individuals can enter a program. Moreover, there were limitations in the supply of ALMPs that created variation in the participants' elapsed unemployment duration at ALMP-entry. In order to correct for possible selectivity one needs (conditional on observed characteristics) homogenous subsamples. Introducing unobserved heterogeneity allows one to work with such homogenous subsamples. This method compares the transition rate from unemployment to regular jobs of individuals within a homogenous group after the ALMP has started.

The timing-of-events method has a number of advantages. First, it addresses explicitly the fact that participation in a program may be selective. By accounting for unobservables in the selection process and the outcome process, the 'causal' effect of the treatment is identified. Second, there are no exclusion restrictions needed in order to provide identification. This is particularly advantageous since there is no formal way to select 'valid' instruments and because there is no instrumental variables estimator in duration analysis. Third, the estimator is semi-parametric. While we do assume that covariates shift the hazard in the same proportion irrespective of elapsed duration of unemployment, the model allows for complete flexibility in the treatment effect, baseline hazard and in the effect of other covariates.

To avoid biased estimates of the impact of ALMPs on unemployment durations it is necessary that individuals do not anticipate future events. If an unemployed worker knows that he or she will have to attend an ALMP in the future, he or she may start to search for a job more strongly.[11] For that reason the effect of that ALMP will be underestimated. There are several reasons why such anticipation effects cannot be of great significant in the case of Swiss ALMP-programs. First, the time between assignment to a specific program and the actual start of the program is

[10] Note that it is important to have data on observed covariates affecting the transition rate to jobs and the transition rate to the program to separately identify unobserved heterogeneity and the effect of observed covariates with single spell data (Honoré 1993).

[11] Black et al. (1998) find that the threat of training may be more effective than training itself in getting the unemployed back to work.

usually short, in the range from one to two weeks. Second, an unemployed worker cannot just start any program. There has to be a vacant slot and if there is one, staff at the employment service has to approve of participation. Moreover there is competition between unemployed workers for vacant slots. Third, job seekers are required to continue to search for jobs until training has started. Nevertheless, section 5 investigates the potential impact of anticipation effects on the estimated effects of ALMPs on the transition rate to regular jobs.

4.2 The empirical model

The empirical model we will estimate below allows for not only one but three different programs. Training courses are indexed by c, employment programs by e, and wage subsidies by w. This means we distinguish four transition rates: from unemployment to a regular job, from unemployment to a training course, from unemployment to an employment program, and from unemployment to a subsidized job. Define t_c (t_e, t_w) the time from the start of the unemployment spell until either the start of the first training program (employment program, wage subsidy) or the start of a regular job. Redefine $t_p = min(t_c, t_e, t_w)$ as the duration until the first program starts. Define $D_c = I[t_p = t_c, t_p < t_u]$, $D_c = 1$ if the first transition to an ALMP is a transition to the training program and the transition is observed before a regular job starts, $D_c = 0$ otherwise. Equivalently, define $D_e = I[t_p = t_e, t_p < t_u]$, and $D_w = I[t_p = t_w, t_p < t_u]$. The transition rate to jobs is

$$\theta_u(t|x, D_c, D_e, D_e, v_u) = \lambda_u(t) \exp(x'\beta_u + \delta_c D_c + \delta_e D_e + \delta_w D_w + v_u). \tag{5}$$

We estimate three treatment effects $(\delta_c, \delta_e, \delta_w)$. The four parameter vectors $(\beta_u, \beta_c, \beta_e, \beta_w)$ are estimated using (5) and (4).

In addition to these parameters we have to specify the empirical implementation of (i) the baseline hazard rate and (ii) the assumption about the joint distribution function of the

unobserved heterogeneity components v_u and v_c, v_e, and v_w. For all four processes we model flexible duration dependence by using a step function

$$\lambda_x(t) = \exp(\Sigma_k(\lambda_{x,k}\ I_k(t)) \tag{6}$$

where $x = u, c, e, w$ indexes the various processes, $k = 1, .., 4$ is a subscript for time-intervals and $I_k(t)$ are time-varying dummy variables for the following time intervals: 0-3 months, 3-6 months, 6-12 months and 12 and more months. Because we also estimate a constant term, we normalize $\lambda_{x,1} = 0$.

It remains to specify $G(v_u, v_c, v_e, v_w)$, the joint distribution of the unobserved characteristics v_u, v_c, v_e, v_w. We assume G to be a multivariate discrete distribution of unobserved heterogeneity. Work by Heckman and Singer (1984) suggests that discrete distributions can approximate any arbitrary distribution function G. We assume that each transition rate has two points of support $(v_{u,a}, v_{u,b})$ for the exit rate out of unemployment to a regular job and $(v_{p,a}, v_{p,b})$ for the transitions into the programs, $p = c, e, w$. Because we distinguish between 3 programs and one outcome process, this implies that the joint distribution has 16 mass points. The associated probabilities are denoted as

$$\begin{aligned}
Pr(v_u &= v_{u,a}\ ,\ v_c = v_{c,a}\ ,\ v_e = v_{e,a}\ ,\ v_w = v_{w,a}) = p_{aaaa} \\
Pr(v_u &= v_{u,a}\ ,\ v_c = v_{c,a}\ ,\ v_e = v_{e,a}\ ,\ v_w = v_{w,b}) = p_{aaab} \\
&\ldots \\
Pr(v_u &= v_{u,b}\ ,\ v_c = v_{c,b}\ ,\ v_e = v_{e,b}\ ,\ v_w = v_{w,b}) = p_{bbbb}
\end{aligned} \tag{7}$$

The construction of the likelihood function is discussed in the appendix.

5 Estimation results

This section discusses the estimated effects of ALMP participation on the transition rate to a regular job. Both, results based on the assumption that there is no unobserved heterogeneity and results allowing for correlated unobserved heterogeneity are reported (Table 2). This allows discussing the impact of selectivity on the estimated treatment effects. We also report the effect of selected individual characteristics on the transition rate to jobs, training programs, employment programs and wage subsidy (Table 3). Moreover, four sets of sensitivity analyses are presented in Tables 4 to 7. First, we investigate whether the effect of ALMP participation differs with respect to nationality and gender (Table 4). Second, we analyze whether the treatment effect varies with the duration after the start of the program (Table 5). This is interesting because our estimates of the treatment effect combine a possible *'locking-in' effect* (lower search intensity *during* program attendance) with a possible *skill-enhancement effect* (improved chances to get a job *after* treatment) of the program on the transition rate to jobs. A third sensitivity analysis reports results based on a model that allows for separate selection processes for four different types of training programs (Table 6). The final sensitivity analysis discusses the importance of anticipation effects (Table 7).

Table 2

Estimates that do not account for selectivity in the inflow into the programs show that temporary jobs (in the non-profit sector) and training programs have a negative and significant effect on the transition rate to regular jobs (Table 2, Column A). The estimated treatment effect of temporary jobs in the public sector of -.29 is to be interpreted such that the transition rate to jobs is estimated to shift downward by 25 % (=exp(-.29)-1) for individuals who participate in temporary jobs. The exit rate of unemployment decreases by 10 % for individuals attending a training program. In contrast, the temporary wage subsidy has a significantly positive effect on

the outflow out of unemployment of 8 %. The results from the model which does not account for selectivity are in line with the results in the study by Gerfin and Lechner (2000) which is based on the matching method. They find that employment programs as well as the majority of training programs significantly reduce the employment rate of participants whereas the temporary wage subsidy increases employment chances of participants.

After accounting for selectivity the average effect for each of the programs is negative, although for temporary wage subsidies the effect is not significantly different from zero (Table 2, Column B). The transition rate to jobs is decreased by 46 % for individuals accepting temporary jobs in the non-profit sector, and by 31 % for individuals in classroom training programs. The fact that these results differ from the results reported previously suggests that (unobserved) heterogeneity is relevant. More precisely, there is *positive selection* into programs. Individuals with better labor market performance in the first place are more likely to enter active labor market programs. The estimated correlation between the transition rate to jobs and the transition rate to training programs is very large and positive (.63), and it is moderately positive (.11 and .13), respectively for employment programs and wage subsidies. If we account for this positive correlation between the unobserved characteristics in the exit rate to jobs and the transition rates to ALMPs all programs have an adverse effect on the transition rate out of unemployment.

The intuition behind this result is simple. For instance, the effects of the training program decreases substantially because the average participant in these programs has a better a priori labor market position than the average non-participant. This is evident in the distribution of unobserved heterogeneity reported at the bottom of Table 2. In terms of training courses, three relevant groups can be distinguished. The first group (80 % of the population; groups aaab and aaba) has a high transition rate to training programs (5 % per month) as well as a high transition rate to regular jobs (11 % per month). The second group (9 % of the population; groups bbaa, bbba, and bbbb) has a low transition rate to training programs (2 % per month)

and has a zero probability of finding a regular job. The third group (11 % of the population; group abaa) has a low transition rate to the training program (2 % per month) but has a high transition rate to jobs (11 % per month).[12] Because the average training program participant is from group one which has good unobserved job search skills, estimates of the effect of training programs which do not allow for selectivity are upward biased. Positive selectivity is consistent with self-selection based on the expected gain from the program as well as selection into the program aiming at maximizing program success on the part of the public employment service ('cream-skimming').

Table 2 also reports the estimated correlation between the unobserved characteristics in the three processes which account for selection into ALMP. Apparently, the temporary wage subsidy and public employment programs are substitutes as indicated by the strongly negative (-.60) correlation between unobservables in these two processes. Unobservable characteristics leading to a higher chance of starting a job with temporary wage subsidy lower chances of starting a public employment program. The correlation between transitions to training programs and the transition rate to employment programs is moderately negative (-.34). There is a small negative correlation (-.05) between transitions to training programs and transitions to temporary wage subsidies.

Table 3

It is interesting to discuss whether individuals attending ALMPs are better qualified on average than non-participants in terms of the observable covariates. Table 3 shows the effects of selected individual characteristics on the transition rate to *regular jobs* as well as the three transition rates describing the selection into ALMPs.[13] The transition rate to regular jobs is significantly affected by all covariates shown. It declines strongly with age, increases with

[12]Note that Table 2 reports only 6 mass points of the unobserved heterogeneity distribution. The results indicate that the remaining 10 mass points have weight zero.

[13]See Table A1 for the complete list of covariates.

marriage for males whereas it decreases with marriage for females. The non-Swiss are found to have a significantly lower exit rate from unemployment to regular jobs than the Swiss. Moreover, individuals who have done a long apprenticeship are likely to leave unemployment after a shorter period of unemployment has elapsed. Participants in the *wage subsidy* program appear to be individuals with good observed job search skills. The transition rate to the wage subsidy program is significantly lower for job seekers aged 40 years or older than for the young and significantly higher for females with no or few dependents. The only group with unfavorable job search skills likely to enter the wage subsidy program are the non-Swiss with a temporary permit of residence for one year. It is unclear whether participants in *training courses* are well qualified for job search. Whereas the entry rate to training courses is significantly higher for individuals who have done a long apprenticeship and for females, it is also higher for the less advantaged individual who are aged 30 years or older and for foreigners with a temporary permit of residence. *Employment programs* are even less well determined by the characteristics shown in Table 3. With the exception of the age effect (aged 40 to 50 years), none of the individual covariates is significant.

Table 4

In order to investigate whether the program effects differ between various groups of individuals we estimated these effects differently for males and females and for foreign and Swiss workers (Table 4). It turns out that while the point estimates of the effects of ALMP appear to be different, the effects of most programs do not differ significantly between the groups. For temporary wage subsidies we find a positive effect for foreign males, while for Swiss males the effect is negative (both are significant at the 10 % level). Temporary wage subsidies decrease the exit rate to jobs for females. The negative effect of training programs is particularly bad for foreigners: the reduction in the transition rate to jobs is at most 30 % for the unemployed Swiss but more than 40 % for the unemployed with non-Swiss nationality. With respect to public

employment programs the adverse effects on the exit rate out of unemployment are smaller for Swiss females than they are for Swiss males or foreign job seekers. Based on the point estimates of each program, the temporary wage subsidy works best for all groups whereas employment programs will prolong unemployment duration the most.

Table 5

In Table 5, we investigate whether the effect of programs changes with elapsed duration since the start of the program. This allows discussing the relevance of the locking-in effect as compared to the skill-enhancement effect of ALMPs. We distinguish between the effect in the first three months of the program, the effect from 3 to 6 months after the start, from 6 to 9 months after the start and more than 9 months after the start. For most of the programs the largest negative effect is in the beginning of the program. This is consistent with the locking-in effect where individuals reduced their efforts to find a regular job while 'locked in' in the program. For training courses the effect is persistently negative. There is an estimated reduction of the transition rate to jobs of 30 % during the first two months. Thereafter, the transition rate remains at a lower level before is becomes even slightly higher (24 %) 9 months or more after the start of the program as compared to the beginning of the program. A potential explanation for this long-lasting locking-in effect is that the probability of starting a second program is substantially higher for training programs than for employment programs or wage subsidies (see last column of Table 1). Participants in the training program appear to be locked into the ALMP system rather than into a specific course. The locking-in effect is most apparent for temporary jobs and temporary wage subsidies. Here, it seems that as soon as the program stops, the effect of the program is no longer negative (after 3 months for the wage subsidy, after 6 months for the employment program).

Table 6

The training programs can be divided into four main types of programs: basic, language, computer or other courses (see Section 2). Table 6 reports the effects of each of these programs in a model that allows for a separate transition rate for each of the four types of classroom training programs, allowing for a total of 7 selection processes (basic, language, computer, other course, employment program, and wage subsidy). Moreover, the estimates do not restrict the correlation between unobserved heterogeneity in the transition rate to jobs and between the unobserved heterogeneity in the transition rate to each of the ALMPs. However, due to computational difficulties, the correlation amongst the four types of classroom training programs was restricted to be either -1 or +1. The impact of this restriction on the estimates is arguably minor. What is more important is to allow for unrestricted correlation between the selection processes (transitions to basic, language, computer or other course) and the outcome process (transitions to jobs).

Results indicate that, from a statistical point of view, the restriction to have just one selection process for training programs can be rejected. The LR test statistic at the bottom of Table 6 is significant at any conventional level. However, in terms of the estimated effect of ALMPs, results are robust. All classroom training programs reduce the transition rate to jobs significantly and the effects are quantitatively important. The average effect of training programs is similar to the effect reported in Table 2. The reduction in the exit rate is strongest for the two programs which last about 2 months, i.e. language courses (-47%) and other courses (-35%). The decrease in the job hazard is less negative for the shorter training programs, i.e. computer courses (-27%) and basic courses (-20%). Moreover, the estimated effects of employment programs and the wage subsidy program are almost identical to the results reported previously.

Table 7

The timing of events method relies to a crucial extent on the assumption that individuals do not change job search behavior in anticipation of future ALMP participation. Table 7 re-

ports the final sensitivity analysis addressing anticipation effects. Anticipation of future ALMP participation is likely to have a stronger effect on the identification of ALMP effects in cantons which are very strict in assigning job seekers to ALMPs once unconditional benefits have lapsed. For instance, in a canton where it is common knowledge that job seekers will have to attend a program once benefit payments which are not linked to participation have run out, job seekers who are not willing to attend the program will increase search intensity before benefits lapse. In such a canton the timing of events method identifies the effect of ALMPs on the transition rate to job by comparing the job hazard rate of participants with non-participants who are trying hard to escape assignment to ALMPs. The ALMP effect identified in this canton confounds the effect of a program with the effect of increased search intensity of individuals trying to escape assignment.

To address anticipation effects, we investigate whether treatment effects are a function of the 'share of non-participants'. This variable is defined as the number of individuals who are not assigned to a program after unconditional benefit payments have lapsed (non-participants) divided by the total of these non-participants and all participants. This variable is even 0 in very lax cantons and amounts to a sizeable fraction if the canton is strict. The share of non-participants is measured in January 1998, the earliest date for which there is reliable information.[14] Table 7 shows that the estimated effects of ALMPs do not vary with the share of non-participants across cantons. This is consistent with the fact that anticipation effects do not strongly affect the identified ALMP effects. A potential explanation for this result is, as previously discussed in section 4, that the time period between notification of a program and actual participation is quite short, and that individuals are required to continue to search for jobs even if they know that they will attend an ALMP in the future.

[14]Note that the sample on which our estimates are based consists only of new entrants into unemployment. Hence the variable 'share of non-participants' is not affected by the behavior of individuals in our sample.

6 Conclusions

This paper evaluates the effect of participating in ALMPs on the duration of unemployment in Switzerland. Our evaluation methodology takes possible selectivity in the inflow into programs into account.

Our main result shows that there is an important trade-off between training the unemployed and reducing unemployment duration. Almost all participants experience a significant reduction in the job-hazard rate right after the start of the program, which indicates that locking-in effects may be important. Therefore, we think it is important to structure training and employment programs such that there is enough time for continuous job search.

All in all, ALMPs do not seem to have a positive effect on the job finding rate. The exception are temporary wage subsidies which reduce unemployment, but only for foreign workers. Note that paying temporary wage subsidies to unemployed workers is cheaper than just paying unemployment benefits. So, even if wage subsidies would not reduce unemployment duration they may still be efficient from a cost-benefit point of view.

Finally, our measure of success is the extent to which ALMPs reduce individual durations of unemployment. This is only part of the story. It could be that although ALMPs in most cases do not reduce unemployment duration they could lead to higher wages or to a better job. We leave the evaluation of the other components of success to future research.

Appendix

Define $D_u = 1$ if the spell of unemployment is completed, and $D_u = 0$ otherwise. Define $\beta'_u = (\beta_u, \delta_c, \delta_e, \delta_w)$, $\beta'_c = \beta_c, \beta'_e = \beta_e$,and $\beta'_w = \beta_w$. Define $1 - F(\lambda_x, \beta'_x, v_{x,y}|t) \equiv S_x(\lambda_x, \beta'_x, v_{x,y}|t) = \exp(-\int_0^t \theta_x(\lambda_x, \beta'_x, v_{x,y}|s)ds))$ the survivor function which defines the probability that, until date t, the individual has not yet left to state $x = u, c, e, w$. Note that in contrast to the main text, the survivor function and the hazard are written as a function of the parameters to be estimated: duration dependence λ_x, effects of observed covariates β'_x, and the masspoints $v_{x,y}$, $x = u, c, e, w$; and $y = a, b$.

We assume first there is no unobserved heterogeneity. This means we have a degenerate distribution of $v_{x,y}$ only one masspoint, say a, has support. In that case the contribution to the likelihood of a single individual is

$$\begin{aligned} L^i_{aaaa} &= \theta_u(\lambda_u, \beta'_u, v_{u,a}|t^i_u)^{D_u} S_u(\lambda_u, \beta'_u, v_{u,y}|t^i_u) * \\ &\quad \theta_c(\lambda_c, \beta'_c, v_{c,a}|t^i_p)^{D_c} S_c(\lambda_c, \beta'_c, v_{c,a}|t^i_p) * \\ &\quad \theta_e(\lambda_e, \beta'_e, v_{e,a}|t^i_p)^{D_e} S_c(\lambda_e, \beta'_e, v_{e,a}|t^i_p) * \\ &\quad \theta_w(\lambda_w, \beta'_w, v_{w,a}|t^i_p)^{D_w} S_w(\lambda_w, \beta'_w, v_{w,a}|t^i_p) \end{aligned} \tag{8}$$

the subscript $aaaa$ refers to the situation that y takes the value a in the transition rate to jobs, to training programs, to employment programs and to the wage subsidy.

The likelihood contribution of an individual observed attending a training course after t^i_p time periods (meaning that $D_c = 1, D_e = 0, D_w = 0$) who did not start at a regular job until t^i_u ($D_u = 0$) reads as follows

$$
\begin{aligned}
L^i_{aaaa} &= S_u(\lambda_u, \beta'_u, v_{u,y}|t^i_u) * \\
&\quad \theta_c(\lambda_c, \beta'_c, v_{c,a}|t^i_p) S_c(\lambda_c, \beta'_c, v_{c,a}|t^i_p) * \\
&\quad S_e(\lambda_e, \beta'_e, v_{e,a}|t^i_p) * \\
&\quad S_w(\lambda_w, \beta'_w, v_{w,a}|t^i_p) \\
&= S_u(\lambda_u, \beta'_u, v_{u,y}|t^i_u) f_c(\lambda_c, \beta'_c, v_{c,a}|t^i_p) S_e(\lambda_e, \beta'_e, v_{e,a}|t^i_p) S_w(\lambda_w, \beta'_w, v_{w,a}|t^i_p)
\end{aligned} \tag{9}
$$

The fact that transitions to a regular job, to an employment program and to a wage subsidy are censored is taken into account by the survivor function to these exit states. Assuming independence accross individuals, the log likelihood function for the entire sample (of size M) is the log of the product of the individual likelihood contributions.

$$
\ln \mathcal{L} = \ln \prod_{i=1}^{M} L^i_{aaaa} \tag{10}
$$

This function is maximised with respect to $\lambda_x, \beta_x, v_{x,a}$ where $x = u, c, e, w$. Recall that β_u contains the treatment effects. Note also that the likelihood without unobserved heterogeneity factorizes. This implies that it is possible to estimate the parameter vector $\lambda_x, \beta_x, v_{x,a}$ separately for each process.

Now assume that we have unobserved heterogeneity. We allow for a non-degenerate distribution of the masspoints $v_{x,y}$ and assume there are two masspoints in each process. Under this assumption, the likelihood contribution of a single individual is

$$
L^i = p_{aaaa} L^i_{aaaa} + p_{aaab} L^i_{aaab} + ... + p_{bbbb} L^i_{bbbb}, \tag{11}
$$

and the log likelihood for the entire sample is

$$\ln \mathcal{L} = \ln \prod_{i=1}^{M} L^i. \tag{12}$$

Note that first, in addition to the parameters $\lambda_x, \beta_x, v_{x,a}$, we estimate 4 masspoints $v_{x,b}$ and 15 probabilities $p_{aaaa}, p_{aaab}, ..., p_{bbba}$ ($p_{bbbb} = 1 - p_{aaaa} - p_{aaab} - ... - p_{bbba}$). Second, because the individual contribution to the likeliood in (11) is a sum of products, the likelihood function does not factorize.

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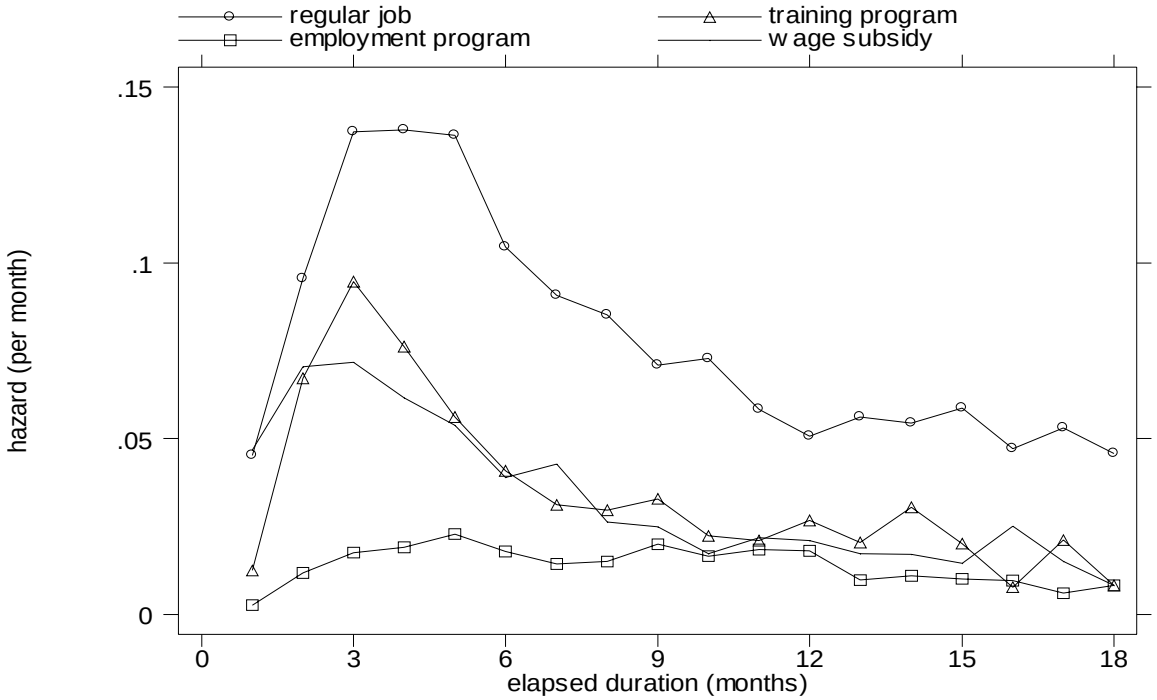

Figure 1. Kaplan-Meier transition rates.

Table 1

Descriptive Statistics of Active Labor Market Programs[a)]

	# Obs.	[%]	Elapsed ALMP-Duration [Months]	Censored ALMP-Spells [%]	Unemployment Duration at Entry [Months] [Mean]	[SD]	Second Program [%]
Training Courses	2729	42.7	1.3	1.0	3.4	(2.7)	40.5
Basic Course[b)]	1191	18.7	0.7	0.1	3.1	(2.4)	41.3
Language Course[c)]	487	7.6	2.4	1.0	3.6	(2.6)	41.7
Computer Course[d)]	548	8.6	0.8	0.2	3.6	(2.8)	44.0
Other Course[e)]	503	7.9	2.2	3.8	3.9	(3.2)	33.8
Employment Programme[f)]	746	11.7	5.1	9.0	4.7	(3.4)	17.2
Temporary Employment[g)]	2909	45.6	4.7	9.1	2.9	(2.7)	4.2
Total	6384	100.0	3.3	2.6	3.4	(2.9)	21.2

Notes: a) First ALMP which lasted longer than one week.
b) Courses aiming at improving the effectiveness of individual job search and self-esteem.
c) Language courses (including reading and writing skills).
d) Basic word processing and spreadsheet calculation.
e) Specific computer training, business administration, technical training, courses in the tourism and the health sector.
f) Temporary jobs in the Non-Profit sector.
g) Temporary regular job with wage subsidy.
Source: own calculations based on AVAM/ASAL/AHV database, Swiss state secretariat (seco).

Table 2. The Effect of ALMPs on the transition rate to regular jobs
Multivariate Mixed Proportional Hazard Model

	A		B	
	Coeff.	z	Coeff.	z
Treatment Effects[a)]				
Training program	-0.105	(-3.39)	-0.367	(-8.25)
Employment program	-0.291	(-4.62)	-0.609	(-6.36)
Wage subsidy	0.077	(2.69)	-0.060	(-1.51)
Mass points[b)]				
Regular job				
$\exp(v_{u,a})$	0.094	(45.93)	0.109	(42.81)
$\exp(v_{u,b})$	-		0.000	-
Training program				
$\exp(v_{c,a})$	0.046	(31.83)	0.052	(24.91)
$\exp(v_{c,b})$	-		0.019	(5.58)
Employment program				
$\exp(v_{e,a})$	0.014	(18.25)	0.044	(13.11)
$\exp(v_{e,b})$	-		0.000	-
Wage subsidy				
$\exp(v_{w,a})$	0.041	(33.42)	0.052	(28.17)
$\exp(v_{w,b})$	-		0.000	-
Probabilities[c)]				
p_{aaab}	-		0.177	(4.26)
p_{abaa}	-		0.619	(15.60)
p_{bbaa}	-		0.111	(1.94)
p_{bbaa}	-		0.014	(1.77)
p_{bbba}	-		0.044	(3.31)
p_{bbbb}	-		0.035	-
Correlation between				
Regular Job and Training program	-		0.632	
Regular Job and Employment program	-		0.105	
Regular Job and Wage subsidy	-		0.128	
Training and Employment program	-		-0.342	
Training and Wage subsidy	-		-0.050	
Employment and Wage subsidy	-		-0.602	
Unobserved Heterogeneity	No		Yes	
Individual characteristics	Yes		Yes	
Duration dependence	Yes		Yes	
log Likelihood	-56217.8		-56124.2	
N	13496		13496	

Notes: Asymptotic z-statistic in parentheses.

a) Effect of ALMP on the transition rate to regular jobs, i.e. coefficient of -0.105 implies that transition rate to regular jobs decreases by 10 % (=exp(-0.105)-1) after starting the training program.

b) Baseline transition rate per month (=constant), months 0 to 3. Model A allows for one constant, model B allows for two constants.

c) $p_{aaaa}=Pr(v_u=v_{u,a}, v_c=v_c,a, v_e=v_e,a, v_w=v_w,a)$. Additional probabilities p_{aaab}, p_{aaba}, ... are estimated to be zero.

Source: own calculations based on AVAM/ASAL/AHV database, Swiss state secretariat (seco).

Table 3. The effect of selected individual characteristics on the transition rate to regular jobs, trainin programs, employment progams, and wage subsidy programs.

	Regular job		Training program		Employment program		Wage subsidy	
Age (below 30 years)								
30 to 40 years	-0.188	***	0.091	**	0.079		0.005	
40 to 50 years	-0.270	***	0.255	***	0.491	***	-0.137	**
Marital status (single)								
Married	0.121	**	0.052		0.029		0.014	
Separated	-0.186	**	-0.042		-0.255		-0.112	
Number of dependents	0.007		-0.003		-0.042		0.033	
Female	0.075	*	0.321	***	0.146		0.452	***
Female * married	-0.256	***	0.007		-0.486		0.037	
Female * separated	0.078		0.067		-0.545		0.115	
Female * number of dependents	-0.085	**	0.011		-0.005		-0.151	***
Permit of residence (Swiss)								
For one year	-0.123	**	0.168	**	0.163		-0.280	***
Permanent	-0.115	***	-0.005		-0.054		0.015	
Apprenticeship (none)								
Short (< 2 years)	0.008		0.097		-0.206		-0.083	
Long (>= 2 years)	0.158	***	0.226	***	0.077		-0.101	
log Likelihood	-56124.2							
N	13496							

Notes: *,**,*** indicates significance at the 10%, 5%, 1% level. Estimates based on Table 2, Model B. Reference category in parentheses. Other covariates are command of local language, position in previous job (apprentice, unskilled, skilled, management, self-employed or home worker), looking for same occupation in new job, previous industry (construction, tourism, manufacturing, transport, retail, financial services), previous occupation (agriculture, food, textiles, metals, health, architecture, construction, transport, tourism, printing, justice, technical drawing, office, cleaning, science, education), previous wage, previous wage squared, duration of previous job, recent labor market history, 1995-1997, (no job, mean wage, variance of wage, percentage employed, number of employment spells, percentage unemployed, number of unemployment spells), distant labor market history, 1988-1994, (same variables), inflow month, degree of urbanization (village, town, city), canton level unemployment rate in month prior to inflow, participants in ALMP / unemployed in January 1998, canton level voters in favor of reduction in unemployment benefits.

Source: own calculations based on AVAM/ASAL/AHV database, Swiss state secretariat (seco).

Table 4. Sensitivity Analysis: Heterogeneous treatment effects
Multivariate Mixed Proportional Hazard Model

	Coeff.	z
Training program		
Swiss males	-0.371	(-7.16)
Swiss females	-0.195	(-3.65)
Foreign males	-0.521	(-8.53)
Foreign females	-0.522	(-6.53)
Employment program		
Swiss males	-0.736	(-5.57)
Swiss females	-0.453	(-3.09)
Foreign males	-0.610	(-4.30)
Foreign females	-0.669	(-3.21)
Wage subsidy		
Swiss males	-0.078	(-1.65)
Swiss females	-0.119	(-2.01)
Foreign males	0.091	(1.71)
Foreign females	-0.207	(-2.39)
Unobserved Heterogeneity	Yes	
Individual characteristics	Yes	
Duration dependence	Yes	
LR test ($\chi^2(9)$)	37.0***	
log Likelihood	-56105.7	
N	13496	

Notes: Asymptotic z-statistic in parentheses.

LR test: H_0: same effect for all groups, H_1: heterogeneous effects.

Source: own calculations based on AVAM/ASAL/AHV database, Swiss state secretariat (seco).

Table 5. Sensitivity Analysis: Duration dependence in the treatment effects
Multivariate Mixed Proportional Hazard Model

	Coeff.	z
Training program		
0 to 3 months[a)]	-0.363	(-8.00)
3 to 6 months	-0.328	(-5.84)
6 to 9 months	-0.381	(-5.23)
9 months and more	-0.271	(-3.27)
Employment program		
0 to 3 months	-0.945	(-7.03)
3 to 6 months	-0.341	(-2.62)
6 to 9 months	-0.051	(-0.33)
9 months and more	-0.200	(-0.92)
Wage subsidy		
0 to 3 months	-0.083	(-1.87)
3 to 6 months	0.015	(0.27)
6 to 9 months	-0.018	(-0.23)
9 months and more	-0.005	(-0.05)
Unobserved heterogeneity	Yes	
Individual characteristics	Yes	
Duration dependence	Yes	
LR test ($\chi^2(9)$)	62.0***	
log Likelihood	-56093.2	
N	13496	

Notes: Asymptotic z-statistic in parentheses.
a) Months after start of ALMP.
LR test: H_0: no duration dependence in the treatment effects, H_1: duration dependence in the treatment effects.
Source: own calculations based on AVAM/ASAL/AHV database, Swiss state secretariat (seco).

Table 6. Sensitivity Analysis: Separate effects for training programs
Multivariate Mixed Proportional Hazard Model

	Coeff.	z
Training program		
Basic course	-0.217	(-3.32)
Language course	-0.647	(-6.35)
Computer course	-0.311	(-3.50)
Other course	-0.425	(-4.78)
Employment program	-0.629	(-6.67)
Wage subsidy	-0.065	(-1.69)
Unobserved heterogeneity	Yes	
Individual characteristics	Yes	
Duration dependence	Yes	
LR test ($\chi^2(219)$)	1964.7***	
log Likelihood	-59252.5	
N	13496	

Notes: Asymptotic z-statistic in parentheses.
LR test: H_0: Transition rate to training programs does not differ by type of program (i.e. basic, language, computer or other course), H_1: Separate transition rates for each training program.
Source: own calculations based on AVAM/ASAL/AHV database, Swiss state secretariat (seco).

Table 7. Sensitivity Analysis: Anticipation effects
Multivariate Mixed Proportional Hazard Model

	Coeff.	z
Training program		
Constant	-0.400	(-9.00)
Share of non-participants in canton[a)]	-0.280	(-0.81)
Employment program		
Constant	-0.622	(-6.42)
Share of non-participants in cantona)	-0.097	(-0.12)
Wage subsidy		
Constant	-0.066	(-1.68)
Share of non-participants in cantona)	0.083	(0.23)
Unobserved heterogeneity	Yes	
Individual characteristics	Yes	
Duration dependence	Yes	
LR test ($\chi^2(7)$)	55.4***	
log Likelihood	-56096.5	
N	13496	

Notes: Asymptotic z-statistic in parentheses.
a) Number of individuals who do not participante in ALMP after unconditional unemployment benefits have lapsed (see main text for a definition) divided by the sum of participants and non-participants in January 1998, by canton.
LR test: H_0: Share of non-participants is insignificant in each process, H_1: Effect of share of non-participants is not zero in at least one process. Additional probabilities (see main text) are estimated to be zero.
Source: own calculations based on AVAM/ASAL/AHV database, Swiss state secretariat (seco).

Table A1. Results for Table 2, Column B.

	Regular Job		Training program		Employment program		Wage subsidy	
	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
Treatment effects[a)]								
training program	-0.367	(-8.25)						
employment program	-0.609	(-6.36)						
wage subsidy	-0.060	(-1.51)						
Female	0.074	(1.81)	0.321	(4.83)	0.146	(1.00)	0.452	(6.38)
Married	0.119	(2.22)	0.051	(0.55)	0.029	(0.13)	0.014	(0.15)
Separated	-0.187	(-2.54)	-0.042	(-0.36)	-0.254	(-0.97)	-0.112	(-0.94)
Female * married	-0.257	(-3.11)	0.007	(0.06)	-0.486	(-1.52)	0.038	(0.27)
Female * separated	0.079	(0.79)	0.066	(0.42)	-0.545	(-1.44)	0.116	(0.71)
Number of dependents	0.008	(0.47)	-0.003	(-0.09)	-0.042	(-0.56)	0.033	(1.12)
Female * number of dependents	-0.085	(-2.57)	0.010	(0.21)	-0.005	(-0.04)	-0.151	(-2.64)
Age (20-30)								
30-40	-0.199	(-5.90)	0.071	(1.26)	0.114	(0.87)	0.040	(0.71)
40-50	-0.291	(-6.91)	0.237	(3.55)	0.568	(3.35)	-0.087	(-1.23)
Residence permint (Swiss)								
yearly	-0.124	(-2.46)	0.167	(2.05)	0.166	(0.84)	-0.280	(-3.21)
permanent	-0.115	(-2.97)	-0.005	(-0.07)	-0.053	(-0.34)	0.015	(0.23)
Command of local language (bad)								
as second language	0.015	(0.33)	-0.090	(-1.23)	0.053	(0.30)	-0.013	(-0.18)
as mother tongue	-0.030	(-0.77)	-0.086	(-1.30)	0.225	(1.42)	0.095	(1.46)
Apprenticeship (has not done an apprenticeship)								
<= 2 years	0.007	(0.16)	0.097	(1.29)	-0.205	(-1.24)	-0.083	(-1.15)
> 2 years	0.158	(3.89)	0.227	(3.36)	0.077	(0.53)	-0.101	(-1.49)
Position in previous job (home worker or self-employed)								
apprentice	-0.037	(-0.29)	-0.040	(-0.20)	-0.575	(-1.40)	-0.012	(-0.04)
unskilled	-0.372	(-3.83)	-0.183	(-1.28)	-0.096	(-0.34)	0.384	(2.01)
skilled	-0.248	(-2.60)	-0.150	(-1.08)	-0.439	(-1.61)	0.284	(1.51)
manager	-0.371	(-3.19)	-0.088	(-0.53)	-1.074	(-2.31)	0.078	(0.36)
Looking for same occupation in new job	0.130	(4.26)	-0.126	(-2.67)	-0.243	(-2.22)	0.008	(0.16)

(continued)

Table A1. Page 2 out of 4

Previous industry (no)								
construction	0.177	(3.87)	-0.088	(-1.04)	0.036	(0.19)	0.041	(0.54)
tourism	0.099	(1.69)	-0.029	(-0.31)	-0.337	(-1.60)	0.110	(1.07)
manufacturing	0.064	(1.48)	0.081	(1.19)	-0.050	(-0.30)	-0.054	(-0.74)
transport	0.190	(3.01)	0.076	(0.71)	-0.506	(-2.05)	-0.015	(-0.14)
retail	-0.047	(-1.12)	0.200	(3.09)	-0.414	(-2.47)	-0.116	(-1.57)
finance	0.017	(0.22)	0.174	(1.52)	-0.191	(-0.55)	-0.264	(-1.83)
Previous occupation (no)								
agriculture	0.221	(2.39)	-0.545	(-2.74)	0.670	(2.00)	0.254	(1.68)
food	-0.023	(-0.18)	-0.061	(-0.30)	0.398	(0.83)	-0.229	(-0.88)
textiles	-0.035	(-0.19)	-0.053	(-0.23)	0.343	(0.62)	-0.143	(-0.47)
metals	0.018	(0.37)	-0.290	(-3.36)	-0.718	(-3.53)	0.094	(1.14)
health	0.031	(0.39)	-0.324	(-2.39)	-0.198	(-0.67)	-0.271	(-1.88)
architecture	0.039	(0.35)	0.504	(3.50)	0.806	(2.31)	-0.220	(-1.18)
construction	0.147	(2.83)	-0.499	(-4.92)	-0.011	(-0.05)	0.056	(0.66)
transport	0.046	(0.63)	-0.148	(-1.21)	-0.028	(-0.10)	0.331	(3.04)
tourism	0.146	(2.41)	0.000	(0.00)	-0.051	(-0.24)	0.149	(1.40)
printing	-0.541	(-0.51)	0.285	(0.20)	2.260	(0.82)	1.131	(0.90)
justice	-0.120	(-0.65)	-0.310	(-1.05)	-0.209	(-0.31)	-0.240	(-0.77)
technical drawing	0.057	(0.90)	-0.060	(-0.56)	0.105	(0.42)	-0.003	(-0.02)
office	0.183	(4.09)	0.100	(1.52)	0.107	(0.61)	-0.266	(-3.34)
cleaning	0.007	(0.09)	-0.194	(-1.49)	-1.011	(-2.94)	0.259	(1.95)
science	0.066	(0.62)	-0.105	(-0.62)	0.588	(1.45)	-0.403	(-2.18)
education	-0.190	(-2.05)	-0.290	(-1.92)	0.506	(1.84)	0.274	(2.08)
previous wage (/1000)	-0.050	(-3.15)	0.100	(3.86)	-0.113	(-1.58)	0.397	(12.44)
previous wage squared	0.000	(-0.18)	-0.014	(-4.00)	0.009	(0.78)	-0.059	(-13.39)
duration of previous job (years)	-0.030	(-4.62)	0.013	(1.27)	0.025	(0.95)	0.000	(0.02)
Recent labor market history, 1995-1997								
no job	-0.018	(-0.11)	0.251	(1.30)	-0.602	(-1.34)	-0.692	(-1.51)
mean wage (/1000)	0.062	(4.56)	0.009	(0.40)	-0.052	(-0.85)	-0.018	(-0.68)
variance of monthly wage	-0.002	(-2.33)	0.000	(0.09)	-0.067	(-1.93)	0.002	(0.63)
percentage employed	0.558	(6.43)	0.084	(0.64)	-0.325	(-1.12)	0.945	(5.96)

(continued)

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number of employment spells	0.039	(2.15)	-0.089	(-2.78)	0.034	(0.52)	0.024	(0.75)
percentage unemployed	-0.507	(-3.67)	-1.034	(-4.88)	-0.291	(-0.68)	-0.207	(-0.83)
number of unemployment spells	0.093	(4.92)	0.032	(0.98)	0.053	(0.78)	0.001	(0.03)
Distant labor market history, 1995-1997								
no job	0.296	(2.85)	0.081	(0.52)	-0.517	(-1.55)	-0.111	(-0.59)
mean wage (/1000)	0.003	(0.24)	-0.005	(-0.25)	-0.105	(-2.09)	-0.061	(-3.05)
variance of monthly wage	0.002	(0.71)	-0.004	(-0.65)	-0.009	(-0.85)	0.006	(1.17)
percentage employed	0.366	(3.88)	-0.189	(-1.33)	-0.489	(-1.61)	0.223	(1.34)
number of employment spells	0.026	(2.93)	-0.042	(-2.64)	-0.067	(-1.84)	-0.035	(-2.27)
percentage unemployed	-0.946	(-4.53)	0.488	(1.48)	-0.158	(-0.26)	-0.150	(-0.42)
number of unemployment spells	-0.037	(-2.05)	-0.005	(-0.16)	0.117	(1.94)	0.009	(0.32)
Inflow month (december 1997)								
january 1998	0.079	(2.46)	-0.151	(-2.77)	0.171	(1.42)	-0.063	(-1.16)
february 1998	0.088	(2.12)	-0.130	(-1.91)	-0.053	(-0.33)	-0.165	(-2.25)
march 1998	0.038	(0.83)	-0.137	(-1.86)	-0.135	(-0.78)	-0.098	(-1.22)
Degree of urbanization (village)								
town	-0.125	(-4.38)	0.061	(1.29)	-0.147	(-1.31)	-0.018	(-0.36)
city	-0.300	(-8.01)	0.013	(0.21)	-0.200	(-1.43)	-0.232	(-3.68)
At the canton level								
log unemployment rate	-0.252	(-4.09)	-0.272	(-2.51)	-0.198	(-0.84)	0.077	(0.73)
log participants in ALMP / unemployedJanuary 1998	-0.064	(-1.05)	0.610	(6.18)	0.908	(3.90)	0.007	(0.06)
log approval of a cut in benefits, September 1997.	0.219	(4.15)	0.309	(3.63)	-0.359	(-1.88)	0.185	(2.07)

(continued)

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Duration dependence (0 to 3 months)								
3 to 6	0.578	(20.22)	0.307	(6.62)	0.898	(9.23)	0.062	(1.28)
6 to 12	0.304	(7.95)	-0.290	(-3.82)	1.109	(8.16)	-0.387	(-5.02)
12 and more	0.140	(2.23)	-0.493	(-3.34)	1.200	(4.24)	-0.681	(-4.17)
Mass points[b)]								
$\exp(v_{u,a})$	0.109	(42.81)						
$\exp(v_{u,b})$	0.000	-						
$\exp(v_{c,a})$			0.052	(24.91)				
$\exp(v_{c,b})$			0.019	(5.58)				
$\exp(v_{e,a})$					0.044	(13.11)		
$\exp(v_{e,b})$					0.000	-		
$\exp(v_{w,a})$							0.052	(28.17)
$\exp(v_{w,b})$							0.000	-
Probabilities[c)]								
p_{aaab}	0.177	(4.26)						
p_{abaa}	0.619	(15.60)						
p_{bbaa}	0.111	(1.94)						
p_{bbaa}	0.014	(1.77)						
p_{bbba}	0.044	(3.31)						
p_{bbbb}	0.035	-						
log Likelihood	-56124.2							
N	13496							

Notes: Reference category and asymptotic z-statistic in parentheses.

a) Effect of ALMP on the transition rate to regular jobs, i.e. coefficient of -0.105 implies that transition rate to regular jobs decreases by 10 % (=exp(-0.105)-1) after starting the training program.

b) Baseline transition rate per month (=constant), months 0 to 3.

c) paaaa=Pr(v_u=v_u,a, v_c=v_c,a, v_e=v_e,a, v_w=v_w,a). Additional probabilities p_{aaab}, p_{aaba}, ... are estimated to be zero.

Source: own calculations based on AVAM/ASAL/AHV database, Swiss state secretariat (seco).

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Phone: 0041 1 634 37 05 Fax: 0041 1 634 49 07 E-mail: bibiewzh@iew.unizh.ch