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# Access to Education Over the Working Life in Sweden

PRIORITIES, INSTITUTIONS AND EFFICIENCY

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**ACCESS TO EDUCATION OVER THE WORKING LIFE IN SWEDEN -  
PRIORITIES, INSTITUTIONS AND EFFICIENCY**

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## **ABSTRACT**

To facilitate individuals to adjust their skills to changes in market demands, Sweden has a relatively generous policy to stimulate formal adult education at the compulsory, upper secondary and tertiary levels. This paper provides an overview of what research has reported to assess if and/or how it may be an efficient use of tax payers' money. Some institutional factors are also briefly presented to discuss what is likely to be required for such a policy to exist in a particular country.

## **RÉSUMÉ**

Afin d'aider les individus à adapter leurs compétences à l'évolution des demandes du marché, la Suède a adopté une politique relativement généreuse pour renforcer la participation des adultes à l'enseignement obligatoire, ainsi qu'au deuxième cycle du secondaire et au supérieur. Ce document donne un aperçu des résultats de la recherche dans ce domaine, avec pour objectif d'évaluer dans quelle mesure cette politique constitue une utilisation efficace de l'argent des contribuables, et de quelle façon. Certains aspects institutionnels sont également évoqués en bref afin de déterminer quels seraient les pré-requis si une telle mesure d'action publique devait être menée dans un autre pays.

## **ACCESS TO EDUCATION OVER THE WORKING LIFE OF ADULTS IN SWEDEN - PRIORITIES, INSTITUTIONS AND EFFICIENCY**

### **1 Introduction**

1. This paper contains a description of access to education throughout working life of adults in Sweden. The aim is to put the Swedish legislative and institutional set-up in an international perspective and to discuss the economic efficiency of the system. A summary of the main characteristics can be found in Table 1.

2. Given that education is often seen as a primary engine to maintain and develop a society's economic standard of living, it is of interest to ask why the amount of adult education (AE) shows substantial variation across countries (*e.g.* OECD 2005). One way to explain this is by considering the demand and the supply of educational investments in a society. Regarding the demand side, one may argue that there is a "race" between technology and education where an advancing technology continuously increases the demand for skills (Goldin and Katz 2010, see also Van Reenen 2010). Technological shifts could differ across countries and generate differences in the demand for skills and for adult education. As for the supply, it is widely believed that on a free market, the amount of educational investments will be inefficiently low. This is because the decisions made by individuals and firms disregard that education affects the well being of society at large, *e.g.* by enhancing economic growth, democratic functions and social cohesion. To compensate for this market failure, and to provide a more efficient supply of education, governments play an important role in all OECD countries. To the extent that the market failure also involves AE, a public supply targeting adults is also justified.

3. In the case of Sweden, the public provision of adult education (AE) at compulsory, secondary and tertiary level is relatively generous. To understand country differences in the amount of publicly provided AE, three broadly defined explanations are, in their order of importance, 1) political aspects 2) emphasis given to theoretical arguments and 3) interpretations of empirical evidence. To clarify, a political system which favors a large AE sector is likely to harbor an acceptance for redistribution policies via tax payer's money. The support for AE is also reinforced if there is a belief in theoretical arguments which justify policy interventions as a tool to smooth temporal fluctuations in the labor market. In contrast, other policy makers may prefer a minimum of redistributions as they see these as unjust, and instead emphasize theories which maintain that public interventions tend to deteriorate incentives and decrease overall productivity. In an ideal world, despite different political and theoretical preferences, these policy makers could still reach a consensus view by looking at empirical evaluations of AE. However, empirical evidence in social sciences generally leaves a certain space for interpretation, which may be sufficiently large to allow for different conclusions regarding the appropriate policy.

4. The level of priority given to AE from these three perspectives constitutes an important background for the discussion in this chapter and they are addressed in more detail in Section 2. In section 3, a description of the Swedish institutional setting is provided and set in relation to the political and theoretical considerations. In Section 4, AE in Sweden is described in terms of participation rates over time, educational contents and characteristics of participants. Section 5 provides a brief survey of the

relatively few empirical studies of AE which have assessed benefits and costs from the point of view of the participating individuals as well as of the society. Section 6 concludes with a discussion.

## **2 The public supply of adult education – prerequisites and priorities**

### *Prerequisites for public supply of adult education*

5. The most common type of AE is on-the-job training, which typically involves short stints of training, predominantly for high skilled workers (Brunello 2003, Arulampala *et al.* 2004). While this partly reflects the preferences of employers, low skilled workers are also reluctant to participate due to financial constraints and/or a perception that there is little payoff (Oosterbeek 1998, OECD 2003, 2005). Governments may intervene to stimulate low skilled participation rates with (1) financial support and (2) by providing formal education or other quality certified programs for adults. This possibly generates a more efficient supply of AE if it meets an excess demand for skills.

6. A prerequisite for governments to intervene is an acceptance among citizens and politicians that resources are redistributed in favor of the low skilled. Thus, those who emphasize the loss in efficiency following tax distortions must have a weaker political bargaining power. Another important prerequisite lies in the strength of the institutional set-up itself, as a lack of social trust makes public interventions more difficult to put into practice and are more costly. Sweden has traditionally had relatively high tax rates and a broad political support for redistributive policies supporting the equality of opportunities. This is reflected also in the legislative and institutional set-up surrounding AE (see further in Section 3).

### *Theoretical considerations – changing labour market conditions*

7. Theoretically, the provision of AE stands in conflict with Becker's traditional human capital model (Becker 1962), in which it is assumed that educational investments are made if the present value of the expected benefits exceed the costs. This implies that under conditions of perfect information about future events, education should be completed as early in life as possible to allow for a longer time to reap the benefits. To put it simply, if education is not expected to be beneficial at an early age, it is even less beneficial at a future point.

8. In reality, changing labour market conditions may mean that the optimal timing is at a later stage. If individuals in each year decide whether or not to enrol in AE, non-participants are (implicitly) choosing not to enrol AE as they feel the costs are too high relative to the expected benefits. It follows that participants in AE must have experienced some change in conditions and/or expectations. One might primarily think of changes in relative wages, which could increase the expected earnings benefits of AE, new information (*e.g.* about working environments), changes in preferences, changes in health and/or changes in borrowing constraints.<sup>1</sup> This is of fundamental importance to understand the role of AE. Unfortunately, it is often argued that resources devoted to AE are better spent on early intervention policies. This argument assumes that we know which intervention is appropriate, and it is then of course preferred earlier rather than later. AE instead addresses the fact that individuals only imperfectly foresee future events.

9. The above reasoning implies that if markets change more quickly, an overall increase in AE investments should follow. OECD and Statistics Canada (2005) demonstrated an increase in AE participation rates between surveys conducted in 1994 and 2003, by 15 per cent in Switzerland and by

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<sup>1</sup> Theoretical contributions include Altonji (1993), Iwahashi (2007), Killingsworth (1982), Monks (1998), Wallace and Ihnen (1975) and Weiss (1971). Warner and Pleeter (2001) find empirical evidence of individual discount rates decreasing with age, leading to the same implication.

13 per cent in Canada and the US. This could reflect changes in the demand for AE, *e.g.* due to some technological shift or increased globalization. Policy documents also seem to indicate an increased interest in the public supply of AE within the EU, the UK, Switzerland, Austria, Belgium, Italy and Germany (EU 2001, 2008, UK Cabinet Office 2008, Schwerdt *et al.* 2011). In the US, the Obama administration issued a six-fold increase, from 2 bn dollars to 12 bn dollars, in the federal government support to community colleges to assist “casualties of a changing economy” (Kellogg and Tomsho 2009).

10. As with conventional education for youths, AE may enhance economic growth by increasing productivity (Krueger and Lindahl 2001), but arguments in favour of education are not limited to monetary aspects as it may improve democratic functions and social cohesion (Gradstein and Justman 2002, Glaeser *et al.* 2007). In addition, if AE is perceived as a way to respond to increased job-competition among low skilled due to structural changes or immigration, it could contribute to a higher level of acceptance towards changes and less social tension. Generally speaking, Swedish governments seem to have had a belief in the positive effects of AE on the democratic process. In the government bill on “adult learning and development of adult education” from 2001, the objective is phrased in the following way; “*All adults shall be given the opportunity to broaden their knowledge and develop their competences with the purpose of fostering personal development, democracy, equality, economic growth, employment and a just distribution*” (own translation from Swedish Ministry of Education 2001). It has also been claimed that the political movements influencing the government to expand AE in the 1970s emphasized the association between AE and democratic functions (Franck 2003). This line of reasoning also appears evident in how the overall educational system is framed (see Section 3).

### ***Interpreting the empirical support***

11. Empirical evaluations of AE usually focus on if/how participation in a program affects labour earnings. A positive “effect” of AE is typically an increase in earnings among participants in AE which exceeds that of a comparison group of non-participants. The economics literature on AE has covered a wide range of human capital investments. Three broad categories can be discerned; active labour market programs (ALMPs), on-the-job-training (OJT) and formal education for adults. An ideal evaluation study would be based on a “social experiment”, where a random sample of individuals undertakes AE whereas a comparison group did not. For ethical reasons, such situations rarely arise and almost all studies are based on non-experimental data. It means that researchers must take into account the self selection of individuals into AE.

12. Evaluations of ALMPs have provided mixed support, with a tendency of more optimistic findings in later surveys (Heckman *et al.* 1999, Kluge 2006, Card *et al.* 2010). Calmfors *et al.* (2001) reported weak results of ALMPs in Sweden and possibly affected how Swedish governments used their resources, but not necessarily the amount of resources (see further in Section 4). A vast literature on the returns to OJT has reported positive returns (*e.g.* Hansson 2008). Although these results are intuitively reasonable, they have been met with skepticism (*e.g.* Pischke 2007). The basic problem is that those who are in line for promotion (or an earnings increase) may also be more likely to obtain training from their employer. The payoff to OJT then risks being exaggerated as increases in earnings do not reflect the true effects of the training, even if one compares their earnings development with a group of individuals with similar earnings levels prior to OJT. Two studies which seek to separate the effects of selection from the payoff to OJT have instead reported zero returns (Leuven and Oosterbeck 2008, Fahr and Simons 2010).

13. Evaluation studies of formal education for adults arguably face less severe selection issues as the training is not as systematically related to employers’ decisions (Jacobson *et al.* 2005a, 2005b, Stenberg 2011, Stenberg *et al.* 2012, 2011). These studies are discussed in more detail in Section 5. Let us here just establish that the results overall indicate that formal AE improves average earnings, but that the costs are difficult to assess. From the society’s point of view, the costs may become overwhelming if individuals in

full employment leave work for class-room training. In the case of Sweden, the large costs implied in these studies may partly be compensated by the above alleged belief in positive side-effects of AE on the society as a whole.

### **3 Institutions encouraging adult education in Sweden**

#### *Institutional set-up*

14. In this section, a brief description of the institutional framework for AE in Sweden is followed by an outline of the Swedish educational system, including secondary education, *Komvux*, higher education and the financial schemes for (adult) students.

15. There are several aspects of the institutional and legislative set-up in Sweden which encourages participation in AE. First, employees have since 1974 a legal right to be on leave for studies and afterwards be reinstated with equal working conditions and wages. Second, municipalities are since 1969 by law obliged to offer AE at compulsory and upper secondary level. *Komvux* is the municipal institutions responsible for this supply and it is the pivotal point of AE in Sweden and also a highly accepted and well known form of education. The omnipresence of *Komvux* is complemented by the fact that tertiary education is available in about 30 cities in a total population of 9 million. Third, all publicly funded schooling is free of charge and full time students are entitled to financial support which covers modest living expenses. Fourth, the educational system at upper secondary level has a relatively high degree of “commonality”, *i.e.* courses which are shared by many educational programs. It enables individuals who wish to change professions to fulfill the required schooling in a relatively short period of time. The supply of AE at *Komvux* is of course intertwined with the conventional education for youths. Compulsory school in Sweden comprises nine years. At the age of 16, some 90 per cent of the pupils move to upper secondary school which, until 1996, consisted of about 20 two-year programmes which were mainly vocational, and five three-year theoretical programmes with different subject focus. Many universities apply *numerus clausus* to limit the number of students. The general admission requirement is a three-year upper secondary diploma, and individuals compete for the available seats based on grade point averages from upper secondary school and/or test scores (further explained below).

#### *Secondary educational system*

16. Since 1996, the mainly vocational two year programmes at upper secondary level were extended to three years to thereby guarantee eligibility for higher education. The reform has been controversial as dropout rates have increased, not only because of the extension to three years, but also because the mandatory theoretical subjects increased to include English, mathematics, science and religion in addition to Swedish which had been previously the only mandatory subject. The greater component of general education in vocational programs means that the “gap” in educational contents between different studying paths at upper secondary level is relatively narrow. This may be interpreted as a reflection of Swedish governments’ belief in the democratic effects of general education and/or a belief that equality in educational content across social groups is positive for the society.

17. Many countries have tracked systems in which low achievers are typically linked with vocational education programmes. These may take place in a workplace and provide a connection to the labour market that is stronger than in the case of general education. Countries with more pronounced tracking (*e.g.* Austria, Denmark, Germany, Netherlands) are also associated with relatively low rates of youth unemployment. It is interesting to note that the youth unemployment in Sweden is markedly higher. The emphasis on general skills applied in Sweden may generate inefficiencies in the transition from education to work, as vocational schooling at upper secondary level becomes more of a preparatory kind. On the other hand, it potentially implies a more flexible work force in the long run as the general skills may

stimulate learning on the job and re-schooling. Hanushek (2006) supports the latter line of reasoning as he reported a substantial impact of cognitive skills on future labour market outcomes. He interprets this as evidence in favor of general education as it “*suggests that alternative programs must be very highly effective if they involve a loss in cognitive skills*” (p460). The findings in Hanushek and Woessman (2006) indicate that early tracking, *i.e.* where educational contents differ between groups of pupils from an early age, tends to increase inequality in PISA test scores. This is perhaps what one would expect as larger groups in specified tracking paths imply a higher degree of skill differences, but it may be costly to a society if general skills are important for the flexibility of the low-skilled workforce.

18. There are other arguments favoring general skills which we unfortunately know very little about. One aspect is that vocational education may be associated with a higher element of risk as future changes could make a specific skill outdated or obsolete. A related argument is that AE may be a more efficient tool to increase the flexibility in skills if the level of general skills is high to begin with from youth education. The value of these arguments is difficult to assess as the long term link between labour market outcomes and educational contents is virtually unexplored (see Section 5).

### ***Komvux – adult education for low skilled***

19. Komvux is a municipal institution intended for adult schooling at compulsory and upper secondary level. Swedish municipalities are legally bound to offer the opportunity for individuals aged 20 or above to return to school to improve and/or redirect educational qualifications and also to fulfill the general admission requirement for studies at tertiary level (college).<sup>2</sup> As mentioned in Section 2, the low skilled tend to be unwilling to participate in AE due to a perception of low quality of the courses and/or low returns to education. From this perspective, it is important that AE consists of well-known educations which the applicants know are recognized on the labour market.

20. The high degree of “commonality” in regular upper secondary school, *i.e.* that the same general courses are studied by a large share of each cohort, means that less AE is needed to switch from a profession where a vocational qualification is needed, to one where general skills are required (*e.g.* a Bachelor in Business administration, computer science etc). Paradoxically, this may increase the demand for AE as the costs associated with changing professions become lower, and more individuals become inclined to enroll in AE.

21. One would perhaps like to think that AE in Sweden contributes to generate a high level of literacy and numeracy among low skilled. Some support for this was found in the International Literacy Survey (IALS, OECD and Statistics Canada 2000) where descriptive levels of literacy and numeracy were presented for the adult population across 20 countries. Sweden displayed the highest average literacy score and also the most compressed distribution. However, it is not possible to say to what extent the IALS scores reflect the quality of the overall educational system or the large AE sector (or some other factors). The OECD and Statistics Canada (2005), in a follow up study of IALS conducted in seven countries (Sweden not included), also show patterns in data indicating a positive association between the level of literacy among adults and the average AE participation rates.

### ***Higher education***

22. The government’s resources devoted to tertiary education are partly distributed between universities (and departments within universities) in proportion to the number of students registered and the amount of studies they complete. The credit-reward system generates an element of competition and is

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<sup>2</sup> For individuals at least 25 years old, and with four years of work experience, it is sufficient with passing grades in Swedish and English at a three year upper secondary level.

intended to generate efficiency in the provision of education, where the quality of the university is thought to be rewarded by the number of students it attracts.

23. The universities offer single courses but the majority of the students follow undergraduate programs which on average encompass about four years of full time study. The first two years typically contain an appropriate mixture of curricula before major subjects are studied in the last two years. The higher education system has a widely recognized credit system which, at least in theory, makes it possible for students to get earnings returns even if they drop out of an educational programme before it is completed. The close connection between general and vocational education discussed above was further underlined by the introduction in 2000 of advanced vocational education (KY, *Kvalificerad yrkesutbildning*). These programs require a three year upper secondary diploma for eligibility and are classified as tertiary level educations, but are generally shorter in study lengths. The KY participants represented about 10 per cent of the students at tertiary level in 2008.

24. Many undergraduate programs are very popular and have more applicants than there are seats. Applications and admittances are administered centrally by the government and the process stipulates that at least one third of the seats must be offered based on the grade point averages (GPA) attained at upper secondary level. Those who feel unsure whether their GPA from upper secondary school is sufficiently high to gain admission can also take the Swedish Scholastic Aptitude Test (*högskoleprovet*). A minimum of one third of the seats are offered to the highest ranked in this category, given that the general admission requirement is fulfilled. The universities may use their own criteria for admittance as long as they follow these basic rules.

#### ***Financing schemes for participants in adult education***

25. AE participants studying at least 50 per cent of a full-time study load are entitled to study allowances. A full time student is entitled to receive approximately EUR 800 a month, where two thirds is a loan to be repaid in 25 years with an interest rate below the market level (the payback rate can be slowed down in case of low earnings). A recipient must complete at least 75 per cent of the registered courses, or the government will request direct repayment the following year. The financing scheme is important as it simultaneously increases the costs of AE from society's point of view, and decreases the opportunity costs (income loss) of individuals participating in AE. Seftor and Turner (2002) found that changes in the Pell grant affected adults' probability of college enrollment markedly more than that of typically college-aged students. It is a reasonable result since earnings and thereby the opportunity costs tend to increase with age. Unfortunately, to the best of my knowledge, there is no other research on the sensitivity of participation in AE to changes in financing schemes. From the point of view of the society, a drawback with generous financing schemes for adults is that they may become very costly. Not only because of the transfers in themselves, but also through the fact that individuals may be attracted away from productive work.

26. A reduced level of financial support would increase the individual costs for participating in AE, and presumably lead to fewer participants. It would imply an efficiency gain if those with high expected returns were less affected by such a change. However, this does not have to be the case since future returns to AE are uncertain. Those who decide not to enrol will therefore also include the more risk-averse, who potentially belong to groups which the government would wish to prioritize such as low skilled, low earners and/or females who may reap sizeable benefits of AE. Several studies have found females more risk averse than males but, as we shall see in Section 5, females are also associated with more positive effects of AE.

## 4 Describing adult education in Sweden

### *Participation in Komvux*

27. Figure 1 shows the numbers registered at Komvux between 1977 and 2009. The statistics are informative regarding the incidence of AE as Komvux is only open to individuals aged at least 20. Until the 1990s, Komvux was not offered as an active labour market program (ALMP). The purpose was to avoid perverse incentives and not allow that some individuals studied at Komvux with financial support equal to the individuals' level of the unemployment insurance benefits (UI). Study allowances are not only of a slightly lower amount, but two thirds must also be repaid.

28. From 1993, the government gradually abandoned the strategy and included Komvux among the measures for unemployed. The background to this was the severe economic recession that hit Sweden at the beginning of the 1990s. The level of unemployment rose from 1.9 per cent in 1990 to 8.2 per cent in 1993. The government's first response was to expand higher education and invest large sums in ALMPs, most notably vocational training for unemployed. As unemployment levels remained high, the resources were from 1993 increasingly re-directed to provide seats at Komvux, reserved for unemployed individuals. This culminated in 1997 when the Adult Education Initiative (AEI) was launched. Between 1997 and 2002, the AEI meant that unemployed individuals were offered the opportunity to one year of full-time studies with a maintained level of the UI. The numbers registered at Komvux doubled between 1996 and 1998 and the average amount of course registrations per participant became twice as high as the possibility to finance the studies was more generous. In 1998, the level of public expenditures for Komvux was at about one fourth of upper secondary school for youths and the numbers registered in Komvux was even higher than the numbers in regular upper secondary education. In 2002, as another point of reference, 4.4 per cent of the population aged 25 to 49 years was registered at Komvux at some stage.

29. The expanded AE sector had detrimental effects elsewhere in the educational system. Björklund *et al.* (2003) showed that the increased demand for teachers at Komvux decreased the average level of qualifications of teachers at regular upper secondary school. At present, participation in Komvux is back to the level existing prior to the AEI, but resources are of course still required which could have been used elsewhere. In addition, young pupils' incentives to perform well in school may be weakened by the fact that there is a second chance. The costs to society of decreasing teacher quality in regular school and/or deteriorating incentives for pupils are hard to measure. The efficiency of AE is discussed in more detail in Section 5, but these examples illustrate some of the difficulties encountered when one seeks to empirically assess the costs and benefits of AE.

### *Who participates in adult education?*

30. Participants at Komvux typically have low but not the lowest education, are slightly more associated with social welfare and unemployment and about two thirds are women. Among males, enrollees tend to be linked with decreases in earnings and increases in transfer payments in the year prior to AE enrollment. In the case of females, the demand for AE is not as sensitive to changes in labour market conditions, but instead more influenced by demands associated with child rearing and other household responsibilities. To a certain extent, a latent demand for AE appears to be realized when child rearing restrictions are relaxed. This may happen at varying ages of the youngest child (Stenberg 2007a, Bergemann and van den Berg 2008, Stenberg *et al.* 2011). A large AE sector may also attract groups of individuals which policymakers did not have in mind. Stenberg (2011) found some 5 per cent of those registered at Komvux were more or less consistently registered in courses and financed by social welfare benefits. This could be defended on the basis of some human values, but it could also be economically rational from the point of view of the public sector if it contributes to decrease socially negative behaviours.

31. Stenberg (2011) reported that among those registered at Komvux for the first time in 1994-1995, aged 24-43, some 60 per cent received study allowances with the average sum in one year approximately EUR 3 200. Thus, the majority do not study full-time. Evening classes were traditionally an important part of Komvux and constituted 29 per cent of the registrations in 1989. These were reduced during the 1990s and represented only at 7 per cent of registrations in 1998, presumably reflecting the increased unemployment and more generous financial schemes, and were at 13 per cent in 2007.

***How much adult education is completed and what is studied?***

32. Table 2 shows the number of course registrations and completed courses for male and female first-time enrollees aged 24-41 years and 42-55 years in 1994. The samples are restricted to individuals who were not eligible to higher education, and have, therefore, completed two years of upper secondary school or shorter. Table 2 shows that between 34 and 39 per cent registered at compulsory level and that the vast majority of AE is conducted at upper secondary level (around 90 per cent of the younger sample). Tertiary level studies are not as common. About one in five in the younger group and only 7 per cent of those aged 42-55 years undertake studies at this level.

33. The last line of Table 2 gives the sum of completed course credits at compulsory, upper secondary and tertiary level. It demonstrates that the amount of studies completed is well above one year for the younger group and about half a year on average in the older group. Female tend to complete substantially higher amounts of AE than do males. Given that females also represent about two thirds of the participants, it is likely that AE contributes to narrow the gender wage and/or earnings gap.

34. The supply of courses at Komvux covers a wide range. Around 300 different subjects were taught when the number of participants was at its height. However, as is displayed in Table 3, traditional subjects such as social science, Swedish, English and mathematics dominated. These subjects are necessary to meet the general admission requirements for higher education and tend to be more popular among younger participants.

35. Figure 3 displays a histogram from Stenberg (2011) showing the amount of completed AE among first time enrollees 1994-1995, aged 24-43 in 1994. Not included are 12 per cent of enrollees who did not complete any credits. One in three participants completed courses corresponding to less than one semester of studies, and 43 per cent completed credits corresponding to more than one year of full time AE. Among enrollees aged 42-55 years (not included in Figure 3), Stenberg *et al.* (2011) find that 38 per cent completed credits worth more than .25 years of AE and only 18 per cent completed more than one year of full-time studies. Low completion rates probably reflect several very different mechanisms. To a certain degree, one would perhaps expect moderate completion rates as participants constitute a negative selection in the sense that they did not complete a three year upper secondary diploma as youths. Individuals may also interrupt their courses due to existing responsibilities in working life and/or family life or because they accept job-offers. Further, there may be individuals who merely “consume” AE as a leisure activity or in order to increase the value of their leisure by studying *e.g.* a foreign language or some other subject.

36. Stenberg (2011) found that of the AE enrollees aged 24-43 in 1994-1995, some 22 per cent again reregistered in AE at some point 2002-2004. The fraction registered every year over the period 2002-2004 was only 2.8 per cent, indicating a lot of movement in and out of AE. A possible interpretation is that the decisions to enroll in AE hinge on relatively small marginal changes in *e.g.* relative wages, information, employment opportunities, borrowing constraints etc. This could make the decision to stay on in AE sensitive to changes in the reverse direction.

***Vocational shift?***

37. One reason behind the popularity of Komvux is that until the reform of the vocational programs at upper secondary level in 1996, about 60 per cent of an age cohort studied two year programs only and were ineligible for tertiary education (see Section 2). The extension of upper secondary programs to three years in meant that only about 20 per cent of recent cohorts lacked a three year upper secondary diploma. This implies that the future need for Komvux could diminish, as much larger shares of recent cohorts are eligible for higher education, without the need for studies at Komvux. Figure 1 displays a drop in numbers participating at Komvux from 1998 which is partly an adjustment from unusually high levels. However, Figure 2 shows how the age distribution of individuals registered at Komvux changed between 1994 and 2002. Interestingly, the proportion of 20-24 year olds dropped from 25 per cent to about 5 per cent between 1994 and 2002, presumably reflecting the reduced need for Komvux following the reform of upper secondary educations for youths.

38. The government which came to office in 2006 in Sweden had an explicit objective to put more emphasis on vocational education, including a shift in the supply of courses at Komvux. Since 2009, “vocational AE” (*yrkesvux*) has been launched as a new term, with significant resources put in relatively small programs. It is still too early for an evaluation of these courses. Moreover, a reform of the Swedish upper secondary school from 2011 will re-establish some of the differences in educational content between theoretical and vocational programs.

***Higher education***

39. Figure 1 shows that during the expansion of higher education (HE) between 1989 and 2002, the number of registered students almost doubled. As in Komvux, the proportion of females is higher in HE, exceeding the number of males by about 30 per cent in 1989 and by 50 per cent in 2002. Figure 4 shows the age distribution in HE for males and females, which has been relatively stable over time. Of those registered in HE, individuals aged above 35 years old represented almost 25 per cent in 2002 (30 per cent among females). This can be compared with AE at Komvux where the corresponding fraction was 30 per cent in 1994 and 60 per cent in 2002. Using the population as a reference point, about 17 per cent of the 25-29 year old population and 8 per cent of 30-34 year-old population was enrolled in higher education. For females, also the 35-39 year-olds registered in HE represented 8 per cent of the population in 2002.

40. For a sample born in 1970, Stenberg (2007a) found about 57 per cent of the individuals registered in HE had completed at least two years by 2002. Of those who made the transition from Komvux to HE, the corresponding proportion was 50 per cent. Table 2 shows that 22 per cent of the enrollees aged 24-41 years at Komvux continued to HE but this applies to only 7 per cent among individuals aged 42-55 years. This could be a key aspect of AE in general and Komvux in particular since in a world with a polarization of skills, the transition from mid- to high-skilled through tertiary education may become increasingly important. Studies have indicated that since the early 1990s, educational investments have been relatively beneficial for moderately skilled (making the transition to high skilled) but much more modest for low skilled (on US data; Autor Levy and Murnane 2003, Autor, Katz and Kearney 2008; on data from the UK; Goos and Manning 2007). To conclude this section, one may also note that in the last decade, the above mentioned policy shift back towards vocational education has also affected HE. The advanced vocational courses KY (see Section 3) have grown from attracting about 10,000 participants in 2002 to 30,000 in 2008.

## 5 Efficiency in the provision of adult education

41. Studies evaluating AE are primarily focused on estimating the average payoff on earnings for participating individuals. The typical economic study of AE compares pre-AE earnings and post-AE earnings of participants and non-participants. After controlling for a number of observable characteristics, a higher increase in earnings among AE participants allows for the possible interpretation that AE has caused an earnings increase. One may always claim that the studies report distorted results (exaggerated or underestimated) because the participants are a selection of individuals (positive or negative) who would have experienced a similar development in average earnings also without AE. However, studies comparing results based on experimental data, with evidence from non-experimental data of good quality, indicate that the latter results may not easily be discarded (Heckman *et al.* 1999, Glazerman 2003, Smith and Todd 2005, Card *et al.* 2010).<sup>3</sup>

42. To provide an idea of the costs and benefits to society, the estimated earnings benefits of the participants in AE could be compared with the costs linked to the supply of AE, including approximations of the foregone production value of participating individuals, *i.e.* the value of the work which is not done due to the activities in AE. This value could be substantial if individuals have left full-time work to enroll AE. However, any assessment of an educational program must be interpreted with caution as schooling may have effects on society which are very difficult to measure. For example, it is feasible that AE has important effects on *e.g.* democracy, equity and social cohesion.

### *Estimating the earnings effects of adult education*

43. The most influential study of AE so far is Jacobson *et al.* (2005a) which concerned a large sample of laid-off workers who enrolled community college in Washington State. The sample studied was aged 20-59 and had at least three years of tenure when they were laid off from work at some point between 1990 and 1994. Some 20 per cent of the individuals enrolled community college. The results indicated an earnings return of about 10 per cent to a year of AE, slightly higher for females than males.

44. On Swedish data, Stenberg (2011) studied first-time AE participants with at most a two year upper secondary diploma (thus ineligible for HE), aged 24-43 years in 1994, followed until 2004, and reported a year of AE increased annual earnings by 4-5 per cent.<sup>4</sup> The estimated returns were thus only about half of those observed in the US, possibly because the distributions of skills and earnings are more compressed in Sweden than in the US, and/or that the average returns are negatively affected by the level of study allowances and/or other institutional arrangements (see Section 3). One may also consider that the AE analyzed on Swedish data chiefly concern upper secondary level studies, while community college regards tertiary education.

45. Stenberg and Westerlund (2008) studied a sample aged 25-55 in 1997 that were long term unemployed, conditioned to have zero earnings in both 1996 and 1997. The sample of participants enrolled Komvux as part of a labour market program, following the AEI which had been launched in 1997 (see Section 4). The reported earnings effects of AE were sizable, and did not differ between the younger (aged 25-42 years in 1997) and the older half (aged 43-55 years). However, the sample is highly selected and the results are unlikely to be representative for an average participant.

<sup>3</sup> Concerning formal education for adults, the only quasi-experimental evidence so far is provided by data from Switzerland presented in Schwerdt *et al.* (2011). They explored Swiss data where individuals aged 20-60 were subject to a randomly distributed voucher system. Participants completed on average 42 hours of courses, with no effects on average labor market outcomes one year later.

<sup>4</sup> Conflicting results reported in Ekström (2003) and Albrecht *et al.* (2004) were reconciled in the working paper version of that paper, Stenberg (2009).

***Adult education for the older half of the work force***

46. Regarding older individuals, Jacobson *et al.* (2005b) undertook a study similar to the one referred to above (Jacobson *et al.* 2005a) but with a particular focus on the older half of the sample, aged 35 years or above at the time of the lay-off. The estimated earnings returns were similar, regardless of age-group, but the private net benefits for the older half were only about 50 per cent of the younger half, as their expected remaining working careers were shorter. There is a question mark concerning the results given that as many as two thirds of the individuals were excluded as they were not observed through the whole period of 14 years (attached to the Washington State UI covered work force). Older workers were presumably more likely to be excluded and if community college enrollees with positive earnings effects were more likely to remain on the labour market, the earnings effects of AE may be overestimated.

47. In current work, Stenberg *et al.* (2011) analyze a sample of first time enrollees in Komvux aged 42-55 in 1994, ineligible for HE, who were followed up until 2007 when aged 55-68 years. The study thus covers a sample approaching and exceeding the age of retirement. Importantly, there are no large exclusions based on pre-AE characteristics (as in Stenberg and Westerlund 2008) or post-AE characteristics (as in Jacobson *et al.* 2005b). The findings contrast with those of earlier studies. The reported returns to AE are for males close to zero. For females, the payoff on earnings represents 4-7 per cent from 2002 and onwards. Even under optimistic assumptions, the beneficial effects on female earnings are insufficient to cover society's total costs. In addition, Stenberg *et al.* (2012) reported that AE at Komvux had no effects on the timing of retirement, a potential mechanism which otherwise could partly compensate for a low earnings return in the shorter perspective.

***Higher education for adults***

48. For individuals born in 1970, Stenberg (2007a) found that the returns to HE with at least two years completed as measured by 2002, did not differ for individuals with and without a previous spell at Komvux. For the present overview, it is of interest to provide a more general estimate of the returns to HE for adults in Sweden. A sample was therefore generated consisting of individuals with a three year upper secondary diploma as their highest attained education. Individuals aged 24-43 years who registered for the first time in higher education in 1994 or 1995 were considered enrolled in HE (5,098). OLS regressions with a rich set of explanatory variables, including transfer payments received and earnings prior to AE (see Stenberg 2011), resulted in an estimated earnings payoff of 6.3 per cent for a year in HE, as measured in 2007. An almost identical result was obtained with a reduced sample where 688 individuals in HE were compared with their siblings (family fixed effects).

49. For the older part of the work force, the returns to HE is obtained by an analogous procedure based on a sample with a three year upper secondary diploma and who are aged 42-55 years at the time of enrollment in HE in 1994-1995. The results for females are similar to those for the younger sample but in the case of males, the estimated returns are basically zero up and until 2004 and weakly positive thereafter.<sup>5</sup>

***Costs and benefits of adult education***

50. Calculations presented in Stenberg (2011) indicated that the positive influence on earnings pertaining to enrollees in upper secondary AE when aged 24-43 years, would only barely be sufficient to cover the total costs incurred by society. If there were positive side-effects of AE, which yield a return to society which exceeds the private returns by a factor of about 1.3, the investments could arguably be justified. The level of the costs was influenced primarily by the value of the foregone production. In

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<sup>5</sup> The results were here corroborated with propensity score matching (sibling samples were very small).

contrast to Jacobson *et al.* (2005a), the sample studied in Stenberg (2011) did not consist of individuals laid-off from work. Many enrollees may instead have left employment and thereby substantially reduced the production value of the society (and tax revenues). One may infer various welfare effects of AE such as its influence on democracy, equity, general equilibrium effects, health, individual self-esteem, external effects on individuals around the participants and/or improved social cohesion. It is difficult to empirically measure such effects and it may be overly optimistic to believe that they are generated by AE, but the level of the required side-effects is theoretically feasible and relatively close to the amounts which have been discussed in the literature (see Stenberg 2009, 2011 for references and an extended discussion).

51. Stenberg *et al.* (2011) present similar calculations for enrollees aged 42-55 which indicate that only around 50 per cent of the costs are covered by the benefits. The more negative result is partly because the members of this group have less time on the labour market to reap prospective earnings benefits, and probably also because only 7 per cent continue to HE, versus 22 per cent of the younger group. In order to tentatively assess AE at all educational levels, corresponding calculations were made based on the adults in HE evaluated above (which did not involve Komvux). A different picture emerges as the benefits exceed the total costs by about 40 per cent for the older sample, and by 140 per cent for the younger sample, which appear sufficient to justify the expenses made.<sup>6</sup>

52. Despite the reservations one may have regarding this sort of exercise, it is still interesting to summarize findings from the four calculations pertaining to young and old samples at Komvux from Stenberg (2011) and Stenberg *et al.* (2011) respectively and the young and old samples in HE discussed above. The total benefits then exceed the total costs by some 50 per cent. Thus, these tentative calculations indicate that the surplus for adults in HE appears to compensate for the potential losses pertaining to low skilled enrolling at Komvux. One possible interpretation is that although the costs of AE are very high, they are perhaps not overwhelming, especially since the surplus is obtained without considering any of the side-effects of AE discussed above.

### ***Who benefits from adult education?***

53. It is important to note that the evaluations discussed here all concern earnings, which are composite measures of the number of hours worked multiplied by the hourly wage rates. Results reported in Stenberg and Westerlund (2008) and Stenberg (2011) indicate that the positive effects of AE in Sweden are primarily driven by participants who had below median earnings prior to enrollment. This implies that AE contributes to compressing the distribution of earnings as well as the distribution of educational attainment. A reasonable interpretation is also that AE enhances the number of hours worked, rather than hourly wages, and that the marginal effect of AE on the number of hours worked is larger if they are small to start with (implying “more room for improvement”).

54. Among older females, a pattern emerging in Stenberg *et al.* (2011) is that household responsibilities, approximated by the number of children living at home, may have limited female participation in AE in earlier years. As children grow up, the constraints are reduced and enrollees may act upon an inherent demand built up during the child-rearing years. Separate estimates for females with zero or one child at home 2-3 years prior to AE indicate moderate returns. Females with at least two children at home were associated with higher point estimates. A similar mechanism, but related to small children, has also been discussed in earlier work (Stenberg 2007a, Bergemann and van den Berg 2008). Although still

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<sup>6</sup> Whether this is satisfactory or not would depend on the returns to alternative investments. The calculations are based on year by year propensity score matching estimates (1996 and onwards). The underlying assumptions follow the basic framework in Stenberg (2011), assuming a deadweight loss of 20 per cent and a 35 per cent probability that individuals enrolled in AE are replaced by non-employed individuals.

preliminary, the results are interesting in a global perspective as they may carry policy implications regarding potential target groups for AE, but it should be emphasized that more research is needed.

### ***General or vocational training?***

55. The preceding has described how significant resources were put into AE, and into general education. Evaluations of vocational Labour Market Training (LMT, *Arbetsmarknadsutbildning*) in the last decade reported beneficial effects on earnings and employment (de Luna *et al.* 2008, Axelsson and Westerlund 2005, Stenberg and Westerlund 2004). However, LMT has in Sweden been questioned by economists since an often cited survey by Calmfors *et al.* (2001) reported mixed results regarding the impact of LMT. The studies referred to were primarily based on data from the first half of the 1990s, *i.e.* during the severe recession, with short follow-up periods. The completion of an LMT program during this period entitled individuals to a new period of unemployment insurance benefits (240 days). Some of these studies also included participants in preparatory LMT, which provided “general theoretical or introductory courses”. These were not intended to lead directly to work but targeted the unemployed who were reluctant to attend other programs. Thus, several factors likely contributed to the lack of positive effects reported during this period.

56. Regarding the efficiency of AE at Komvux, one may wonder if the resources would have been more efficiently used if they to a greater extent had been invested in vocational training programs rather than general education. To simplify, one may view the educational content in a program as related to the ability of adapting to changing demands (general skills) or to ease the transition from education to the labour market (specific skills). However, it is remarkable how little we know about the effects of educational content on earnings and employment.

57. A rare analysis is found in the OECD (2008) where unemployment duration was compared between groups of 19-24 year olds in vocational and theoretical programs at upper secondary level. To avoid selection bias, the comparison was made between siblings (family fixed effects) and controls for differences in ability were made with grade point averages from school when aged 16. The results indicated that given registration in unemployment, theoretical education was associated with shorter unemployment duration. The AEI in Sweden allowed Stenberg (2007b) to compare two programs for unemployed; general education at Komvux (within the AEI) and LMT which offered vocational courses intended to reflect the professions in demand on the labour market. The results offered rather clear evidence that vocational education was a more efficient tool to enhance average earnings, at least in the short term. Still, it is likely to be desirable to also provide a “menu” of programs, so that individuals can choose the programme which suits them best.

## **6 Concluding discussion**

58. This paper has given an account of some important aspects of how access to education throughout working life is achieved in Sweden. Empirical evaluation studies of the economic impact of adult education (AE) have most often reported positive earnings effects. These studies are still relatively few in number but an interpretation of the present evidence would be that AE does improve average earnings, although not for all groups, and potentially also have welfare enhancing effects on society as a whole. One source of uncertainty is that the true costs and benefits are difficult to pin down as they regard a number of factors which are very difficult to assess such as democracy, equity, health and/or that the mere existence of the opportunity to upgrade skills may increase job-mobility and breed a perception of justice and social cohesion. Nevertheless, the results may serve as a useful point of departure for an intellectual discussion on the appropriate level of the public supply of AE, framed in accordance with each country’s pre-conditions.

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Table 1. Access to formal education over the working life – Main characteristics of Swedish system.

KEY AREAS	UPPER SECONDARY	TERTIARY	NOTES
<b>PROMOTING EDUCATION OVER THE WORKING LIFE</b>			
<b>Overall incentives and institutional framework</b>	<ul style="list-style-type: none"> <li>- there are prerequisites for an appropriate institutional set-up to be possible.</li> <li>- social trust in that there is not an overall resistance against paying taxes, <i>e.g.</i> due to a widespread belief in corruption.</li> <li>- an acceptance for redistributive policies</li> </ul>	<ul style="list-style-type: none"> <li>- no stigma associated with HE at an adult age, possibly partly explained by the widespread acceptance of <i>Komvux</i>, where municipalities are by law obliged to provide compulsory and upper secondary education for adults.</li> </ul>	
<b>Responsiveness</b> (ensuring that education/training providers can adapt efficiently to changing demand)	<ul style="list-style-type: none"> <li>- Komvux traditionally provide courses in general skills (rather than specific skills), to thereby enhance the ability to learn and the overall flexibility of the workforce.</li> <li>- vocational AE (<i>yrkesvux</i>) has recently been launched as a new term, with large resources put in relatively small programs.</li> </ul>	<ul style="list-style-type: none"> <li>-public funding of universities follows the student as funding depends on the both course registrations and amount of studies completed.</li> <li>- a rich set of advanced vocational courses (<i>kvalificerad yrkesutbildning</i>) at tertiary level.</li> </ul>	<ul style="list-style-type: none"> <li>- the funding system of higher education is intended to generate efficiency in the provision of HE. The quality and attractiveness of the education is thought to be rewarded by the number of students it attracts.</li> <li>- advanced vocational courses have recently grown from attracting about 10,000 participants in 2002 to 30,000 in 2008.</li> </ul>
<b>Quality and efficiency</b> in learning provision (ensuring that the right skills are acquired at the right time, right place and in the most effective mode)	<ul style="list-style-type: none"> <li>- commonality in curricula, <i>i.e.</i> courses providing general skills are included in educational programs with vocational contents.</li> </ul>		<ul style="list-style-type: none"> <li>- commonality in curricula enhances flexibility in that it enables adults to switch between professions at relatively low costs.</li> </ul>
<b>Flexibility in provision</b> (allowing people to study/train what they want, when they want and how they want)	<ul style="list-style-type: none"> <li>- Evening classes are given and approximately 10-15% adult students attend these after working hour courses.</li> </ul>	<ul style="list-style-type: none"> <li>- courses and classes outside working hours are provided at universities</li> <li>- admittance to popular programs are rationed on the basis of upper secondary grade point averages, but also on labour market experience, and a scholastic aptitude test that can be taken at any age.</li> </ul>	

Table 1. Access to formal education over the working life – Main characteristics of Swedish system (continued).

KEY AREAS	UPPER SECONDARY	TERTIARY	NOTES
<b>Ease of access</b> (e.g. by reducing barriers to entry such as institutional rigidities, up-front fees and age restrictions, existence of a variety of entry and re-entry pathways)	<ul style="list-style-type: none"> <li>- all publicly funded schooling is free of charge.</li> <li>- students of all ages are entitled to financial support which covers modest living expenses</li> <li>- employees have a legal right to be on leave for studies.</li> <li>- municipalities are by law obliged to offer AE at compulsory and upper secondary level (<i>Komvux</i>).</li> </ul>	<ul style="list-style-type: none"> <li>- employees have a legal right to be on leave for studies.</li> <li>- tertiary education is open to all ages.</li> <li>- almost all universities are publicly funded and free of charge.</li> <li>- students of all ages are entitled to financial support which covers modest living expenses.</li> </ul>	<ul style="list-style-type: none"> <li>- AE participants studying full time receive approximately €800 a month, where two thirds is an income contingent loan with an interest rate below the market level. A recipient must complete at least 75 per cent of the registered courses, or the government will request direct repayment the following year.</li> </ul>
<b>Transferability of skills</b> (such that skills gained are documented in a commonly accepted and understandable form) and <b>low costs of early exit</b> (e.g. credit is granted for components of learning, modular provision, credit accumulation and credit transfer systems exist)	<ul style="list-style-type: none"> <li>- course credits at <i>Komvux</i> makes it possible for adult students to move in and out of studies, accumulate education at their own pace.</li> </ul>	<ul style="list-style-type: none"> <li>- higher education system has a credit system which makes it possible for adult students to move in and out of studies, accumulate education at their own pace.</li> </ul>	
<b>IMPACT AND BENEFITS</b>			
<b>Overall participation rates</b>	<ul style="list-style-type: none"> <li>- Of the population 25 to 49 years old, 4.4 per cent were at some stage registered at <i>Komvux</i> in 2002.</li> <li>- Of those registered at <i>Komvux</i>, the share aged 35 or above was 60 per cent.</li> </ul>	<ul style="list-style-type: none"> <li>- Individuals aged above 35 years old constitute almost 25 per cent (30 per cent among females) of those enrolled in tertiary education.</li> <li>- In 2002, 17 per cent of the 25-29 year old population and 8 per cent of 30-34 year-old population was enrolled in higher education.</li> </ul>	<ul style="list-style-type: none"> <li>- women represent about 2/3 of the AE participants and also tend experience a better payoff. AE is therefore likely to narrow the gender earnings gap.</li> </ul>

Table 1. Access to formal education over the working life – Main characteristics of Swedish system (continued).

KEY AREAS	UPPER SECONDARY	TERTIARY	NOTES
<b>Participation among target groups</b>	<ul style="list-style-type: none"> <li>- participants typically have low but not the lowest education, are slightly more associated with social welfare and unemployment.</li> <li>- two-thirds of those enrolled in AE are female, a large portion enroll following a period of child rearing.</li> <li>- among males, participation in AE tend to be linked to decreases in earnings and increases in transfer payments prior to enrolment.</li> <li>- younger adults study subjects that will give access to higher education.</li> </ul>	<ul style="list-style-type: none"> <li>- About 8 per cent of the 35-39 year-old female population was in 2002 enrolled in higher education.</li> </ul>	<ul style="list-style-type: none"> <li>- more generous financial support would attract more participants, but it is potentially also associated with high costs as it may attract individuals away from productive work.</li> <li>- increased financial support will on the margin attract more risk averse individuals which may include groups which are typically targeted and associated with high returns to AE, <i>e.g.</i> low earners and females.</li> </ul>
<b>Efficiency</b>	<ul style="list-style-type: none"> <li>- 22 per cent of enrollees aged 24-41 at Komvux continued to HE but this applies to only 7 per cent among individuals aged 42-55.</li> <li>- a large share of the enrollees at Komvux completed only small amounts of courses. The shares completing more than one year of schooling were 43 per cent among aged 24-41 and 18 per cent among aged 42-55.</li> <li>- society's payoff of AE depend largely on foregone production value, <i>i.e.</i> production which is not executed as individuals withdraw from the labor market to study.</li> <li>- females typically have larger benefits than males. This is plausibly related to that motivations for enrolment differ.</li> <li>- the effects of AE on annual earnings do not display any clear differences between younger (aged 25-42 at the time of enrollment) and older (aged 43-55). The main difference instead lies in the number of years left of the working career, which makes the payoff decrease with age.</li> </ul>	<ul style="list-style-type: none"> <li>- preliminary results indicate that the returns to HE for adults appears more positive than what is indicated for Komvux.</li> <li>- calculations based on these estimates indicate that benefits accruing to AE at tertiary level is sufficient to cover potential losses incurred by the society on AE at Komvux.</li> <li>- most evaluations of Komvux suggest that earnings benefits are somewhat low to recover total costs. A bigger picture, which incorporates HE enrollees (without Komvux), seems to change this conjecture.</li> </ul>	<ul style="list-style-type: none"> <li>- for an assessment of any policy measure one needs to consider both benefits and costs.</li> <li>- any assessment of costs and benefits to society of AE must be interpreted with caution. It requires that one makes several untestable assumptions, not least regarding the side-effects of AE on other individuals and on society's economic and democratic functions.</li> <li>- if benefits exceed the costs, the program may still not be the most efficient measure, <i>e.g.</i> if both vocational and general education has beneficial effects, one may be more efficient than the other, or a certain mix of the two may be the optimal policy.</li> </ul>

**Table 2: First time enrollees at Komvux 1994-1995, sample averages of studies up to and until 2003.**

	Treated aged 24-41		Treated aged 42-55	
	Males	Females	Males	Females
N	10322	17659	2015	4296
<u>Compulsory level</u>				
Fraction registered	.34	.39	.38	.34
Registered credits (years) if > 0	.38	.39	.38	.39
Completed credits (years) if > 0	.14	.16	.11	.13
<u>Upper secondary level</u>				
Fraction registered	.88	.92	.68	.79
Registered credits (years) if > 0	.92	1.21	.57	.90
Completed credits (years) if > 0	.63	.84	.36	.60
<u>Higher education</u>				
Fraction registered	.27	.26	.07	.07
Fraction completing > 0	.22	.22	.04	.04
Completed tertiary education, if > 0	2.36	2.47	1.85	2.09
Total years of completed AE	<b>1.16</b>	<b>1.40</b>	<b>.36</b>	<b>.60</b>

**Table 3: Komvux proportions registered in upper secondary subjects, first time enrollees 1994-1995.**

	Treated aged 24-41		Treated aged 42-55	
	Males	Females	Males	Females
N	10322	17659	2015	4296
<u>Frequency of upper secondary subjects</u>				
Mathematics	.528	.530	.335	.295
English	.494	.550	.382	.445
Swedish	.456	.544	.282	.308
Social sciences	.578	.750	.488	.660
Natural sciences	.312	.326	.140	.145
Human sciences	.120	.180	.132	.167
Computer sciences	.498	.576	.644	.666
Health sciences	.134	.344	.123	.359
Vocational course	.143	.082	.127	.067

Figure 1. Numbers in unemployment, Komvux, active labour market programs (ALMP) and higher education.

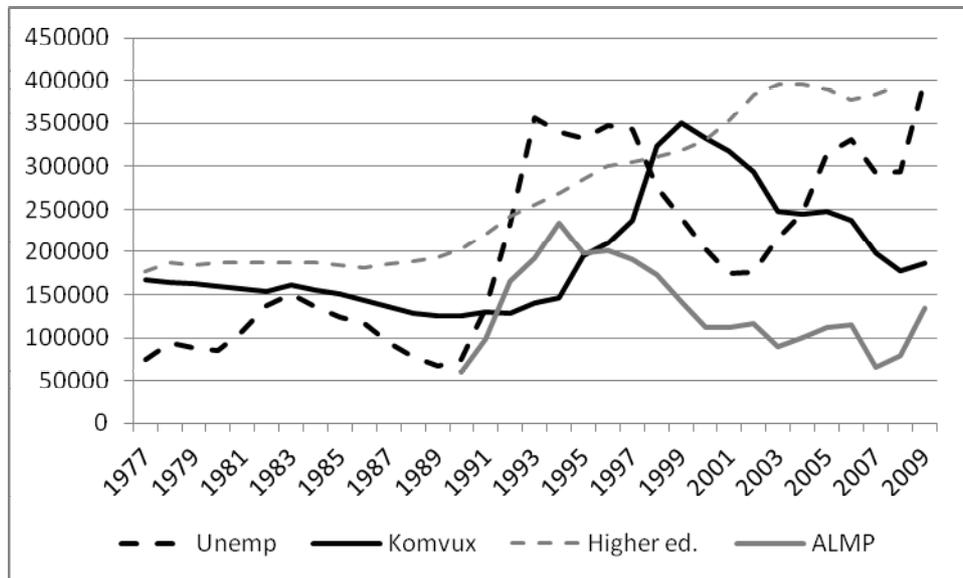
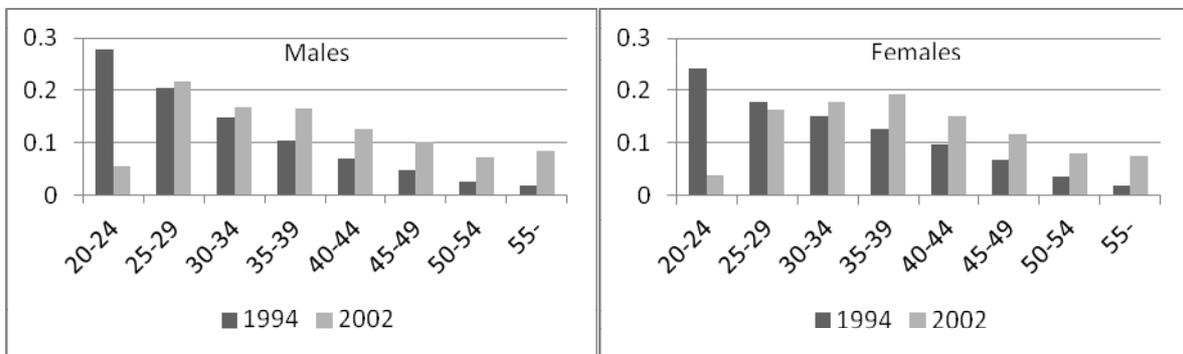
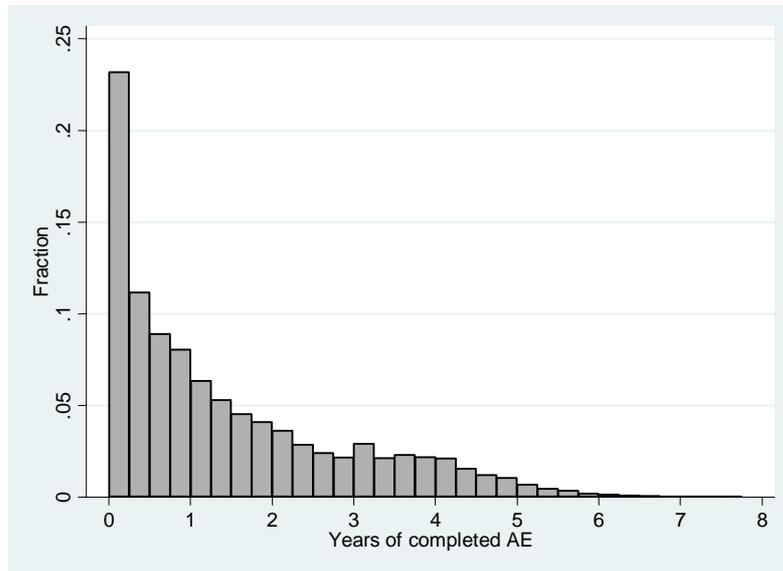


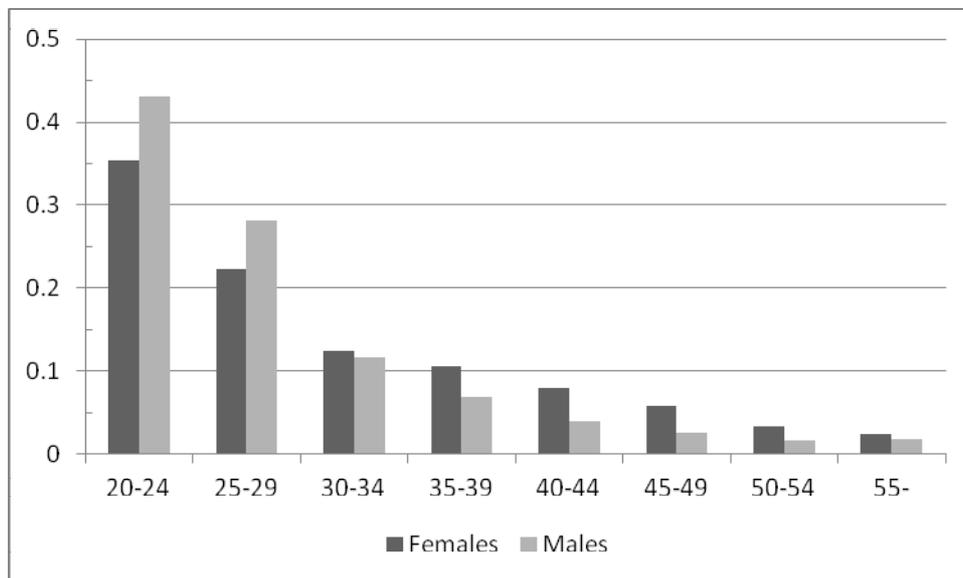
Figure 2. Age distribution of individuals registered at Komvux, 1994 and 2002.



**Figure 3. Distribution of completed AE 1994-2003, if above zero credits, enrollees aged 24-43 in 1994.**



**Figure 4. Age distribution in higher education in 2002, males and females.**



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