Comprehensive Education for the Unemployed - Evaluating the Effects on Unemployment of the Adult Education Initiative in Sweden

Anders Stenberg[*]

Department of Economics

Umeå University

Abstract

This paper evaluates the effects on unemployment of the Adult Education Initiative (AEI) in Sweden. The AEI offered the unemployed adult education at a compulsory or upper secondary level. The AEI is compared with the vocational training part of Labor Market Training (LMT). The study uses unemployment incidence and unemployment duration times as outcome variables, both measured immediately after completion of the programs. For the incidence, selection on unobservables is taken into account while the analysis of duration times in unemployment considers both

selection bias and censored observations. The results indicate lower incidence following participation in the AEI, but also, significant at the ten per cent level, longer duration times.

1. Introduction

Swedish labor market policy has traditionally been characterized by measures that seek to activate the unemployed in some form of work related training rather than passively receiving unemployment benefits. The ambition has been to keep the labor force participation rate as high as possible during recessions and to avoid bottlenecks during economic boom periods. On July 1st 1997, this strategy was boosted by the introduction of a large scale project, the Adult Education Initiative (AEI, *Kunskapslyftet*). It was intended as an alternative to traditional labor market programs as the AEI offered the unemployed education at compulsory or upper secondary levels. Some of the overriding aims of the AEI were to reduce unemployment, reduce differences in formal education and to promote economic growth. The AEI involved studies at the municipal adult education centers, *komvux,* which, since 1968, have offered education to adults who lack elementary or upper secondary level education. The municipalities received government funds to cover their added expenses as the number of participants at komvux increased. The program was set to continue for five years and was subsequently brought to an end in 2002. The AEI was then replaced by a reduced scheme with partly different conditions for the participants.

The AEI was primarily aimed at unemployed adults who lacked complete three year upper secondary school qualifications. Individuals with a short education that were in employment were also eligible, under the condition that their employers filled their vacancies with a long term unemployed individual.

Mainstream evaluation literature in economics is essentially concerned with either labor market programs or with comprehensive schooling. The hybrid nature of the AEI therefore makes this evaluation interesting from the point of view of a policy maker. Es-

pecially as the AEI had a general and evident set up which, if successful, should be relatively easy to copy in other countries.

The present paper evaluates the AEI by using register data of unemployment as the outcome, and by comparing the outcome of the AEI with the vocational training part of Labor Market Training (LMT). The counterfactual world is one where the AEI did not exist and where LMT was its substitute. The evaluation should then answer the question whether unemployment outcomes improved with the introduction of the AEI. The outcomes in focus are the incidence and duration of unemployment immediately after a program ends. Only the duration of the first period of unemployment is considered.

Both the AEI and LMT are primarily intended for job searchers who are unemployed or at risk of becoming unemployed. The training grant in either program is equal to the size of the unemployment insurance (UI) and the completion of a program lasting more than six months qualifies the participant for a new period of unemployment benefits.[1] Also, the policy declarations of both programs make it a priority to promote the prospects of those with a weak position on the labor market.

LMT involves various types of vocational training. A criterium for enrollment in LMT, which slightly differed from the AEI, is that enrollment must be preceded by search for work at an employment agency. The basic idea is to offer vocational training in sectors where there is a shortage of labor supply. The object is to increase the probability of finding work for the individual and to promote economic growth. Until the AEI was introduced, LMT was the largest labor market program in Sweden. At one stage, in 1992, there were more than 100,000 participants in LMT, representing

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[1] The UI benefit level is based on the income before unemployment. It presumes membership in a UI-fund for at least 12 months. During this period, one must have worked at least part-time for six months.

about two per cent of the total labor force. In the sample at our disposal, the number of participants in LMT was about 33,000. A third of these were in "preparatory training" which included courses in job-search or preparations for other programs. LMT referred to in this paper, only concerns the vocational training part of the program, meaning that individuals in preparatory training are excluded.

The important difference between the programs is that the AEI involves comprehensive education whereas LMT is orientated towards a given profession. This represents two types of programs and this study will compare the effects of a theoretical program to a more practical one. It could be argued that the relatively large number of participants in LMT makes it a suitable object of comparison with the AEI, since it would have been the alternative for many of the individuals participating in the AEI.

Economic evaluations of the AEI so far include Westerlund (2000) and Axelsson and Westerlund (2001). These studies also use LMT participants including those in preparatory training, as a reference group. Summarizing their results, they indicate beneficial effects of the AEI on both unemployment duration and incidence to unemployment. However, outcomes are in general not estimated with explicit correction for selection effects. When this is done in Axelsson and Westerlund (2001) by way of a two-step Heckman estimation, using the total number of days in unemployment as dependent variable, there are no significant differences between the programs.

The impact of LMT in Sweden has been evaluated a number of times. In their survey, Calmfors *et al.* (2002) mention twelve studies since 1991, with data from both the 1980's and the 1990's. The estimated effects of LMT, on various measures of employment and income, tend to be less beneficial with data from the 1990's when the numbers participating in LMT were, as hinted above,

very high.

In this study, the empirical estimations seek to take into account selection on unobservables. In the case of estimating the incidence for unemployment a bivariate probit is employed. The estimates of the duration of unemployment deal with the presence of selection and censored observations. The method used follows Brännäs (2000) who suggested an instrumental variable (IV) adaptation of the symmetrically trimmed least squares estimator of Powell (1986).

The plan of the paper is as follows, section two describes the data and section three presents the econometric models. Section four contains the empirical results and section five concludes.

2. Data

The data used in this study were collected from different registers which have been merged by Statistics Sweden (SCB). First, all individuals are included that were registered in adult education at komvux, some time during the autumn semester of 1997. Second, the stock of individuals registered as participants in LMT on October 15th 1997, are collected from the event history database *Händel* of the National Swedish Labor Market Board (AMS). The data set also includes information on age, gender, income, education, citizenship, place of residence, civil status and family situation.

The individuals registered in Händel are classified in different categories. Some of these indicate that the individual is unemployed and in search of work while others indicate participation in labor market programs. The latter include LMT but *not* the AEI. This is the reason why the data of the participants in komvux have been collected separately. Based on the registers of employment agencies, unemployed individuals can be followed over time until the 1st of October 2002 (when the data were reported) if they were openly unemployed or participating in labor market programs.

In this study, the definition of unemployment following program, is to be registered in Händel, i.e. openly unemployed and/or enrolled in some labor market program (not including the AEI).

There were 222,209 participants in adult education during the autumn semester of 1997. To identify the participants in the AEI, information on the special grant for education and training (UBS) is used. It was equal in size to the UI. To be eligible to apply for UBS, the individual must have met the criteria that he or she was between 25 and 55 years old, studied at elementary or upper secondary level and was entitled to the UI when the studies were initiated. If the individual was employed, his or her employer must have agreed to hire a long term unemployed person as a replacement. Here, the definition of a participant in the AEI, is that the individual has been registered in adult education at some point during the autumn of 1997 *and* has received the special grant UBS during the same semester (55,965 observations). Of those offered UBS there were, according to the Report of the Government Commission (SOU 1998:51), eight per cent which enrolled in studies at folk high schools. Besides classes in traditional subjects, these offer a variety of courses such as art, music and drama. Our data only includes those with UBS that were enrolled in komvux.

There are only poor individual records of what kind of education, within a program, the individuals attended. The Report of the Government Commission (SOU 1998:51) summarized enrollment to different educations within the AEI among those unemployed that had been offered UBS in the autumn of 1997. These fractions are presented in Table 1. "Core courses" include mathematics, Swedish, social science and English. Both the preparatory courses and "other vocational" courses, representing almost one fourth, may overlap the programs offered by LMT. However, the probability is small as less than five per cent of the vocational training part of LMT was purchased from komvux.

The number of individuals registered in the vocational training part of LMT, on the 15th of October 1997, were 21,867. The program spans over most sectors of the economy. AMS (1999) names the five largest sectors in the second quarter of 1998, without presenting the various fractions, as being technology and science, health care, administration, manufacturing and service.[2] The vocational training sometimes, wholly or partially, takes place directly in a company.

In order to make the two program samples comparable, observations are excluded according to the criteria given below. An individual may have been excluded for more than one of these conditions.

- If age in 1997 is not between 25 and 55 (AEI 0 and LMT 4,487 obs.).

- If LMT program start is registered before May 1st 1997, when the AEI was announced with an information campaign (4,775 obs.). From May 1997, it is more probable that the individuals in this sample made choices whether to enroll in LMT or the AEI.

- If participants in the AEI were already in adult education during the spring term of 1997 (15,416 obs.). Presumably, these individuals would have continued their studies even without the introduction of the AEI.

- If recorded as a participant in the AEI in the autumn of 1998 (26,447 obs.). A lot of individuals in the AEI continued in the autumn semester of 1998. The special grant, UBS, was also offered for a second year to the individuals that had enrolled in 1997. This extension of the UBS was not repeated for the coming years when the AEI was in effect. Those excluded for this reason had on average 159 days of unemployment in 1996 compared with the average of

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[2] AMS (2000) gives a more detailed description of fractions across 16 different sectors for 1999.

Table 1: Enrollment of unemployed with UBS in 1997.

	% of AEI
Preparatory course	4.9
Mainly compulsory level	12.8
Upper secondary level	
core courses	10.6
core courses & other theoretical	52.4
core courses & other vocational	19.3
Total	100.0

Source: SOU 1998:51.

the original sample, 167 days.

• If individuals were recorded in LMT during more than 365 days and/or finished program after July 1st 1998 (3,438 obs.).

• If individuals had zero days in Händel in 1997 prior to enrolling to the AEI (8,067 obs.). The purpose of this is to avoid having individuals who arrive from employment. This is not possible to control for altogether, as people with more than one day in Händel could have experienced those days at the start of the year, then found employment, and from employment entered a program.

• If data of the first day in unemployment, following program, has been recorded incorrectly *before* the program started (AEI 1,507 and LMT 0 obs.).

• If there were missing observations (various variables) (AEI 4,829 and LMT 266 obs.). There are more observations missing among the AEI participants as some of the variables were collected from Händel.

The remaining sample consists of 26,988 observations of which 56 per cent were in the AEI. The sample of the vocational training part of LMT, had an average program time of 146 days. By the

1st of January 1998, 49 per cent of the LMT participants had completed their programs. As for the AEI, 21.8 per cent studied only one semester. If one approximates the length of the autumn and spring semester, the average time on the AEI is in the region of 220 days. When studying duration, only those who go from a program straight to unemployment are included.[3] The number remaining is then 21,926 of which 51.8 per cent were in the AEI with the average program lengths roughly unaltered.

It should be noted that there are no individual records of dropping out. The notion "program participation" actually refers to *started program* rather than *completed program*. For the vocational training part of LMT, the drop out rate as reported by AMS (1999) was approximately 18 per cent in the second quarter of 1998, including those that found work. According to the Report of the Government Commission (SOU 1999:39), ten per cent of the participants in the AEI interrrupted their studies.

In Table 2, various individual characteristics are described in terms of program participation frequencies (out of 21,926 obs.), mean duration of unemployment and unemployment incidence (out of 26,988 obs.). The definition of incidence to unemployment following a program is to be registered in Händel as in search of a job within five days after the individual's program was supposed to end, or before, as in the case of a drop-out. This definition is used as there are signs in the data that many unemployed individuals did not go to the employment office until after a few days. The incidence to unemployment is 74.9 per cent for the AEI compared with 89.7 per cent from LMT. Detailed definitions of the variables are given in the Appendix.

Note from Table 2 that the distribution of program participants

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[3]It is not possible to know whether those outside the unemployment register are in employment or have withdrawn from the labor market.

Table 2: Program participation, unemployment duration and unemployment incidence for various characteristics.

	N	% of AEI	% of LMT	Mean duration N=21,926	% incidence N=26,988
Total	21,926	51.8	48.2	443	81.4
AEI	11,349	100	0	418	74.9
LMT	10,577	0	100	470	89.7
366 days unemp. 1996	10,857	49.4	49.6	501	84.4
Zero days unemp. 1996	2,340	10.6	10.8	369	75.2
Outside labor force 1996	742	2.8	4.0	364	78.7
Age 25-29	5,666	29.3	22.1	361	79.0
Age 30-34	5,294	26.0	22.2	408	79.8
Age 35-39	3,898	17.1	18.5	448	80.8
Age 40-44	3,022	12.8	14.8	500	84.3
Age 45-49	2,242	8.4	12.2	529	84.3
Age 50-	1,806	6.3	10.3	596	86.9
Elementary school	677	2.8	3.4	535	82.5
9 year compulsory school	3,653	18.7	14.5	456	79.3
2 year upper secondary school	11,390	61.1	42.1	433	79.8
3 year upper secondary school	2,977	10.4	17.0	439	85.2
University < 3 years	2,108	5.6	13.9	436	84.4
University ≥ 3 years	1,121	1.4	9.1	475	88.5
Swedish citizens	19,839	93.5	87.2	445	81.1
Scandinavian, not Swedish	523	2.2	2.6	429	83.0
Non Scandinavian	1,564	4.3	10.2	425	83.6
Born in a foreign country	4,101	15.4	22.3	442	84.1
Stockholm county	3,065	12.7	15.4	335	80.5
Inland of Norrland	1,565	7.4	6.8	446	78.3
Munic. with high educ. level	10,790	45.0	53.7	431	82.7
Male	9,212	32.9	51.8	430	82.1
Male, ≥ 1 child at home	2,281	7.7	13.3	433	82.7
Male, married	2,933	9.2	17.8	450	83.4
Female	12,714	67.1	48.2	453	80.8
Female, ≥ 1 child at home	7,689	43.1	26.5	442	79.7
Female, married	4,768	24.7	18.6	467	79.7
Disabled 97	2,667	10.7	13.7	560	85.4

with zero or 366 days of unemployment in 1996, only show minor differences. The mean number of days in unemployment in 1996 (not displayed) was 261 for the AEI and 263 for LMT.

As can be seen, 17.4 per cent of those in the AEI had more than a two year upper secondary education. Individuals was eligible to the special grant UBS even with a formally completed upper secondary level. The condition would be that the individual had not completed secondary level with passes in all subjects or did not have the required knowledge in one or more subjects. Further, those that were long term unemployed or had an "old" secondary education could also apply. In the groups with the highest and lowest educational levels, Swedish citizens and younger age groups are underrepresented.[4] Note that foreign citizens, both Scandinavian and non-Scandinavian, have *shorter* mean duration than average.

There were large differences in the mean outcomes between regions. Apart from the regional labor markets, one could expect different program effects as both the AEI and LMT were implemented locally. However, there are no clear patterns across regions except that Stockholm county had much shorter duration than other regions. One would be tempted to think it is associated with the population density, but the second and third largest municipalities in Sweden, Gothenburg and Malmo (not displayed), have means of 463 and 428 days (compared with the overall average of 443 days). The sparsely populated inland of Norrland, which is a region often referred to as a labor market with difficulties, has a mean duration of 446 days and a lower than average incidence frequency.

Another regional dummy variable is "municipalities with high levels of education". It takes the value one for municipalities with fractions of the population having completed at least a three year

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[4]An exception to this rule is the elementary level (folkskola) which was stepwise replaced by the nine year compulsory school (grundskola) 1962-1972.

upper secondary school education, which exceed the median in Sweden. It is one for 67 of 288 municipalities, which represents approximately half, 54 per cent, of the Swedish population. In the sample, this variable is one for 49 per cent and is also connected with shorter than average duration (431 days).

It is difficult to say whether one should think that the sample has a positive or negative self selection into the AEI relative LMT. There are indications of a positive self selection to the AEI, as it has higher representation in the younger age groups and among those with a two year upper secondary school. These are groups with lower incidence to unemployment and shorter duration. On the other hand, there are fewer participants from the county of Stockholm, fewer from municipalities with high levels of education and there are also fewer men. Characteristics which, in Table 2, indicate a negative self selection into the AEI.

3. Econometric methods

3.1. Incidence to unemployment

To estimate incidence to unemployment, a bivariate probit model is estimated (see e.g. Greene, 2000 ch. 21). The approach is intended to take potential problems of selection bias into account. In a bivariate probit setting, the assignment decision to a program is estimated simultaneously with the outcome. Let v_{1i} indicate empirical observations of the individual's choice whether to enroll in the AEI ($v_{1i} = 1$) or in LMT ($v_{1i} = 0$). Also, let v_{2i} denote whether the individual was registered in unemployment immediately after finishing a program ($v_{2i} = 1$) or not ($v_{2i} = 0$). The latent variables v_{1i}^* and v_{2i}^* are determined by the independent variables represented by the vectors $\mathbf{w}_{1i}$ and $\mathbf{w}_{2i}$. This gives the following general speci-

fication of the model

$$
\begin{aligned}
v_{1i}^* &= \mathbf{w}_{1i}^{'}\boldsymbol{\gamma}_1 + \eta_{1i} \\
v_{1i} &= 1 \text{ if } v_{1i}^* > 0,\ v_{1i} = 0 \text{ otherwise}
\end{aligned}
\tag{1}
$$

$$
\begin{aligned}
v_{2i}^* &= \mathbf{w}_{2i}^{'}\boldsymbol{\gamma}_2 + \eta_{2i} \\
v_{2i} &= 1 \text{ if } v_{2i}^* > 0,\ v_{2i} = 0 \text{ otherwise}
\end{aligned}
$$

where $\boldsymbol{\gamma}_1$ and $\boldsymbol{\gamma}_2$ are vectors of unknown parameters to be estimated, and the disturbances η_{1i}, η_{2i} are assumed to be bivariate normally distributed, with correlation coefficient ρ. The parameters $\boldsymbol{\gamma}_1$ and $\boldsymbol{\gamma}_2$ are estimated simultaneously with ρ. The joint estimation approach has two advantages. First, joint estimation will be more efficient if $\rho \neq 0$. Second, joint estimation allows for potential selection bias to provide consistent estimates of the underlying parameters.

3.2. Unemployment duration

The estimation of the program effect on the duration of unemployment deals with both potential selection bias and censored data. The methodology follows Brännäs (2000) who applied an instrumental variable (IV) adaptation of the symmetrically trimmed least squares estimator introduced by Powell (1986).

The symmetrically trimmed least squares estimation uses the fact that the OLS estimator is unbiased when the distribution of the disturbance term is symmetric. In the presence of censored observations, symmetry is constructed by "trimming", i.e. by modifying or discarding censored observations at one end of the distribution and non-censored observations at the other end. There are no explicit distributional assumptions in accounting for censoring.

As a point of departure, consider a "true" underlying regression

equation

$$y_i^* = x_i'\beta + \varepsilon_i \qquad i = 1, ... N \qquad (2)$$

where y_i^* varies symmetrically around the value $x_i'\beta$. Because of right hand side censoring, the dependent variable takes the form $y_i = \min\{x_i'\beta + \varepsilon_i \ , c\}$ where c indicates a censored value.

To restore symmetry, Powell (1986) presents a modified normal equation

$$0 = \sum_{i=1}^{N} 1(x_i'\beta < c) \cdot (\max\{y_i, 2x_i'\beta - c\} - x_i'\beta) \cdot x_i \qquad (3)$$

where $1(.)$ is an indicator function which takes the value one if the claim in parenthesis is true and zero otherwise. The solution for β in (3) is not necessarily unique. Accordingly, Powell (1986) instead minimizes the corresponding objective function

$$\begin{aligned} S_N(\beta) &= \sum_{i=1}^{N} \left(y_i - \max\left\{ \frac{1}{2}y_i, x_i'\beta \right\} \right)^2 \\ &+ \sum_{i=1}^{N} 1(y_i < 2x_i'\beta - c) \cdot \left[\left(\frac{1}{2}y_i \right)^2 - (\min\{c, x_i'\beta\})^2 \right] \end{aligned}$$

and defines the "symmetrically censored least squares estimator", $\widehat{\beta}_N$, which is given by

$$\begin{aligned} \widehat{\beta}_N &= \left[\sum_{i=1}^{N} 1(x_i'\widehat{\beta}_N < c) \cdot x_i x_i' \right]^{-1} \times \\ &\sum_{i=1}^{N} 1(x_i'\widehat{\beta}_N < c) \cdot \max\left\{ y_i, 2x_i'\widehat{\beta}_N - c \right\} \cdot x_i \qquad (4) \end{aligned}$$

The sample is made symmetric by replacing the uncensored observations in the left tail of the distribution with their estimated values, in Powell's words, their "symmetrically censored" values.

Now, assume the estimated model to be a loglinear duration

model and introduce a conventional selection model specification

$$y_i = \ln t_i = \mathbf{x}_i'\boldsymbol{\beta} + \alpha d_i + \varepsilon_i$$

$$
\begin{aligned}
d_i &= 1 \quad\text{if } \delta_i = \mathbf{z}_i'\boldsymbol{\gamma} + \xi_i > 0 \\
d_i &= 0 \quad\text{if } \delta_i \leq 0
\end{aligned}
$$

where $d_i = 1$ indicates participation in the AEI. The use of the estimated $\widehat{d}_i$ for participation creates a consistent parameter for the program effect.

Define $\boldsymbol{\Theta} = (\boldsymbol{\beta}, \alpha)$, $\mathbf{x}_i^* = (\mathbf{x}_i, d_i)$ and $\widehat{\mathbf{x}}_i = (\mathbf{x}_i, \widehat{d}_i)$. Then, from Brännäs (2000), the IV adaptation to the Powell estimator is

$$
\widehat{\boldsymbol{\Theta}} = \left[\sum_{i=1}^{n} \mathbf{1}(\mathbf{x}_i^*\widehat{\boldsymbol{\Theta}} < c_i) \cdot \widehat{\mathbf{x}}_i \mathbf{x}_i^{*'} \right]^{-1} \times \tag{5}
$$
$$
\sum_{i=1}^{n} \mathbf{1}(\mathbf{x}_i^*\widehat{\boldsymbol{\Theta}} < c_i) \max(y_i, 2\mathbf{x}_i^*\widehat{\boldsymbol{\Theta}} - c_i) \cdot \widehat{\mathbf{x}}_i
$$

where c_i is the value of censored observations. $\widehat{\boldsymbol{\Theta}}$ is iterated until convergence. A consistent estimator of the covariance matrix is of the form

$$Cov(\widehat{\boldsymbol{\Theta}}) = n^{-1}\mathbf{C}^{-1}\mathbf{D}\mathbf{C}^{-1}$$

where

$$
\begin{aligned}
\mathbf{C} &= n^{-1} \sum_{i=1}^{n} \mathbf{1}(2\mathbf{x}_i^*\widehat{\boldsymbol{\Theta}} - c_i \leq y_i < c_i)\widehat{\mathbf{x}}_i'\mathbf{x}_i^* \\
\mathbf{D} &= n^{-1} \sum_{i=1}^{n} \mathbf{1}(\mathbf{x}_i^*\widehat{\boldsymbol{\Theta}} < c_i) \min(\widehat{\omega}_i^2, (c_i - x_i^*\widehat{\boldsymbol{\Theta}})^2)\widehat{\mathbf{x}}_i'\widehat{\mathbf{x}}_i
\end{aligned}
$$

The covariance matrix estimator above adapts the original Powell estimator to right censored data and to instrumental variables.

4. Results

4.1. Incidence to unemployment

Table 3 presents the results of the bivariate probit model. The columns show the bivariate probit estimates of the probability of participation in the AEI and, of the probability of going straight into unemployment following a program.[5] There are two instruments used, i.e. variables that are excluded from the outcome equation. First, the fraction of the municipal population registered in adult education during the autumn of 1997 and, second, a dummy indicating a municipality having high fraction of their population with at least a completed three year upper secondary school education (defined in section two). These are insignificant if included in the outcome regression.

In the estimation of assignment to the AEI, in the first column, the two instruments are both significant. Living in a municipality where a high educational level is more common lowers the probability of enrolling in the AEI. As mentioned in the introduction, one of the targets of the AEI was to promote the prospects of people with a weak position in the labor market. The evidence here suggests that the AEI, as an egalitarian tool, evened out some of the regional differences in educational levels.

The second instrument signals that a large local adult education, in relation to the municipal population, is positively correlated with enrolling in the AEI. Possibly, it reflects a relative capacity to offer a variety, as well as a magnitude, of courses. There is a negative sign on the coefficient associated with the fraction of 25-64 year

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[5] Reference groups are: for the Stockholm county and the inland of Norrland, the rest of Sweden; for the age groups, those above 50 years of age; for the educational groups, Elementary and Compulsory levels; for the foreign citizens, Swedish citizens; for the gender and civil status dummies; unmarried females with no children under the age of 16 at home.

Table 3: Bivariate probit model.

Dependent variable: Incidence to unemployment.				
N = 26,988	Participation in the AEI		Incidence to unemployment	
Variable	Coeff.	$\|t\text{-value}\|$	Coeff.	$\|t\text{-value}\|$
Constant	.010	.02	.400	.86
AEI			-.585	2.26
Fraction in adult edcuation	15.554	9.46		
High educ. level	-.120	5.59		
Aged 25-64 in municip. (%)	-2.208	4.55	1.893	3.98
Stockholm county	.177	4.12	-.121	2.46
Inland of Norrland	-.046	1.36	-.060	1.65
Regional growth	-.004	.36	-.051	3.83
Regional employment	.014	3.42	.003	.64
Age 25-29	.324	9.20	-.208	3.94
Age 30-34	.261	7.48	-.196	3.88
Age 35-39	.154	4.27	-.185	3.86
Age 40-44	.148	3.98	-.065	1.31
Age 45-49	.059	1.54	-.104	2.14
2 year upper secondary school	.074	3.48	.059	2.45
3 year upper secondary school	-.454	16.21	.129	2.33
University < 3 years	-.665	20.78	.049	.66
University ≥ 3 years	-1.141	24.37	.129	1.08
Disabled 97	-.210	7.98	.109	3.01
Outside labor force 1996	-.451	7.96	.075	1.08
181-365 days unemp. 1996	-.044	2.21	-138	5.87
91-180 days unemp. 1996	.004	.13	-.183	5.63
1-90 days unemp. 1996	.014	.42	-.222	6.41
Zero days unemp. 1996	.115	3.67	-.333	9.69
Scandinavian, not Swedish	-.224	4.03	-.022	.31
Non Scandinavian citizen	-.327	7.76	-.119	1.97
Born in foreign country	.103	2.06	.071	1.18
Yrs in Sweden*Born in f.c.	-.002	.80	.001	.16
Male	-.393	16.54	-.118	2.54
Male, married	-.668	1.70	.013	.25
Male, ⩾ 1 child at home	.113	2.72	-.016	.22
Female, married	.025	1.07	-.086	3.36
Female, ⩾ 1 child at home	-.040	.47	.024	.23
ρ			-.001	.01

olds in the municipal population. It may indicate that increased competition on the local labor market, makes the unemployed prefer a program with a close connection to a specific profession, such as LMT.

In the second column, which considers the incidence to unemployment, the coefficient of the participation in the AEI is significantly negative.[6] In Table A.1 in the Appendix is a list of results using different subsamples. All samples display negative coefficients. However, only the result of the total sample is significantly determined at the five per cent level. The result of the female sample is significant at the ten per cent level.

If one returns to the second column of Table 3, there are some other parameter estimates which deserve attention. First, the regional variables show the expected signs throughout. A high fraction of the population aged 25-64 in the municipality, is a measure of the competition on the local labor market, and subsequently, its parameter sign is positive. A higher age seems to indicate a higher incidence to unemployment. Furthermore, those with an upper two or three year secondary school diploma, have a significantly higher probability of incidence than the reference group with no secondary school. One must remember that the sample under study here, where the average time in unemployment in 1996 was more than eight months, is by no means a good representation of the working population. The unemployment background of the sample tells us that, on average, this is a negative selection of all educational levels. For the highly educated, it should in addition be a *more* negative selection than for other groups (given that education has a beneficial effect on labor market performance).

Those with fewer days in unemployment in 1996 show lower

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[6]This becomes insignificant ($|t$-value$|$ of 1.51) if one does not exclude any variables from the outcome equation.

probabilities of incidence than the reference group with 366 days. Finally, males have a lower probability of incidence. Among females, married women have a relatively low probability of incidence to unemployment.

4.2. Unemployment duration

Histograms of unemployment duration, for those who were registered as searching for job within five days after program completion, are shown in Figures 1 and 2 for the AEI and LMT respectively. The mean duration is 418 (calendar) days for the AEI and 470 days for LMT. Note that after 300 weekdays, which is in the region of 420 calendar days, eligibility to the UI has either been prolonged through participation in some labor market program or the individual has relied on social allowances or other sources of income.

There is a nail, in both Figure 1 and Figure 2, which occurs after about three months, especially for the participants in the AEI. It depends on individuals leaving unemployment for further education after a summer break.[7] Among the spells lasting 80 to 100 days, 70 per cent of the AEI participants had left unemployment for further studies. For LMT, the corresponding figure is 18 per cent.

If one excludes those that escaped unemployment through further studies the pattern of the means changes to become 487 days for the AEI and 484 days for LMT. It is an indication of how the AEI creates opportunities for further studies. The effect of the AEI on duration cannot only be interpreted in terms of an effect on the ability to escape unemployment but also as one of increasing the set of possible routes of escape. There is a second, smaller nail, at the end of each histogram which regards the censored observations, i.e. those still unemployed on October 1st 2002.

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[7]However, note that those who leave adult education for a summer (or Christmas) break in unemployment and then resume adult education with UBS

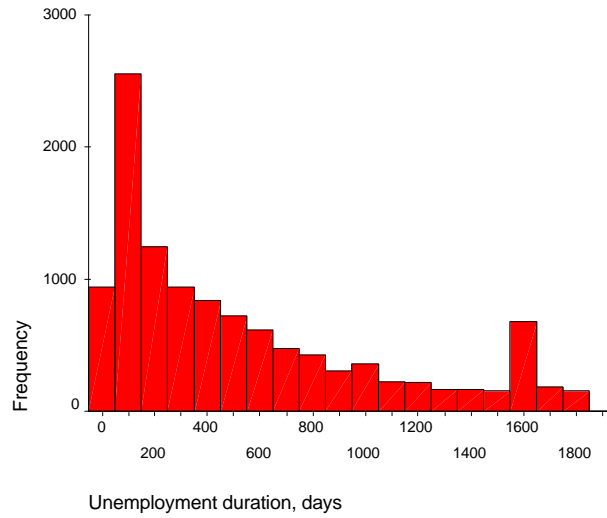Figure 1: The AEI post program unemployment duration.

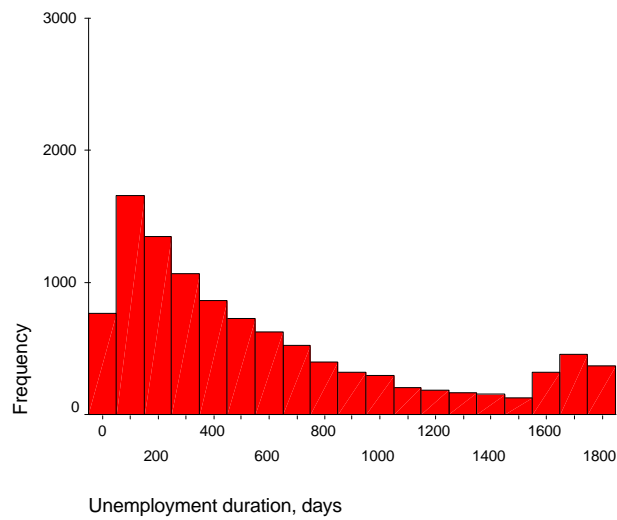Figure 2: LMT post program unemployment duration.

Table 4: Reason for end of unemployment spell by treatment group.

	Mean duration	% of AEI	% of LMT
Censored	1,666	8.6	9.3
Employment	467	38.0	52.0
Miscellaneous	514	14.2	17.0
Unknown reason	460	14.4	10.8
Further Education	319	25.0	10.9
Total	553	100.0	100.0

Figure 3: Post program survival rate in unemployment of the AEI and LMT participants.
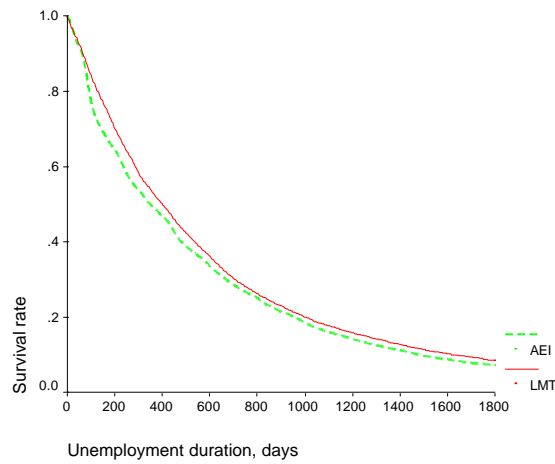
Table 4 shows frequencies of different reasons for deactivation. Detailed definitions of these are given in the Appendix. The main difference between the programs is that the AEI participants go on to further education more frequently while LMT has a larger fraction going into employment. Figure 3 shows the survival rate in unemployment of the AEI (dashed line) and LMT participants (solid line). The difference between the survival rates increases after 80-100 days.[8] After that, the differences are small.

For the study on duration, the fact that the incidence is lower for the AEI represents a selection process *out* of the program. To see this selection problem clearly, suppose an unobserved characteristic such as motivation, on average, speeds up the job finding process. If those who do not enter unemployment immediately after the program have a higher motivation than average, the sample of those unemployed will correspondingly be less motivated. The unemployment incidence, 74.9 per cent for the AEI and 89.7 per cent for LMT, indicates a selection effect which is more negative on unemployment duration for the AEI than LMT.

The results of the duration model are presented in Table 5. The first column presents the coefficient values of a probit estimation with participation in the AEI as the dependent variable. The second column has duration in unemployment as the dependent variable and contains the results of estimations according to equation (5) in section three, taking into account selection by using IV. As in the previous estimations, the instruments used are the municipal fraction of participants in adult education and a dummy indicating a municipality with a high level of education. These are insignificant if included in the duration equation.

The results of the participation equation are similar to that of

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are treated as still in the AEI.

[8]If $F(t) = \Pr[T < t]$ is the probability that duration T is less than some value t, the survival function is $S(t) = 1 - F(t) = \Pr[T \geq t]$.

Table 5: Powell IV estimations of duration times in unemployment.

Dependent variable: Log time in unemployment.				
N = 21,926	Participation in the AEI		Duration times	
Variable	Coeff.	|t-value|	Coeff.	|t-value|
Constant	-.545	1.17	6.574	15.49
AEI			.389	1.85
High educ. level	-.110	4.67		
Fraction in adult edcuation	16.205	8.89		
Aged 25-64 in municip. (%)	-2.247	4.18	-.911	2.19
Stockholm county	.070	1.46	-.420	9.67
Inland of Norrland	-.044	1.17	-.022	.64
Regional growth	-.007	.50	-.033	2.82
Regional employment	.021	4.48	.003	.64
Age 25-29	.325	8.66	-.777	18.61
Age 30-34	.246	6.45	-.618	16.02
Age 35-39	.136	3.42	-.482	13.21
Age 40-44	.143	3.52	-.326	8.82
Age 45-49	.049	1.18	-.210	5.72
2 year upper secondary school	.082	3.50	-.083	3.86
3 year upper secondary school	-.413	13.32	.000	.01
University < 3 years	-.636	17.89	.034	.57
University $\geq$ 3 years	-1.153	21.96	.190	2.12
Disabled 97	-.209	7.64	.352	12.05
Outside labor force 1996	-.392	6.41	.121	2.12
181-365 days unemp. 1996	-.048	2.17	-.226	11.24
91-180 days unemp. 1996	.008	.24	-.299	10.16
1-90 days unemp. 1996	.030	.83	-.325	10.10
Zero days unemp. 1996	.059	1.69	-.439	13.92
Scandinavian, not Swedish	-.243	3.94	-.084	1.41
Non Scandinavian citizen	-.356	7.33	.027	.54
Born in foreign country	.121	2.14	-.015	.30
Years in Sweden * Born in f. c.	.002	.72	.005	1.83
Male	-.372	14.32	-.049	1.33
Male, married	-.076	1.76	.014	.36
Male, $\geqslant$ 1 child at home	.111	2.41	-.062	1.51
Female, married	.007	.26	-.045	2.06
Female, $\geqslant$ 1 child at home	.185	7.24	.004	.16

the previous section. The main result being that individuals in municipalities with overall lower education levels, tend to join the AEI and thus reduce regional differences in education. In column two, the coefficient of the AEI dummy is positive and significant at a ten per cent level, indicating that participants in the AEI have longer duration in unemployment following program than those in LMT. In Table A.1 in the Appendix, there is a list of results from using different subsamples. Apart from the estimates of the total sample, the only significant effect, also at a ten per cent level, is the positive coefficient for the female sample. These implications remain unaltered if those escaping unemployment through further studies are excluded. In Table 5, a high fraction of the municipal population aged 25-64, is presumed to reflect the level of competition on the local labor market. Unexpectedly, the parameter is significantly negative. Those with more than two years of university studies show significantly longer duration. The reasoning on the educational dummies in the previous section is probably valid. The dummies for days in unemployment in 1996 also show parameters with the logical negative signs.

5. Conclusion

This paper uses register data to evaluate the effects of the Adult Education Initiative (AEI) in Sweden. One of the main objects of the AEI was to offer the unemployed education at compulsory or upper secondary levels. The question that has been evaluated is how the AEI compares with labor market training (LMT) which instead offers vocational training to, in many ways, similar target groups as the AEI. In terms of outcome variables, the focus has been on the incidence of unemployment and duration in unemployment, following the period immediately after program participation.

The empirical estimations seek to take into account selection

on unobservables. In the case of estimating the incidence to unemployment a bivariate probit model is employed. The estimations of duration deal simultaneously with selection and censored observations. The econometric approach follows Brännäs (2000) who used an IV adaptation of the symmetrically trimmed least squares introduced by Powell (1986). There is evidence that the AEI decreases the incidence of unemployment.

Regarding duration, there are indications of longer times in unemployment following the AEI compared with LMT. In general, when performing the estimations with various subsamples, the results are insignificant, both in terms of incidence and duration of unemployment. The results are at odds with Westerlund (2000) who found beneficial effects of the AEI on duration. The findings are more in line with Axelsson and Westerlund (2001) who found a beneficial effect of the AEI on unemployment incidence but no effects on the accumulated time in unemployment during the two years that followed program completion.

An explicit aim of the AEI was to reduce educational differences. In the estimations of the participation choice there is evidence that municipalities with lower educational levels among their inhabitants have attracted more participants to the AEI. This may have reduced differences between regional educational levels.

Appendix

Definitions of data

AEI; Officially domiciled in Sweden and registered in adult education some time during the autumn semester of 1997 and receiving the special grant for education and training. Individuals registered in adult education in the spring 1997 or autumn 1998 were excluded.

CHILDREN; Number of children below the age of 16 living at home.

DAYS UNEMPLOYED; Number of days spent in any of the search categories, including unemployment and labor market programs, as defined by the Swedish National Labor Market Board.

DISABLED 1997; Classified with a working disability in 1997.

EDUCATIONAL LEVEL; Highest level of education attained by 1997.

END OF UNEMPLOYMENT PERIOD; Employment; Employed, re-employed or employed with a time-limit. Miscellaneous; Other reasons for deactivation. Unknown reason; Contact discontinued or unknown reason. Further education; Not LMT or the AEI.

FRACTION IN ADULT EDUCATION; The number of individuals registered in adult education at komvux during the autumn semester of 1997 divided by the municipal population.

INLAND OF NORRLAND; Norrland except municipalities on the coast line.

LMT; Registered in LMT October 15th 1997, with a program start later than May 1st 1997, officially domiciled in Sweden and aged between 25 and 55.

MUNICIPALITY WITH HIGH EDUCATION LEVEL; Equals one for those living in municipalities with a higher than median fraction of individuals having completed at least a three year upper secondary school. It equals one for 56 of 288 municipalities, representing 54 per cent of the population.

OUTSIDE THE LABOR FORCE 1996; Zero days in unemploy-

ment in 1996 and less than SEK 50,000 in wage earnings in 1996.

REGIONAL EMPLOYMENT GROWTH; Measured for 21 counties as the change of employment rate in the fourth quarter of 1998 compared with that of a year earlier. Employment figures based on Statistics Sweden and their Labor Force Surveys (*Arbetskraftsundersökningarna, AKU*).

REGIONAL EMPLOYMENT LEVEL; As measured in 21 counties in the second quarter of 1998. Employment figures based on Statistics Sweden and their Labor Force Surveys (*Arbetskraftsundersökningarna, AKU*).

Table A.1: Estimations of unemployment incidence and duration for various samples. Coefficient values of the AEI dummy is reported.

	Incidence			Duration		
	N	Coeff.	$|t|$	N	Coeff.	$|t|$
Total sample	26,988	-.585	2.26	21,926	.389	1.85
Men	11,235	-.485	1.28	9,212	.040	.12
Women	15,753	-.693	1.89	12,714	.508	1.73
Inland of Norrland	2,000	-.514	.96	1,565	2.393	.91
Stockholm county	3,817	-.930	1.09	3,065	-.092	.17
No secondary school	5,440	-.611	1.43	4,330	.240	.67
2-year secondary school	14,282	-.596	1.36	11,390	.766	1.64
Born in foreign country	4,886	-.658	1.11	4,101	-.013	.02
Foreign citizens	2,503	-.690	1.06	2,087	-.024	.04
Disabled	3,123	-.753	1.39	2,667	.085	.21

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