

The Adult Education Initiative in Sweden

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Second Year Effects on Wage Earnings and the Influence on Branch Mobility

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Abstract

This paper presents a follow up study of earlier economic evaluations of the Adult Education Initiative (AEI) in Sweden. The AEI was foremost directed to those unemployed and involved comprehensive education at compulsory or upper secondary levels. The AEI is compared with the vocational part of Labor Market Training (LMT). Outcome variables are annual wage earnings in 1999 and in 2000 as well as mobility between branches of employment. The estimated effects on wage earnings of the AEI relative to LMT are negative for both the samples enrolled in 1997 and in 1998. Selection model estimates indicate positive selection on unobservables into the AEI, which is larger for those enrolled in 1998. For the sample enrolled in 1997, the earnings effects of the AEI is relatively more beneficial in 2000 than in 1999. Results on mobility indicate that AEI participants had a lower probability of changing branch of employment and a relatively stronger attachment to the public service sector.

Keywords: Selection, adult education, wage earnings, mobility

JEL classification: J68, J62

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1. Introduction

The Adult Education Initiative (AEI) in Sweden was in effect between 1997 and 2002. It offered foremost the unemployed the opportunity to a year of formal education at compulsory or upper secondary levels, with financial support equal to the level of their unemployment insurance (UI). The policy declarations of the AEI announced as main targets to improve the confidence and employment possibilities of those in weak positions in the labor market, and to encourage its participants to pursue further studies. More all-embracing aims included to reduce unemployment, to reduce differences in education, to increase mobility on the labor market and to promote economic growth.

A considerable share of the Swedish labor force has a two year upper secondary education as the highest educational attainment level. Normally, this does not fulfill the requirements of applying to higher education. The design of the AEI made the unemployed adults with a two year upper secondary diploma a natural target group. Employed individuals with short educations could also enroll on the condition that their employer agreed to fill their vacancy with a long term unemployed.

The purpose of this study is twofold. First, the aim is to evaluate the effects of the AEI on wage earnings for two different cohorts that enrolled in the AEI in 1997 and 1998. The vocational part of Labor Market Training (LMT) is used as reference group. The outcome variables are the annual wage earnings of 1999 and of 2000, which means that individuals still in education in those years are excluded. With this reservation, the question evaluated is whether gross wage earnings improved with the introduction of the AEI compared with a world where LMT was its substitute. The second purpose is to study data on branches of employment before and after program participation to detect how the AEI influenced mobility on the labor market compared with LMT. Estimates of mobility are also compared between the samples that enrolled in 1997 and 1998 respectively.

The program of the comparison group, LMT, has been the largest labor market program in Sweden since the 1950's. Among those enrolled in the

late 1990's, about a third of the participants in LMT was in preparatory training. It included preparations for other programs and courses in job search. Here, LMT only refers to the vocational training part of LMT.

There were similarities between the AEI and LMT in their enrollment procedures and their targets. Both programs offer financial support during program which is equal to the UI, and policy declarations state they aim at assisting individuals with a weak position in the labor market. One may also argue that a comparison between the two is relevant as these were the two largest programs for the unemployed. Had the AEI not existed, many of the participants in the AEI would have been in LMT. The comparative study between the effects on wage earnings of the AEI and LMT is also one which contrasts a theoretical program with a traditional and more vocational program.

The AEI has been evaluated by Westerlund (2000) and Axelsson and Westerlund (2001) who used LMT, including those in preparatory training, as reference group. The results in Westerlund (2000) indicated beneficial effects of the AEI on both unemployment duration and incidence to unemployment. However, when explicit correction for selection effects was used in Axelsson and Westerlund (2001), no indications of significant effects were found. Stenberg (2002a and 2002b) used only the vocational training part of LMT. The first study indicated that the AEI reduced the probability of unemployment incidence following program, but that LMT had more beneficial effects on duration in unemployment. The second study used the 1999 wage earnings as outcome variable, and reported significantly negative effects of the AEI relative to LMT. It was also indicated that groups with a weak position in the labor market prior to program, tended to show lower effects on wage earnings from the AEI than the total sample. This was also the case for males.

There are a number of studies which have evaluated LMT in Sweden. The survey by Calmfors *et al.* (2002) mention twelve different articles. The results tend to indicate positive effects of LMT when data from the 1980's are used, but negative effects with data from the start of the 1990's. There are fewer studies of LMT with data from the late 1990's. Apart from the comparative studies of the AEI mentioned above, Carling and Richardson (2001) compared LMT with seven other labor market programs. They found

the effects of LMT to be in the lower half within the group of programs evaluated.

The weaker connection to the labor market of comprehensive schooling may make the effects on wage earnings show later for the AEI. As mentioned, Stenberg (2002a) found that duration in unemployment were longer for participants in the AEI relative to LMT. A first contribution of this paper is to evaluate the effects of the AEI on wage earnings in 2000 and to make comparisons of earnings outcomes in 1999 and 2000. Also, it allows for a comparison between estimates of the samples enrolled in 1997 and 1998, i.e. whether the effects of the AEI changed between the samples. Ordinary least squares and the classical selection model will be used as methods of estimating the relative program effects on wage earnings.

With increased formal education, the AEI aimed at increasing the flexibility and mobility on the labor market. Intuitively, mobility between branches of employment may be enhanced by the AEI compared with LMT. There is a demand for general education in most parts of the labor market. On the other hand, LMT, with programs more specifically connected to professions, may assist the individual in a more natural way to change between branches of employment. Studying the branch mobility of the participants in the two programs, may also assist to explain the estimated outcomes on wage earnings. A second contribution of this paper is to study the mobility across branches of employment before and after program participation. Binomial and multinomial logit models are used to discern whether there are any differences in the patterns of mobility of the participants in the AEI relative those in LMT.

The remainder of the paper is structured so that the data are analyzed in the following section. In section three, the mobility patterns between branches of employment are analyzed and estimated. Section four presents the estimation results of the relative effects on wage earnings, and discusses methodological issues. Section five concludes.

2. Data

The data used in this study comes from several official registers. Included are all individuals registered at the municipal adult education centers, *kom-*

vux, some time during the autumn semesters of 1997 or 1998. The stock of individuals registered in LMT on October 15th in 1997 or in 1998, has been collected from the event history database *Händel*, of the Swedish National Labor Market Board (AMS). Information on income has been obtained from the Swedish National Tax Board. Statistics Sweden (SCB) has merged this data with official registers to make it include information on age, educational level, gender, citizenship, place of residence, civil status, branch of employment and family situation.

In order to distinguish the participants in the AEI from individuals in regular adult education, information on the special grant for education and training (UBS) is used. The UBS was a part of the government funding of the AEI and it was equal to the UI. To be eligible to apply for the special grant the requirements were that the individual was aged 25-55, 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. Also, individuals with a completed three year upper secondary level could be considered on several grounds.¹ Participants in the AEI are defined as those who were registered in adult education at some point during the autumn of 1997 or 1998, *and* received the special grant UBS during the same semester (55,965 observations in 1997 and 74,406 in 1998). Participants in the vocational training part of LMT in *Händel* included 21,867 observations in 1997 and 28,895 in 1998.

There are only poor records of what kind of education the individuals attended within the programs. The Report of the Government Commission (SOU 1998:51) summarized the enrollment among unemployed that had been offered UBS in the autumn of 1997. Some 15 per cent then studied at compulsory level and the remainder upper secondary level of mathematics, Swedish, social science, English and various other subjects. LMT spans over most sectors of the economy and the largest being technology and science, health care, administration, manufacturing and service (AMS, 2000). Sometimes LMT takes place directly within a company.

¹ For example, if the individual lacked grades or sufficient knowledge in one or more subjects, had a particularly long unemployment period, or had an "old" secondary school diploma. The criteria also included some short college educations as "incomplete upper secondary school".

To create comparable samples of the AEI and LMT, data has been excluded if it does not fulfill a number of criteria. These criteria are given in the Appendix, with numbers excluded for each condition given. In many cases, observations are excluded as a consequence of more than one of the restrictions.

The sample is set so that age is between 25 and 55. Furthermore, as the introduction of the AEI was announced by a promotion campaign in May 1997, individuals enrolled in LMT prior to May 1997 were excluded as they probably never made a choice between programs. To be consistent, among those enrolled in 1998, individuals are excluded if they started LMT before May 1st 1998. Along a similar way of reasoning, participants in the AEI that were in adult education already in the spring term, which preceded their enrollment to the AEI, are excluded. Presumably, these individuals would have continued their studies even without the introduction of the AEI.

The participants in the AEI in 1997 were offered an extension of the special grant UBS, to include another year. This offer was not made to any of the coming years of the AEI and those who did continue are therefore excluded. To keep program times relatively similar, LMT participants that were still in program after July 1st the year after program start, or were in program more than 365 days, are excluded. The intention is that both sets of program participants will have a more similar amount of time to find work, before the start of the year when the outcome variable is measured.

As mentioned earlier, it was possible to enroll in the AEI from employment as long as the employer agreed to hire a long term unemployed as replacement. To exclude individuals that entered program from employment, those with zero days as registered job searchers during the year of program enrollment are left out.²

There are no reliable individual records of drop outs from either program so the interpretation of the concept "participation" should be *started program* rather than *completed program*. Based on survey data, AMS (1999) and AMS (2000) report the fractions which interrupted the vocational training

² There may still be individuals in the sample that enrolled to the AEI from employment. Some individuals may have been unemployed at the start of the year, then found employment, and from employment entered the AEI.

part of LMT in the second quarter of 1998 and 1999 respectively. It was approximately 18 per cent out of which one half left LMT as they had found work. The Report of the Government Commission (SOU 1999:39) stated that, of those who enrolled in the AEI in the autumn of 1997, ten per cent ended their studies before program completion.

A problem with evaluating the AEI two years after program completion is that many of its participants were still in education. Comparing wage earnings makes little sense if the participants have not yet re-entered the labor market. This is why observations are excluded if a participant was registered in any formal education, adult education, university or other, during the course of 1999 and 2000 respectively. Of those enrolled in the AEI in 1997, 51 per cent were in some form of education in 1999, 11 per cent in higher education (19 per cent and 2 per cent for LMT). Among those enrolled in 1998 the fractions were almost identical. There is no impression that this exclusion concerns a weaker or stronger group of individuals. The average wage earnings before program of the excluded groups are similar to the overall averages in the respective years.

With a year in the AEI, those with a prior two year upper secondary school could acquire a three year secondary school diploma. However, most of the individuals in this group that continued education, did so at komvux (around 70 per cent). It indicates that they did not complete a three year upper secondary school diploma within the year of the AEI.

The outcome variable is based on the yearly gross wage earnings. It includes gross salary and holiday compensation, but not taxable benefits or transfers such as the UI. Outlier values in excess of SEK 300,000 are excluded. Using the yearly wage earnings from both 1999 and 2000 as outcome variables allow for three different sets of estimates. The program participants enrolled in 1997 can be evaluated based on their wage earnings in 1999 and in 2000 respectively. The sample of enrolled in 1997 is set so that outcomes can be observed for all individuals in both these years. Observations remaining are then 20,124. The program participants enrolled in 1998 are evaluated on the basis of their wage earnings in 2000 and consists of 14,433 observations. The fractions of participants in the AEI are 56.7 and 54.8 per cent in the respective samples.

The selection process into (or out of) the programs may change the characteristics of the sample from one year to another. Thereby, the relative effect of the programs could change. Table 1 presents the average wage earnings of the samples (thousands of SEK) the year before and the year(s) after program.³ The overall increase in wage earnings after program is presumably influenced by the increase in the employment-population-ratio during the period under study. The yearly average in Sweden was 71.6 per cent in 1996 and 70.7 per cent in 1997. It rose to 72.9 per cent in 1999 and to 74.2 per cent in 2000 (source: Labor Force Surveys, SCB).

Table 1: Average wage earnings levels, in thousands of SEK, before and after program.

	1996-1999			1996-2000			1997-2000		
	Total	AEI	LMT	Total	AEI	LMT	Total	AEI	LMT
Before	58.5	60.9	55.5	58.5	60.9	55.5	73.6	70.4	77.5
After	96.8	91.0	104.4	117.9	113.0	124.4	111.8	102.8	122.8
% change	65.5	49.4	88.1	101.5	85.6	124.1	51.9	46.0	58.5
N	20,124	11,405	8,719	20,124	11,405	8,719	14,433	7,913	6,520

If one focuses on the AEI, those who engaged in the program in 1998 had higher average wage earnings the year before program than those enrolled in 1997. This was also found in Axelsson and Westerlund (2000). However, if one compares the AEI with LMT, those who enrolled in the AEI in 1997 had higher wage earnings before program and lower wage earnings after program. In the sample enrolled in 1998 LMT participants had slightly higher average wage earnings both before and after program.

In Table 2 the frequencies and fractions of various characteristics are displayed for the different samples. Detailed definitions of the variables are given in the Appendix. As Table 2 shows, there are no great changes in characteristics between the 1997 and the 1998 enrollees. The major differ-

³ Note that in Table 1, and henceforth, the sample enrolled in 1997 is also referred to as both 1996 – 1999 and 1996 – 2000, based on the years of measurement before and after program. Similarly, the sample enrolled in 1998 is also referred to as 1997 – 2000.

ences between the programs are that the participants in the AEI are a little younger, include more females and have a slightly shorter education.

Table 2 also compares the fractions of participants in the AEI and LMT with respect to branches of employment prior to program. Given the differences in the contents of the AEI and LMT, there are surprising similarities between the programs when it comes to the pre-program employment by branch. The public service sector is the main difference. In the 1997 sample, the fraction in the AEI was 34.2 per cent compared with 24.8 in LMT (34.6 and 25.3 in the 1998 sample).

There are two dummy variables indicating regional residency in Table 2. The inland of Norrland is a sparsely populated area made up of the municipalities in the north of Sweden with no coast line. This region has a permanently higher than average unemployment rate. The Stockholm county is on the other hand a region where one may expect the diversity of branches and the overall employment level to be higher than in any other region in Sweden.

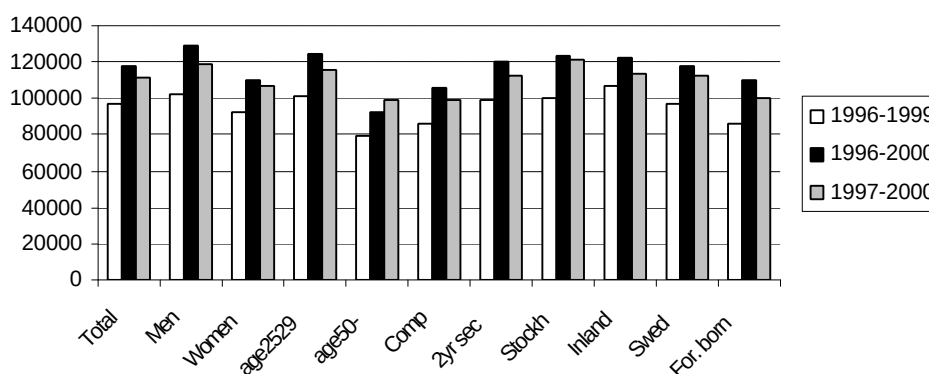
A “high percentage of upper three year secondary school diplomas” is a municipal dummy variable. It has been given the value one for the municipalities with fractions of the population with at least three year upper secondary education exceeding the median fraction of the whole population. It equals one for 67 out of the 288 municipalities, representing 54.4 per cent of the population (municipalities with high populations tend to have high fractions). In both samples, it takes the value one for roughly 48 per cent.

Table 2: The fractions of various characteristics among participants in the AEI and LMT.

	Enrolled 1997			Enrolled 1998		
	N	% of AEI	% of LMT	N	% of AEI	% of LMT
Total	20,124	56.7	43.3	14,433	54.8	45.2
Zero wage earnings 1996/97	5,873	26.5	32.7	3,738	25.3	26.6
>150,000 W.E. 1996/97	2,502	12.2	12.8	2,799	17.3	21.9
Male	8,601	33.8	54.4	5,657	31.0	49.7
- child(ren) at home	2,161	8.4	13.9	1,322	7.1	11.7
- married	2,750	10.0	18.5	1,711	8.9	15.5
Female	11,523	66.2	45.6	8,776	69.0	50.8
- child(ren) at home	6,880	41.4	24.7	5,333	44.5	27.8
- married	4,536	25.6	18.6	3,297	25.2	19.9
Age 25-29	5,024	27.4	21.8	3,693	27.8	22.9
Age 30-34	4,703	24.7	21.6	3,448	24.8	22.8
Age 35-39	3,534	17.3	17.9	2,577	18.4	17.2
Age 40-44	2,787	13.2	14.7	1,871	12.4	13.7
Age 45-49	2,232	9.8	12.7	1,477	9.1	11.6
Age 50-55	1,844	7.7	11.1	1,367	7.5	11.9
Elementary school	697	3.3	3.7	513	3.2	4.0
Compulsory school	3,478	19.2	14.7	2,628	20.5	15.4
2-year secondary school	10,842	61.8	43.5	7,637	63.1	40.5
3-year secondary school	2,505	9.0	16.9	1,869	8.8	18.0
< 3 years of university	1,739	5.2	13.1	1,196	3.4	14.3
≥ 3 years of university	863	1.4	8.0	590	1.0	7.9
Manufacturing	1,925	9.1	10.2	1,467	8.6	12.0
Construction	898	4.0	5.1	452	2.7	3.7
Retail	2,984	15.0	14.6	2,593	17.3	18.7
Private service	1,385	6.6	7.2	1,170	7.2	9.2
Public service	6,063	34.2	24.8	4,388	34.6	25.3
No attachment	6,869	31.1	38.1	4,363	29.6	31.1
Stockholm county	2,750	13.2	14.2	2,410	16.3	17.2
Inland of Norrland	1,434	7.3	7.0	946	7.0	6.1
High % sec. school	9,736	44.9	53.0	6,883	44.8	51.2
Swedish citizen	18,359	93.7	87.9	13,207	92.9	89.8
Born in a foreign country	3,415	14.2	20.5	2,287	14.1	17.9
Disabled	2,471	11.3	13.5	1,340	8.9	9.7

To conclude this descriptive part of the paper, Figure 1 shows the average wage earnings across some of the subgroups. Every subgroup has three columns, defined in the same way as in Table 1. As can be seen, wage earnings was on average higher for men, young age groups and Stockholm residents. The reverse is shown for individuals above the age of 50, those with a short education and those who are foreign born.

Figure 1: Mean wage earnings after program for various subgroups.



3. Mobility between branches of employment

This section will look at movements between the branches of employment that were mentioned in the previous section. The analysis is based on a rather crude division of the employed into five different branches, including the public service sector.

In Table 3, the frequencies in each branch of employment, before and after program, are given. Those who had no attachment are labeled “no branch”. As employment generally increased, there is a decrease in the fractions of “no branch” after program and an increase of the fractions on all branches. The largest changes occur in private service which in the 1997 sample increased its share by about 70 per cent. There is also a large increase in the fraction of manufacturing, in the region of 50 per cent.

Table 3: Distribution across branches of employment before and after program.

Sample	1996 – 1999		1996 – 2000		1997 – 2000	
	Before	After	Before	After	Before	After
No branch	34.1	21.7	34.1	18.2	30.2	17.9
Manufacturing	9.6	13.7	9.6	15.3	10.2	13.0
Construction	4.5	4.3	4.5	4.5	3.1	4.2
Retail	14.8	17.5	14.8	18.4	18.0	18.8
Private service	6.9	11.8	6.9	12.3	8.1	12.7
Public service	30.1	31.0	30.1	31.3	30.4	33.4

As it is difficult to get a picture of the flows between branches, one may start by looking at how large the fractions were that *returned* to the same branch as before the start of the program. Table 4 shows these fractions (those in “no branch” are excluded). The analysis in the following yields similar results for the sample enrolled in 1997 whether one looks at 1999 or 2000. For simplicity of exposition, the presentation in this section concentrates on the mobility between 1996 and 1999 for the 1997 enrollees.

The public sector had by far the highest percentage of individuals that returned after program. However, it is notable that the percentages which returned, were in most cases low. Considering the stable pattern between branches in Table 3, the flows between different branches of employment were substantial, with mobility rates in excess of 50 per cent. One must recall though, that all individuals in these samples had at least one unemployment spell during the year of enrollment to program. This may well be an explanation to the amount of mobility between the branches of employment.

Comparing the programs, the AEI participants tended to return to the public service sector to a greater extent than LMT participants. This may be an indication that the public service sector values theoretical education relatively highly. As its opposite, one would perhaps consider manufacturing, to which LMT had a relatively higher fraction of individuals that returned. Retail is the sector where the participants of the two programs seem to have behaved fairly alike.

Table 4: Percentage of individuals that return to a particular branch of employment.

	1996 – 1999		1997 – 2000	
	AEI	LMT	AEI	LMT
Manufacturing	41.0	48.6	40.0	50.5
Construction	41.5	46.3	48.7	47.4
Retail	50.2	47.8	50.9	48.8
Private service	35.6	38.5	32.7	37.9
Public service	73.3	59.1	76.1	66.9

Performing Logit estimations of the probability of changing branches, with the observations of the dependent variable Y coded $Y = 1$ if an individual changed branches of employment and $Y = 0$ otherwise, the results reveal that the AEI participants had a relatively lower probability of mobility. This holds in both samples. Table 5 shows the full results.⁴

In Table 5, the variable “branch density” indicates the number of branches that are represented in the municipality of residence. It follows the Swedish industrial classification system (SNI92) at the five digit level. The estimated coefficient on this variable have the expected sign and is significant for the 1997 sample. Among other explanatory variables, the parameter estimates on the regional dummies of the inland of Norrland and the Stockholm county have the expected signs (negative and positive respectively). Coefficient values for younger age groups and males indicate a higher probability of mobility. The estimated parameters on wage earnings before program indicate a higher probability of returning to the same branch.

⁴ 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 level; 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; for wage earnings, wage earnings SEK 0 – 50,000.

Table 5: Logit estimates of mobility between branches of employment.

Dependent variable: Y=1 if the individual changed branches of employment, Y=0 otherwise.

Sample	1996 – 1999	1997 – 2000
	N = 11,222 Coefficient	N = 8,872 Coefficient
Constant	-1.125	-.976
AEI	-.210 ^{***}	-.289 ^{***}
Branch density	.004 ^{***}	.001
Regional employment	.013	.007
Regional growth	-.003	.027
Inland of Norrland	-.040	-.203 ^{**}
Stockholm county	.237 ^{***}	.221 ^{**}
Age 25-29	.148 [*]	.180 [*]
Age 30-34	.206 ^{**}	.166 [*]
Age 35-39	.024	.074
Age 40-44	-.074	-.053
Age 45-49	-.038	-.156
Compulsory school	.100	.239
2 year upper sec. school	-.015	.218
3 year upper sec. school	.034	.310 ^{**}
University ≤ 3 years	.045	.137
University > 3 years	-.286 [*]	-.051
Working disability	.060	.253 ^{***}
Born in foreign country	-.095	-.283 ^{**}
- yrs since last immigration	-.010	.010
Citizenship Scandinavian	.003	-.087
Citizenship European	.032	.455 ^{**}
Citizenship outside Europe	.202	.115
Male	.431 ^{***}	.597 ^{***}
- male married	.181 [*]	-.051
- male with child(ren)	-.198 [*]	.053
- female married	-.001	.075
- female with child(ren)	-.122 ^{**}	-.060
Wage earnings before prg	$-3.3 \cdot 10^{-6}$ ^{***}	$-3.3 \cdot 10^{-6}$ ^{***}
- W.E. mean dev. squared	$5.2 \cdot 10^{-6}$ ^{**}	$1.1 \cdot 10^{-5}$ ^{***}
- W.E. 50,001–150,000	-.157 [*]	-.102
- W.E. 150,001–300,000	.166	.096

Note: ^{***} significant at the 1 % level.
^{**} significant at the 5 % level.
^{*} significant at the 10 % level.

A more systematic analysis of mobility between branches of employment is provided by estimations of multinomial logit models (see e.g. Greene 2000, ch. 21). Conditioning on the branch of employment before program participation, observations of the dependent variable in the multinomial logit model represent four possible outcomes. These correspond to the four branches of employment *after* program, equal to those given in Table 4, but with manufacturing and construction merged.

The model handles four unordered outcomes $j = 0, 1, 2, 3$ for each individual i . The multinomial logit model can be expressed in terms of the probabilities of outcome j :

$$\Pr[Y = j] = \frac{\exp(x_i b_j)}{\sum_{k=0}^3 \exp(x_i b_k)}$$

where x_i contains explanatory variables and β is a vector of parameters. Estimations require that the model is normalized by assuming the parameters $\beta = 0$ for one of the outcomes. Defining $j = 0$ as the alternative of staying in the same branch of employment and assuming $\beta_0 = 0$, there are three sets of parameters to be estimated, one for each remaining outcome $j = 1, 2, 3$. The outcome of staying in the same branch is the alternative of reference. Facilitating the interpretation of the parameters, the model can be written as a linear model in terms of the log – odds ratios:

$$\ln \frac{\Pr[Y = j]}{\Pr[Y = 0]} = x_i b_j$$

The multinomial logit parameter estimates pertaining to the variable indicating participation in the AEI, are presented in Table 6. To interpret the coefficient estimates one may use the public service sector as a point of departure. The estimations results indicate that given that an individual was in the public service sector in the year prior to program, the probability of moving to any other branch of employment is lower among the AEI participants relative to LMT. This holds in both samples.

Table 6: Multinomial logit estimates of the probability of mobility conditioning on a specific branch of employment before program. Estimated parameters on the variable AEI.

	Branch of employment after program							
	1996 – 1999				1997 – 2000			
	1	2	3	4	1	2	3	4
Before program:								
1. Manuf. + constr.		.470 *	.526 *	.472 *		.278	-.358	.258
2. Retail	-.124		.044	.039	-.412 *		-.197	-.103
3. Private service	-.029	.129		-.133	-.176	-.122		.216
4. Public service	-.656 *	-.363 *	-.910 *		-.420 *	-.250 *	-.590 *	

Note: * significant at the 5 % level.

If one instead conditions that participants were in manufacturing or construction the year before program, those enrolled in the AEI have a relatively higher probability of mobility to retail, private service or the public service sector. For the 1998 sample, these estimates are not significantly different from zero.

The results of the multinomial model indicate that the lower probability of mobility for the AEI, indicated in Table 5, is largely a consequence of the behaviour of those employed in the public sector.⁵

4. Effects on wage earnings

This section presents the estimation results of the effects of the AEI on annual wage earnings relative to LMT. To start with, the results from using ordinary least squares (OLS) estimations are displayed. These make corrections for observable differences in the characteristics of the program participants. Then follows a brief presentation of the classical selection model which, under certain assumptions, also considers systematic differences in unobservable characteristics between the program participants.

⁵ The complete set of the multinomial logit model estimates is available from the author on request.

4.1 Ordinary least squares estimations

Theoretically, when individuals choose to enroll in one of two labor market programs, their decisions are based on their expected utility of participating in the respective programs. This causes the groups of enrollees to differ systematically with respect to various characteristics which in turn may influence the outcomes.

Using OLS the effect on wage earnings of the AEI relative to LMT is estimated conditional on the variables that are included in the regression. The complete OLS results of the total samples are presented in Table A.1 in the Appendix. The parameter values associated with the AEI are significantly negative in all three equations. In Table 7, the estimated coefficients on the indicator of participation in the AEI are presented using various subsamples. All the estimated coefficients in Table 7 are significantly different from zero at the five per cent level.

If one compares the estimated results of the 1997 sample on their wage earnings in 1999 and 2000, one would perhaps expect them to be more beneficial for the AEI in 2000. As the AEI does not have a connection to a profession or a specific working site, it could be that it is more difficult for the AEI participants to find work in the short run. This reasoning is in line with Stenberg (2002a) who found the AEI participants to have longer duration in unemployment than the vocational part of LMT. In Table 7, the coefficients of the estimates 1996 – 2000 are closer to zero compared with 1996 – 1999. This holds for all subsamples represented and indicates a lag in the effects on wage earnings of the AEI relative to LMT.

Hypothetically, there are several potential reasons for the coefficient values to differ between the estimations 1996 – 1999 and 1997 – 2000. First, one may suspect that a newly introduced program such as the AEI would attract the unemployed with the highest expected returns in its first year. Other things being equal, this implies that the earnings effect should be lower for 1998 participants. The effects could also be sensitive to changes in the composition of participants. According to Table 1, wage earnings before program changed somewhat between 1997 and 1998. Among other possible reasons for the estimation results to differ are structural changes in the labor market, economic fluctuations and quality changes in how the programs

were administered. If one compares the coefficient values for the total sample, the subsamples of males, females and several others, there are only minor differences in the estimation results 1996 – 1999 and 1997 – 2000.

Table 7: OLS estimates of post program wage earnings effects of the AEI.

Dependent variable: Wage earnings.						
Sample used	1996 – 1999		1996 – 2000		1997 – 2000	
	N		N		N	
Total sample	20,124	-15,809	20,124	-11,396	14,433	-16,866
Males	8,601	-18,569	8,601	-12,369	5,657	-19,055
Females	11,523	-12,505	11,523	-9,550	8,776	-14,642
Munic. with high % secondary school	9,736	-17,543	9,736	-12,646	6,883	-19,243
- low % sec. school	10,388	-14,279	10,388	-10,297	7,550	-14,193
Inland of Norrland	1,434	-19,537	1,434	-7,314	954	-8,938
Stockholm county	2,749	-9,905	2,749	-6,357	2,371	-7,779
No secondary school	4,175	-18,181	4,175	-14,894	3,141	-12,020
2-year secondary school	10,842	-14,103	10,842	-9,481	7,637	-15,660
More than secondary sch.	2,602	-15,784	2,602	-12,022	1,786	-25,215
Foreign citizens	1,765	-18,063	1,765	-13,337	1,226	-31,319
Foreign born	3,415	-21,722	3,415	-18,725	2,287	-28,003
Disabled	2,471	-8,120	2,471	-5,969	1,340	-8,432
Zero wage earnings	5,873	-20,706	5,873	-16,676	3,738	-20,998
Wage earnings >150,000	2,498	-13,399	2,498	-7,478	2,798	-18,694
Manufacturing	1,925	-16,626	1,925	-7,121	1,467	-24,316
Retail	2,983	-12,734	2,983	-6,117	2,593	-20,209
Public service	6,063	-10,439	6,063	-6,549	4,388	-6,823

Note: All estimates are significant at the 5 % level.

In Table 7, the estimates with respect to the subsamples of males and females give the impression of more beneficial effects of the AEI for females.⁶ To explain this gender pattern, there is a potentially important ob-

⁶ Coefficient values in Table 7 are influenced by the standard deviations of the respective sam-

servation outside the economics literature, in Axelsson (1996). She interviewed ten women and four men from groups with the lowest salaries. She met these individuals in their homes, on several occasions, during a period of 18 months. They generally stated that their short education was the most important explanation to their relative poverty. However, women often explained it with the fact that they had become young mothers. Men instead tended to say they were “too stupid”. This could perhaps reveal a difference in self-esteem between gender at the lower end of the social scale. In fact, the reason there were only four men in her study was that it was so difficult to find men that would agree to be interviewed. If her observations were true in general, the men in our samples would have less confidence to confront theoretical studies and be more reluctant to participate in the AEI. This is also indicated in the estimated effects of participation in the AEI in Table A.2 in the Appendix. The implication here is also that males in the AEI relative to females, achieve less beneficial effects, as compared with vocational training.

The samples are also divided based on the municipal populations educational levels, i.e. the fractions of the population with at least a three year upper secondary education. If one looks at average wage earnings in these groups of municipalities (not displayed), they are very similar both before and after the respective programs. In municipalities with fractions below the median of the population, the marginal return of formal education may be higher because of a low supply of well educated. On the other hand, in municipalities with high fractions, there may be spill-over effects on the local labor market which increase the returns of formal education relative to vocational training. The results in Table 7 point towards more advantageous effects of the AEI relative to LMT in municipalities with a “low education”.

As mentioned in section two, the county of Stockholm and the inland of Norrland represent two labor markets with opposite characteristics. In Stenberg (2002b) it was found that the effects of a general labor market measure such as the AEI, is more dependent on a diversified labor market. This is also indicated in the 1996 – 1999 estimates. However, the differences in coefficient values are small between the other columns. The hypothesis that

ples. If one compares the ratios between the coefficient values and their standard deviations in the outcome variable, the patterns commented in this section still hold.

the outcome of the AEI was more dependent on a diversified labor market no longer finds support.

Participants with a two year secondary school diploma was a major target group of the AEI. In contrast to others, this group could improve their educational level with an established degree. As was seen in section two, they constituted more than 60 per cent of the participants in the AEI. For this group, the coefficient values of the 1997 sample are only slightly higher than for the total sample. As was mentioned in section two, there are indications that many of those with an upper two year secondary school diploma did not complete the third year while enrolled in the AEI.

One of the explicit aims of the AEI was to assist groups with a weak position in the labor market. Disadvantaged groups are represented by those with a reported working disability, foreign born, foreign citizens and those with zero wage earnings the year before program.

The parameter estimates for those with a reported working disability are closer to zero than the estimates of the full samples. Negative coefficients are obtained for the samples of foreign born and foreign citizens which, in absolute values, exceed those of the full samples. These two groups may be special as they might have cultural barriers to overcome. On this evidence, vocational training then seems as a more efficient tool than theoretical schooling. Participants with zero wage earnings the year before program show weaker effects of the AEI compared with most other groups. Apart from those with a working disability, the impression is that, on average, participants with a weak position prior to program had lower effects on wage earnings from the AEI relative to LMT than other subsamples.

Finally in Table 7, there are results from samples of the different branches of employment the year before program. Compared with manufacturing and retail, those attached to the public service sector have earnings effects which are more beneficial for the AEI. This is what one would expect. Arguably, LMT has a more natural connection to manufacturing than the AEI. The results could imply that the public service sector values theoretical education relatively higher than other branches do. However, the estimation results for 1996 – 2000 are fairly similar across different branches.

Both for manufacturing and retail, the estimates 1996 – 1999 indicate considerably more beneficial effects of the AEI compared with 1997 – 2000. This is interesting to note in view of the results on mobility in Table 6. The AEI overall had a lower probability of mobility, but when conditioning on employment in manufacturing and construction before program, the participants in the AEI had a *higher* probability of mobility to all other sectors in the 1996 – 1999 sample. For estimates 1997 – 2000 this difference in mobility was not significantly different from zero. A relatively higher mobility among the participants in the AEI in the 1997 sample may be a partial explanation to the relatively beneficial estimate obtained.

4.2 The selection model

Evaluation studies of labor market programs and formal education are widely believed to be influenced by selection on unobservable characteristics. Researchers assume that individuals with certain abilities tend to be overrepresented in certain programs. If the unobservable characteristics also affect the outcome, OLS estimates will be biased. A typical unobservable attribute would be motivation. If one uses “non-participants” as reference group to education one would normally assume those who enroll to be more motivated. However, when comparing two labor market programs, as in this study, it is not obvious in which direction the selection on unobservables would bias the OLS estimates.

The classical selection model has an intuitively attractive set up which, under certain assumptions presented below, yield unbiased estimates even if the individuals choose program on the basis of their unobservable characteristics. The model specifies two equations, one for the decision in which program to participate and one for the outcome. Let D_i be a dummy variable which takes the values $D_i = 1$ for the AEI and $D_i = 0$ for LMT. The participation equation can then be written

$$D_i^* = z_i g + u_i$$

where

$$\begin{array}{lll} D_i = 1 & \text{if} & D_i^* > 1 \\ D_i = 0 & \text{if} & D_i^* \leq 1 \end{array}$$

The outcome equation is given by

$$y_i = x_i\beta + aD_i + e_i$$

The vectors z_i and x_i contain observable explanatory variables (to be defined), a indicates the effect of participating in the AEI while β and g are vectors of parameters to be estimated. The error terms in the respective regressions are assumed to be correlated with correlation coefficient ρ and have a bivariate normal distribution. Based on the assumption of bivariate normality, the first step estimation is used to create an extra variable, the inverse Mill's ratio. It is inserted in the outcome regression and takes account of the unobserved heterogeneity in the samples of the participants of the two programs.⁷ This variable is often referred to as “Heckman's lambda” (? henceforth). The sign of the coefficient on ? indicates the sign of ρ , and thereby, the direction of how the selection on unobservables has biased the OLS estimates.

Theoretically, to identify the two step estimations, it is not necessary to use instrumental variables (IV's), i.e. variables that are excluded from the outcome equation. However, quite implausible coefficient values indicate that the model is not properly identified without the exclusion of variables from the outcome equation. The criteria of valid IV's are (i) that they should have a strong explanatory power in the participation equation, and (ii) they should not affect the structural form of the outcome equation. The strategy to find IV's here follows Stenberg (2002b), who excluded the municipal fractions enrolled in komvux and the educational level dummy variables from the outcome regression. In the OLS estimates (see Table A.1), the educational level dummies are rarely significantly different from zero.

In Table 8, the selection model estimates of the effects of participation in the AEI, are given for different subsamples. The complete selection model results for the total samples are presented in the Appendix in Table A.2 (the participation equation) and Table A.3 (the outcome equation).

A simple two step procedure is performed in order to test whether the IV's are valid or not. First, the participation in the AEI is estimated with a Probit

⁷ Formally, the inverse Mill's ratio created in the first step is the estimated value of $f(z_i g)/\Phi(-z_i g)$, where $f(\cdot)$ and $\Phi(\cdot)$ denote the pdf and cdf of the normal distribution, respectively.

model to generate fitted values of the probability to enroll in the AEI. These fitted values replace the AEI dummy in two different OLS regressions on wage earnings. The first uses all the explanatory variables in Table A.1 as well as the municipal fractions enrolled in komvux, i.e. it includes the IV's. The second regression excludes the IV's but is otherwise identical. A likelihood-ratio test indicates whether the excluded variables had any explanatory power in the regression on the outcome variables. A p -value above .05 indicates that the null hypothesis of valid instruments is not rejected.

In Table 8, the p -values of the full samples reject the null hypothesis of valid instruments. Fortunately, in order to get an idea of the direction of the selection on unobservables, for the majority of the samples the specification of the selection model is not rejected. The indication is in general that there is a positive selection into the AEI, implying that OLS overestimates the effects of the AEI relative to LMT. In fact, all the estimates in Table 8 where the specification is not rejected, and where the coefficient on ? is significantly different from zero, indicate a positive selection on unobservable variables into the AEI.

Note that for samples based on the educational level there is a shortage of strong IV's and it becomes difficult to get reliable estimates. The same reservation may also be valid for samples below some 2,000 observations which have a tendency to show large variations in the coefficient estimates.

Table 8: Selection model estimates of post program wage earnings effects of the AEI.

Dependent variable: Wage earnings.

	1996 – 1999			1996 – 2000			1997 – 2000		
	N		p	N		p	N		p
Total sample	20,124	-26,430 *	.003	20,124	-23,971 *	.000	14,433	-36,596 *	.034
Males	8,601	-36,777 *	.411	8,601	-32,532 *	.031	5,657	-42,558 *	.339
Females	11,523	-24,186 *	.002	11,523	-23,517 *	.011	8,776	-34,211 *	.165
Munic. with high % secondary school	9,736	-21,240 *	.287	9,736	-18,977 *	.010	6,883	-40,733 *	.025
- low % sec. school	10,388	-30,878 *	.004	10,388	-24,034 *	.004	7,550	-28,824 *	.686
Inland of Norrland	1,434	-52,307 *	.129	1,434	-32,212 *	.601	954	-11,967	.387
Stockholm county	2,749	-13,120	.201	2,749	-3,920	.093	2,371	-27,148 *	.189
2+3-yr secondary sch.	13,346	-13,204	.071	13,346	-2,460	.003	9,506	-26,288 *	.282
Foreign born	3,415	-34,814 *	.020	3,415	-36,431 *	.026	2,287	-73,852 *	.587
Disabled	2,471	-24,759	.535	2,471	-14,118	.579	1,340	-40,319	.857
Zero wage earnings	5,873	-47,896 *	.298	5,873	-40,407 *	.070	3,738	-63,387 *	.184
W.E. >150,000	2,498	-4,375	.841	2,498	-1,165	.269	2,798	-660	.496
Manufacturing	1,925	-44,963 *	.554	1,925	-30,930	.648	1,467	-66,202 *	.567
Retail	2,983	-35,454 *	.571	2,983	-33,300 *	.103	2,593	-41,663 *	.718
Public service	6,063	-13,910 *	.352	6,063	-14,957 *	.440	4,388	-14,666 *	.072

Note: * significant at the 5 % level.

The results displayed in Table 8 are in general not in contradiction with the relations that were commented regarding Table 7, despite the larger variation in coefficient values. However, there are two exceptions. The implication that those with a reported working disability had a relatively favorable outcome of the AEI relative to the total sample is moderated considerably in Table 8. Another difference compared with Table 7 is that the public service sector has estimates which are relatively higher as compared with manufacturing and retail also in 2000 for those enrolled in 1997.

5. Concluding discussion

This paper has evaluated the effects of the Adult Education Initiative (AEI) relative to the vocational part of Labor Market Training (LMT), with wage earnings from 1999 and 2000 as outcome variables. Using data on branches of employment, the mobility among the participants in the respective programs have also been studied.

Data on attachment to branches of employment shows that the participants in the AEI more frequently were employed in the public service sector. Among those who were employed in the year before and in the year after program, logit estimations yield results which indicate that participants in the AEI had a lower probability of mobility relative to LMT. Performing multinomial logit model estimations, conditioning on the public service sector as the branch of employment before program, the results also indicate a lower probability of movement among the AEI participants. However, conditioning on those in manufacturing and construction (merged), the estimates imply that the AEI participants have a higher probability of changing between branches of employment. This result changes for the 1998 sample to be insignificantly different from zero. Hence, the generally lower mobility among participants in the AEI seems to be the result of low mobility from the public sector.

The effects of the AEI relative to LMT of participants enrolled in 1997, could be evaluated for two subsequent years to help determine whether there is a lag in the effects of the AEI. The negative effects are reduced when estimated on wage earnings 2000. This may be a consequence of the fact that the AEI participants had more difficulties finding work after program, something which is plausible given the natural link of LMT to a given profession or a working site.

Conversely, the OLS estimates 1996 – 1999 showed only small differences compared with the estimates 1997 – 2000, despite the fact that they could differ for a number of reasons. In particular, one may be tempted to think that the AEI would have attracted the unemployed with an, on average, higher expected gain from the AEI in the first year. There was no support for this hypothesis in the OLS estimates

Several results from Stenberg (2002b) are confirmed. Females seem to have had a relatively more beneficial effect of the AEI compared with men. Also, groups with a weak position in the labor market had smaller effects on wage earnings of the AEI than the full samples. On the other hand, differences in the effects between the Stockholm county and the inland of Norrland, found in Stenberg (2002b), does not hold for earnings outcomes measured in 2000. The results pertaining to the group with a prior two year upper secondary school did not differ substantially from the total sample estimates.

Concerning samples of different branches of employment prior to program, the AEI seemed to have rendered the most advantageous effects among participants attached to the public service sector. Conditioning on manufacturing as branch before program, there is a substantial decrease in the effects of the AEI in the sample enrolled in 1998. This is interesting considering the mobility estimations which indicate that the AEI participants, when one conditions on manufacturing and construction, were relatively *more* mobile than LMT participants in the sample enrolled in 1997. For the same subgroup, this is not found among those enrolled in 1998. A possible interpretation is that the extent of the mobility partially explain the differences in the estimated effects on wage earnings.

Selection model estimates indicate a positive selection on unobservables into the AEI. It implies that OLS overestimates the effects of the AEI relative to LMT.

The short run evaluations of the AEI are so far incomplete as there was a large group still in the educational system. Future studies of the AEI will hopefully clarify what this exclusion has meant for the results.

Appendix

Exclusion conditions and the number of observations excluded:

Note that an observations may have been excluded for more than one reason.

If age is not between 25 and 55, 4,487 observations from 1997 and 5,964 from 1998 were excluded.

If recorded in LMT before May 1st the year of enrollment, 4,775 and 16,258 observations.

If recorded as participant in the AEI in the autumn after program, i.e. 1998 and 1999 respectively, 26,447 and 11,888 observations.

If recorded in LMT more than 365 days and/or finished LMT after the 1st of July in the year which follows enrollment, 3,438 and 16,144 observations.

If participants in the AEI were in adult education already in the spring term of the year they enrolled in the autumn, 15,416 and 45,301 observations.

If zero days in Händel in the year of enrollment to program, 8,067 and 18,689 obs.

If missing observations (various variables), 8,375 and 13,749 observations.

If registered in any formal education, adult education, university or other, during the year of measured outcome 31,926 and 44,113 observations.

Conditioning that the samples 1997 – 1999 and 1997 – 2000 are identical, 2,851 observations.

Outlier values of wage earnings of SEK 300,000 and more, 1,364 and 1,059 observations.

Definitions of variables:

AEI; Officially domiciled in Sweden and registered in adult education some time during the autumn semester of 1997 or 1998, and receiving the special

grant for education and training.

BRANCH OF EMPLOYMENT; Five sectors are given, manufacturing, construction, retail, private service and public service.

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

DISABLED; Classified with a working disability in the year of enrollment.

EDUCATIONAL LEVEL; Highest level of education attained by 1997.

FRACTION IN ADULT EDUCATION; The number of individuals registered in adult education at komvux during the autumn semester of 1997 or 1998, divided by the municipal population.

INLAND OF NORRLAND; Norrland except municipalities with a coast line.

LMT; Registered in LMT October 15th 1997 or 1998, with program start not before May 1st 1997 or 1998, officially domiciled in Sweden and aged between 25 and 55.

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

REGIONAL EMPLOYMENT GROWTH; Measured for 21 counties as the change in the employment rate in the second quarter of 1999 and 2000, 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 1999 and 2000. Employment figures based on Statistics Sweden and their Labor Force Surveys (Arbetskraftsundersökningarna, AKU).

Table A.1: Results of OLS estimations.

Dependent variable: Wage earnings.			
Sample	1996 – 1999 N = 20,124 Coefficient	1996 – 2000 N = 20,124 Coefficient	1997 – 2000 N = 14,433 Coefficient
Constant	-28,201	-15,321	14,469
AEI	-15,809 ^{***}	-11,396 ^{**}	-16,866 ^{***}
Munic. % with 3yr sec. sch.	-179 [*]	-116	178
Munic. % aged 25-64	-27,622	-17,228	-86,424 ^{**}
Regional growth	-1,034 ^{**}	332	-224
Regional employment	1,555 ^{***}	1,385 ^{**}	1,227 ^{***}
Stockholm county	971	2,657	8,986 ^{***}
Inland of Norrland	7,538 ^{***}	4,808 [*]	15
Age 25-29	27,021 ^{***}	35,840 ^{***}	27,392 ^{***}
Age 30-34	22,616 ^{***}	31,634 ^{***}	22,606 ^{***}
Age 35-39	21,519 ^{***}	29,491 ^{***}	18,580 ^{***}
Age 40-44	19,897 ^{***}	26,971 ^{***}	18,168 ^{***}
Age 45-49	13,220 ^{***}	18,463 ^{***}	13,442 ^{***}
Compulsory school	-5,526 [*]	-10,441 ^{***}	-8,238 ^{**}
2 year upper sec. school	2,114	-801	-1,471
3 year upper sec. school	3,088	-319	1,161
University ≤ 3 years	8,072 [*]	7,340 [*]	9,070 ^{**}
University > 3 years	187	-2,859	1,993
Manufacturing	8,535 ^{***}	7,804 ^{**}	16,750 ^{***}
Construction	18,807 ^{***}	16,539 ^{***}	19,505 ^{***}
Retail	10,243 ^{***}	10,352 ^{***}	14,553 ^{***}
Private service	9,407 ^{***}	10,921 ^{***}	11,970 ^{***}
Public service	14,924 ^{***}	9,221 ^{***}	18,447 ^{***}
Working disability	-28,628 ^{***}	-33,921 ^{***}	-31,624 ^{***}
Born in foreign country	-9,693 ^{***}	-9,452 ^{***}	-9,031 ^{**}
- yrs since last immigration	-342 ^{**}	-395 ^{**}	-186
Citizenship Scandinavian	4,614	1,594	-35
Citizenship European	22,832 ^{***}	31,501 ^{***}	20,656 ^{***}
Citizenship outside Europe	-5,689	-10,341 ^{**}	-10,148 ^{**}
Male	9,887 ^{***}	19,674 ^{***}	11,378 ^{***}
- male married	1,544	2,815	2,586
- male with child(ren)	11,633 ^{***}	11,385 ^{***}	6,677 [*]
- female married	8,534 ^{***}	9,353 ^{***}	10,217 ^{***}
- female with child(ren)	1,605	2,572	73
Wage earnings before prg	.365 ^{***}	.328 ^{***}	.307 ^{***}
- W.E. mean dev. squared	-.664 ^{***}	-.663 ^{***}	-.747 ^{***}
- W.E. 1 – 50,000	-2,961	-1,417	2,150
- W.E. 50,001–150,000	-10,062 ^{***}	-5,928	-4,123
- W.E. 150,001-300,000	-10,685 [*]	-4,821	-240

Note: ^{***} significant at the 1 % level.
^{**} significant at the 5 % level.
^{*} significant at the 10 % level.

Table A.2: Results of ML probit estimations.

Dependent variable: Participation in the AEL.			
Sample	1996 – 1999 N = 20,124 Coefficient	1996 – 2000 N = 20,124 Coefficient	1997 – 2000 N = 14,433 Coefficient
Constant	.962 ^{**}	.962 ^{**}	1.244 ^{***}
Munic. % in adult education	16.744 ^{***}	16.744 ^{***}	3.338
Munic. % with 3yr sec. sch.	-.004 ^{**}	-.004 ^{**}	.002
Munic. % aged 25-64	-3.385 ^{***}	-3.385 ^{***}	-1.712 ^{***}
Regional employment	.010 ^{**}	.010 ^{**}	-.008
Stockholm county	.215 ^{***}	.215 ^{***}	.198 ^{***}
Inland of Norrland	-.088 [*]	-.088 ^{**}	-.016
Age 25-29	.197 ^{***}	.197 ^{***}	.254 ^{***}
Age 30-34	.137 ^{***}	.137 ^{***}	.162 ^{***}
Age 35-39	.051	.051	.188 ^{**}
Age 40-44	.054	.054	.106 ^{**}
Age 45-49	.013	.013	.067
Compulsory school	.143 ^{**}	.143 ^{***}	.235 ^{***}
2 year upper sec. school	.172 ^{***}	.172 ^{***}	.316 ^{***}
3 year upper sec. school	-.410 ^{***}	-.410 ^{***}	-.399 ^{***}
University ≤ 3 years	-.596 ^{***}	-.596 ^{***}	-.828 ^{***}
University > 3 years	-1.057 ^{***}	-1.057 ^{***}	-1.218 ^{***}
Manufacturing	.001	.001	-.165 ^{***}
Construction	-.019	-.019	-.060
Retail	.011	.011	-.071
Private service	.042	.042	-.097 [*]
Public service	.163 ^{***}	.163 ^{***}	.130 ^{***}
Working disability	-.120 ^{***}	-.120 ^{***}	-.104 ^{***}
Born in foreign country	.197 ^{***}	.197 ^{***}	.048
- yrs since last immigration	-.006 ^{**}	-.006 ^{**}	.005 [*]
Citizenship Scandinavian	-.331 ^{***}	-.331 ^{***}	-.039
Citizenship European	-.545 ^{***}	-.545 ^{***}	-.182 ^{**}
Citizenship outside Europe	-.009	-.009	-.007
Male	-.415 ^{***}	-.415 ^{***}	-.364 ^{***}
- male married	-.064	-.064	.053
- male with child(ren)	.132 ^{***}	.132 ^{***}	.003
- female married	-.019	-.019	-.020
- female with child(ren)	.182 ^{***}	.182 ^{***}	.130 ^{***}
Wage earnings before prg	2.1•10 ⁻⁶ ^{***}	2.1•10 ⁻⁶ ^{***}	-5.4•10 ⁻⁷
- W.E. mean dev. squared	-5.2•10 ⁻⁶ ^{***}	-5.2•10 ⁻⁶ ^{***}	-8.5•10 ⁻⁷
- W.E. 1 – 50,000	-.080 ^{**}	-.080 [*]	.049
- W.E. 50,001–150,000	-.102 [*]	-.102	.055
- W.E. 150,001-300,000	-.254 ^{***}	-.254 ^{***}	.057

Note: *** significant at the 1 % level.
 ** significant at the 5 % level.
 * significant at the 10 % level.

Table A.3: Results of the selection model outcome equation.

Dependent variable: Wage earnings.			
Sample	1996 – 1999 N = 20,124 Coefficient	1996 – 2000 N = 20,124 Coefficient	1997 – 2000 N = 14,433 Coefficient
Constant	-17,926	-5,849	32,309
AEI	-26,430 ***	-23,971 **	-36,596 ***
Regional growth	-1,019 **	348	-195
Regional employment	1,572 ***	1,406 ***	1,162 ***
Munic. % with 3yr sec sch.	-192 *	-129	185
Munic. % aged 25-64	-34,538	-26,102	-95,119 ***
Stockholm county	1,397	3,155	10,167 ***
Inland of Norrland	7,648 ***	4,948 *	243
Age 25-29	27,798 ***	36,198 ***	29,105 ***
Age 30-34	23,248 ***	31,845 ***	23,717 ***
Age 35-39	21,736 ***	29,262 ***	19,797 ***
Age 40-44	19,931 ***	26,547 ***	18,649 ***
Age 45-49	13,349 ***	18,372 **	13,681 ***
Manufacturing	8,432 ***	7,704 **	15,202 ***
Construction	18,890 ***	16,639 ***	19,086 ***
Retail	10,306 ***	10,399 ***	14,031 ***
Private service	9,540 ***	11,028 ***	11,427 ***
Public service	15,888 ***	10,385 ***	19,568 ***
Working disability	-29,454 ***	-34,921 ***	-32,647 ***
Born in foreign country	-9,510 ***	-8,947 ***	-121 **
- yrs since last immigration	-341 **	-400 **	-9,249
Citizenship Scandinavian	3,025	-305	-924
Citizenship European	21,124 ***	29,372 ***	19,242 ***
Citizenship outside Europe	-6,015	-10,702 **	-10,871 **
Male	8,153 ***	17,611 ***	8,745 ***
- male married	1,221	2,388	3,109
- male with child(ren)	12,310 ***	12,254 ***	6,585 *
- female married	8,547 ***	9,397 ***	10,209 ***
- female with child(ren)	1,950	2,936 *	730
Wage earnings before prg	.376 ***	.341 ***	.306 ***
- W.E. mean dev. squared	-.690 ***	-.697 ***	-.760 ***
- W.E. 1 – 50,000	-3,367	-1,894	2,680
- W.E. 50,001–150,000	-10,705 ***	-6,701	-3,823
- W.E. 150,001-300,000	-11,963 **	-6,365	-68
? (inverse Mill's ratio)	6,417 **	7,566 **	11,995 ***

Note: *** significant at the 1 % level.
 ** significant at the 5 % level.
 * significant at the 10 % level.

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