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Sweden - a Learning Society?

The Performance of the Swedish Educational System in an International Perspective

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Abstract

This paper gives a perspective on diverging views about the performance of the Swedish educational system. International comparisons are used to position the results of the Swedish educational system in a number of quantitative and qualitative aspects relating both to basic education and lifelong learning. Sweden is compared on the one hand to its main competitors on international markets and on the other hand to some potentially new competitors in Asia, Latin America, and Eastern and Central Europe.

The international comparisons are supplemented by some data describing recent developments in Sweden. Areas covered are the supply of labour, the stocks and flows of labour with different types of education and training, and the resulting effects of the interaction between supply and demand on the labour market in terms of employment and earnings.

Judging from international comparisons, Sweden has a fairly well educated population and has started the transition towards an educational system adapting to the requirements of lifelong learning. There are, however, a few weaknesses in the Swedish educational system. The rate of young people transferring from upper secondary school to tertiary education is low. The share of science graduates in the young labour force is also quite modest but the critical factor here may rather be the generally low level of participation in tertiary education and the small number of students, especially women, opting for science and technical programmes in upper secondary education than the distribution of students over subject matters.

The private incentives to invest in education and training seem to be rather weak both for young people and for adults in Sweden. The main returns to individuals of investments in education may be higher chances of employment not higher earnings.

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1. Summary

Judging from international comparisons, Sweden has a fairly well educated population and has started the transition towards an educational system adapting to the requirements of lifelong learning. More problematic may be the fact the it is not the young generation, the young science graduates that are at the forefront. In Sweden young people, at least after the age of 18, participate to a lesser degree in education than in many other countries. They stay on for a rather long time in secondary education and transfer at a fairly old age to higher education. However, they seem to pass their exams at an average age and return more frequently to higher education at an older age.

The share of science graduates in the young labour force is also quite modest but the critical factor here may rather be the generally low level of young people participating in tertiary education and the small number of students, especially women, opting for science and technical programmes in upper secondary education than the distribution of students over subject matters.

Judged by international test, the quality of basic education in Sweden seems to be very good as measured by literacy standards and at an average level as measured by mathematics and science standards. But current costs for education are high in Sweden though neither teaching hours nor teachers' salaries are very high.

Participation by adults in labour market related training, traditional adult education and recurrent tertiary education is quite high in Sweden. Several recently initiated policy programmes will further increase the possibilities for adults to participate in education and training.

The private incentives to invest in education and training seem to be rather weak both for young people and for adults in Sweden. The main returns to individuals of investments in education and training may be higher chances of employment not higher earnings.

The international comparisons suggest that if Sweden has the ambition to stay a leading knowledge based society it will have to increase the participation of young people in tertiary education, especially in the fields of science and technology. But this may be a goal for the long run. As long as the private incentives for tertiary education are not increasing it may be a risky and costly affair for the state to try to raise participation in higher education.

As for traditional adult education, recurrent education at tertiary level, employment training and employer sponsored training many aspects still remain to be studied. Still, it is probably important to try to uphold the present level of education and training in view of the expected needs for further training and lifelong learning in working life. However, also in these fields the incentive structure is of great portent for an efficient use of resources.

The higher education sector seems to be under high pressure in Sweden not only to produce more education for young people and adults but also to do much of the research and development work and the dissemination of the results of research and development.

2. Introduction

During the recent election campaign very diverging views about the performance of the Swedish educational system were aired. The idea was even launched that it might be necessary to set up an impartial Commission to find out the truth about the state of the system. Meanwhile, this paper offers a basic overview of the achievements of the Swedish educational system. It builds to a large extent on international comparisons, i.e. a benchmark approach.

International comparisons can be helpful bringing the educational results of a given country into perspective. There are, of course, many problems connected with the use and interpretation of such comparisons. Many aspects of education and training can't be analysed by means of international comparisons - and for different reasons. Sometimes for sheer lack of information. Sometimes because suitable theoretical approaches and indicators have not yet been developed. When data do exist, quality problems frequently arise. Available statistics are they reliable, relevant, and comparable?

Most data available relate to formal education and training. It is relatively easy to get figures for educational stocks and flows measured by years of schooling, shares of an age group at different levels of education and numbers passing certain exams. Sometimes, but more rarely, you will get an indication of the ”quality” of the education and training. What did the students learn? How did their attitudes change? Results measured in terms of employment, occupations and earnings of students after education and training often exist though such ”results” are, of course, not only the effects of previous education and training but also influenced by many other factors. Generally, there will be more information about the education and training of young people than of adults; more about formal education than on non-formal education; more on education and training in schools than outside schools and, indeed, even less about informal learning.

To ensure as relevant data as possible, is may be necessary to try different types of indicators, follow their development over time, take out obsolete ones and add better ones as the field develops. This paper is the second follow-up study in a row starting in 1992 (Ds 1992:83; Sohlman, 1996) where readily available international statistics are used for comparative purposes. It is, by the way, interesting to note what progress has been made during this rather short period of time. Education, training and lifelong learning are nowadays at the centre of political interest. This is also reflected in the availability of statistics even though much still remains to be done to match the new focus on lifelong learning which to a large extent means informal training and on-the-job training.

An important source of information about education and training is the OECD. An advantage using OECD-statistics is the fact that the member countries themselves are very active developing and putting these statistics together.

This is a state of the art exercise the purpose of which is to inspire policy discussions but, of course, it can't be used to prescribe policy conclusions.

The paper will concentrate on economic issues - education and training as factors of growth and economic development. The countries Sweden will be compared to, are its main competitors on international markets. The selected 14 countries in this category at the same time belong to the group of OECD countries with the highest GDP per capita. However, to

check what is happening in potentially new competitor countries data will, to the extent possible, be added for certain new members and partners in the OECD representing Asia (Korea), Latin America (Mexico) and Eastern and Central Europe (the Czech Republic, Hungary, Poland, and the Russian Federation). Including Sweden, there are thus 15 countries in the first group of countries and 7 in the second group of countries.

The comparisons in section 3 and 4 will be concerned with the supply of labour with different types of education and training and in section 5 with the interaction of supply and demand on the labour market and the resulting effects in terms of employment and earnings.

3. Human capital stocks

Let us first have a look at the *formal education of the population 25-64 years of age* in 1995 (OECD, 1997a). Looking at the percentage of the population having completed tertiary education, non-university tertiary education and university-level education respectively, we find that Sweden:

- ranks number 4 as to the share of the population having completed tertiary education among the main competitor countries and number 1 among the potentially new competitor countries. Only Canada, the USA and Norway have (in descending order) higher shares than Sweden. (In this case we have data for 14 countries in the first group of countries and 4 in the second group. Data for Japan, Hungary, the Russian Federation and Mexico are missing.)

Dividing tertiary education into non-university tertiary education and university-level education, we can note that Sweden has more of its population concentrated to the former level than to the latter level:

- sharing placement numbers 2 and 3 (with Belgium) for non-university tertiary education among the main competitor countries and ranking number 1 among the new competitor countries. Only Canada has a higher share than Sweden in this case.

- sharing placement numbers 5 and 6 (with Denmark) for university-level education among the main competitor countries and ranking number 2 among the new competitor countries. In this case the USA, the Netherlands, Norway, Canada, and Korea have higher shares than Sweden.

Making the same comparisons for women and men separately, you find that more often are the results for Swedish women better than those for Swedish men comparing women and men in different countries. The good average results for the Swedish population are thus to a certain extent explained by the achievements of Swedish women.

The expansion of higher education started rather late in Sweden. However, during the 1960ies and 1970ies there was a rapid growth in the share of the population having completed higher education. It did approach that of the highest ranking OECD countries. However, during the 1980ies and the 1990ies this development came to a halt.

Enrolments in higher education were at a standstill during the late 1970ties and the1980ties in Sweden. Only in the late 1980ties and the 1990ies did the expansion resume again.

The effects of these changes can be seen in Sweden's relative position within age groups. In 1995 comparing the share having completed tertiary education in Sweden with that in the main competitor countries, Sweden ranked number 5 in age group 25-34 years, number 3 in age group 35-44 years, and number 2 in age group 45-64 years. For earlier years you even find an inverted U-shaped pattern over the age groups with Sweden having a rather low ranking in older age groups, a better ranking in middle age groups, and again a lower ranking in young age groups (Sohlman, 1996). As for the new competitors, in 1995 Sweden normally outperforms them in all age groups. However, for the group 25-34 years of age Sweden shares the top position with Korea.

While the average Swedish position improved during the 1960ties and 1970ies, nothing happened during the 1980ies and first half of the 1990ies. In 1989, compared to with the main competitors, Sweden ranked number 4 for the share of the population having completed tertiary education which was also the case in 1995 as noted above. Looking closer at the figures, the resumed expansion of higher education in Sweden in the late 1980ties and 1990ies is, however, revealed in the amount of increase in the share of the population having completed higher education. Between 1989 and 1992 the increase was only one percentage point while it was four percentage points between1992 and1995. The latter figure is rather high comparing internationally but not high enough to change the over all Swedish position (Ds 1992:83; Sohlman, 1996; Brandell, 1998).

With high rates of labour force participation even in low educational groups (cf. section 5.1) the Swedish standing as to education in the labour force is weaker than as to education in the population. The ranking position does not necessarily change but in absolute terms the differences between Sweden and other countries are higher for education in the labour force than for the population (Sohlman, 1996; NUTEK, 1998b).

As for the younger age groups there exists another interesting times series. It is concerned with the number of *science graduates per person in the labour force 25 to 34 years of age* and further underlines the weak Swedish position among young people. In 1995 comparing the main competitor countries Sweden:

- ranks number 10 on average for university-level graduates and non-university graduates as wells as for university-level graduates alone and number 7 for non-university graduates.

This type of education is dominated by the university level which explains the fact that the better Swedish ranking for the non-university level isn't reflected in its overall position. Moreover, in this case the results of Swedish women are not better but worse than those of Swedish men. The ranking for Swedish women is number 10 for university graduates and number 9 for non-university graduates while the corresponding figures for men are number 9 and 8.

For 1995 we have in this case data for 12-13 countries depending upon what level is compared. The countries more or less consistently outperforming Sweden in 1995 are Belgium, Denmark, Finland, Germany, Norway, the United Kingdom, Japan, Canada, and the Unites States while Austria, the Netherlands, and Switzerland normally show lower shares than Sweden and no

data are available for France and Italy. Using the whole time series 1988-1995 one might conclude that also France ranks higher than Sweden while Italy ranks lower. The Swedish ranking position has remained approximately the same since 1988 though in relative terms the differences have diminished somewhat especially since 1992 comparing, for example, Sweden and the two leading countries the UK and Japan (cf. also NUTEK, 1998b).

To be able to compare Sweden with the new competitor countries we have to go back to 1994. For that year we have at least data for the Czech Republic, Hungary, Poland and Korea. Among these countries Sweden ranks number 3 after the Czech Republic and Korea (OECD 1997a; Sohlman, 1996).

A total stock measure that to some extent corresponds to the science graduates in the young labour force is the number of *researchers in the labour force* - university graduates and total R&D personnel. Looking at *researchers/university graduates* per person in the labour force, the latest year for which Swedish data are available is 1995. In 1995 Sweden ranked number 2 among the 12 main competitor countries for which data for 1995 were also available. If we use the whole time series 1975-1996 Sweden can be estimated to rank number 2 or 3 among the 15 main competitor countries only being surpassed by Japan and perhaps the USA.

Making the same operation for the new competitor countries Sweden could be ranked number 1 among the 6 countries for which data are available, i.e. all of them except the Russian Federation.

For *total R&D personnel* the Swedish position is as impressive. Making use of the time series 1989-1996 Sweden can be ranked number 1 both among the main competitor countries and the new competitors. In this case, altogether, there are data for 14 of the main competitors, i. e. all of them except the USA, and 6 of the new competitors, again all of them except the Russian Federation (OECD, 1997e; 1998b; Sohlman, 1996).

Once more we note an excellent total stock result for Sweden, a much better result for the total population than for the young age groups.

The large share of researchers in the labour force in Sweden corresponds to an important share of GDP being devoted to expenditure on research and development. The latest Swedish figure (for 1995) in the OECD time series 1990-1997 is actually the highest one noted for any of the countries compared in this study during that period (OECD,1994b; 1997e;1998b). The Swedish distribution of these expenditures over R&D performers: the business enterprise sector, the higher education sector, the government sector and the private non-profit sector is also interesting. In Sweden like in most other countries the business enterprise sector carries out most of the research and development more or less closely followed by the higher education sector, the government sector and the finally private non-profit sector that normally is very small. Looking at the time series 1990-1997, the only exceptions to these general patterns are found in Finland, France, Poland, the Czech Republic, Hungry, Korea and Mexico where the government sector is bigger than the higher education sector and, in Mexico, both of them bigger than the business enterprise sector. While following the general pattern, Sweden is characterised by having a rather small government R&D sector and rather big business enterprise and higher education sectors (OECD, 1994b; 1997e; 1998b). The Swedish higher education sector may presently to be more concerned with R&D activities than with producing

new R&D personnel than the higher education sectors in other countries which in the long run may be a non-sustainable situation.

So far we have mainly looked at formal education. What about skills and competencies? The development of skills and competencies that might be learnt at school but not necessarily so? Would the Swedish performance be better or worse when it comes to informal learning?

There exists at least one indicator of one of the aspects that make up the skills and competencies of the population in different countries, i.e. the IALS (International Adult Literacy Study) measure of literacy skills. By now tests have been conducted in12 countries - Belgium (Flanders), Germany, the Netherlands, Sweden, Switzerland, the United Kingdom, Ireland, Australia, New Zealand, Canada, the Unites States and Poland (OECD, 1995c; 1997b; 1997d). In IALS ”literacy” was measured according to three scales - a prose scale, a document scale and a quantitative scale. For each scale five proficiency levels were identified though only combined data for the two highest levels were reported as the number performing at the highest skill level were small (under five per cent in most countries). The testing of the populations were done in 1994/1995.

However measured and compared, the results show that the level of functional literacy is very high in Sweden.

- On average. For all scales, Sweden has a lower share of its population aged 16-65 at the lowest proficiency level and a higher share on the two highest levels than the other countries.

- By educational level. The mean score on the quantitative scale for adults aged 25-65 was, for example, higher in Sweden than in other countries except among people with university education where Canada had a better result than Sweden.

- By occupation. The proportion of skilled craft workers and machine operators at literacy levels 3 to 5 was, to give another example, 74 per cent in Sweden (the highest figure among the 12 countries), 32 per cent in the USA and 20 per cent in Poland (the lowest figure among the 12 countries).

There is, however, a tendency that even though young people in Sweden have better test results than young people in other countries their results are not as much better compared with their counterparts in other countries as those of older age groups in Sweden (Sohlman, 1996).

However, when the IALS results were presented in Sweden, public opinion did not give much attention to the fact that the Swedish results were very good compared to those of other countries but concentrated on the ”shocking” fact that 25 per cent of the adult population was below level 3 which corresponds to the level that students are supposed to have acquired by the end of compulsory education (nine years in Sweden).

Summing up, on may conclude that comparing internationally the Swedish population both quantitatively and qualitatively seems to have a high level of education and training. More problematic from the point of view of future developments is the skewed distribution of education - better results for the total population than for the young age groups; better results for researchers than for young science graduates.

If these imbalances are to be redressed a number of questions arise. The recruitment of students is one that will be discussed in the next section. However, tertiary education is not only concerned with education but also research and development as well as the dissemination of the results of research and development. As we saw earlier in this section presently the higher education sector in Sweden stands for as an important part of current research and development. High pressure on the higher education sector both as to teaching and producing and disseminating research results may be difficult to combine.

4. Human capital formation - the flows

There are many different ways of measuring human capital formation among young people and adults.

4.1 Education for young people

Looking at the share of youth 5-29 years of age participating in formal education (primary, secondary and tertiary education - private as well as public) is one way of getting an *overview* of current investments in young people. Measured in full-time students we have the following ranking results for Sweden in 1995:

- total participation
  number 11 among the main competitors and number 2 among the new competitors
- upper secondary education
  number 7-8 among the main competitors and number 1 among the new competitors
- tertiary education
  number 12 among the main competitors and number 2 among the new competitors.

In these cases the information relates to 14 of the main competitor countries and 3 of the new competitors.

Over all the Swedish position has deteriorated somewhat comparing 1975, 1985, 1990 and 1995. It has improved somewhat for upper secondary education but definitely deteriorated for tertiary education - from ranking number 4 (among 12 competitor countries) to ranking number 11 (among 14 competitor countries). In 1975 Canada, the Unites States and Denmark had higher rates of participation in tertiary education the Sweden. In 1995 the list also includes Austria, Finland, France, Germany, Italy, the Netherlands, Norway, and Japan. The country among the new competitors that has a better position than Sweden in 1995 is Korea.

A similar measurement based on head counts gives Sweden a somewhat better ranking 1995:

participation	main competitors	new competitors
total	5	1
primary and lower secondary	6-7	3
upper secondary	3	1-3
tertiary	10-14	2-3

which means that Sweden has more part-time students in these age groups than other countries.

Similar information is conveyed comparing expected years of education for different age groups. Based on head counts we have the following ranking results for Sweden in 1995:

	main competitors	new competitors
for a 5 year-old child	9-10	1
women	7	1
men	10	1
for a person aged 17	10-12	2
women	8-10	1
men	13	2

Given these figures one might expect that Swedish educational costs would be rather low but, on the contrary, the current costs for education are rather high - Sweden ranking number 2 after Norway for total (public and private) costs as a share of GDP in 1994 (among 13 main competitor countries) and number 3 for public costs as a share of GDP (among 15 main competitor countries). The new competitor countries all devote less resources to education than Sweden (OECD, 1997a). In all countries compared here public expenditure is more important than private but in a few of them private expenditure as a percentage of total expenditure on education exceeds 20 percent - in the United States (27%), Japan (22%) and Germany (21%) as well as in Korea (40%) and Mexico (22%). With 15% Sweden is at an average level (OECD, 1997a).

High educational expenditure in Sweden seems neither to be related to extensive teaching hours nor for that matter to high teachers' salaries (cf. section 5.3). As for teaching hours in primary and secondary education in 1994 and 1992 Sweden had the following ranking positions among the main competitor countries for which data were available (where the first figure/figures in each cell denotes the Swedish ranking number/shared ranking numbers and the figure after the slash the number of countries, including Sweden, participating in each comparison):

	Primary education	Lower secondary education	Upper secondary	
			general education	vocational education
1992	10/10	11/11	9/9	6-7/7
1994	11/11	11/11	8/10	6-7/8

Sources: OECD (1995a); OECD (1996a); OECD (1997a).

After this digression into educational costs and teaching hours, let us go back to participation in education. In Sweden compulsory schooling begins at age 7. Looking at *participation by single year of age* you will normally find low participation rates in Sweden before the age of 7, high rates of participation for age groups associated with primary and secondary education, low rates for age groups associated with early participation in tertiary education and high rates in older age groups. For 1995 we have the following ranking results for Sweden comparing participation by single year of age:

	main competitors	new competitors
18	1	1

19	13	2
20	11	2
21	10	1-2
22	9	1
23	5-6	1
24	4	1

This information relates to 14 of the main competitors and 6 of the new competitors.

Over the years this U-shaped pattern seems to shifted upwards. In 1995 the rates of participation are very high in Sweden up to the age of 18 but then falls down and only picks up at the age of 24 while in the beginning of the 1990ies the rates of participation were not that high in the age group 16-18 but on the other hand picked up already by the age of 22 (OECD, 1995a; 1996a; 1997a).

Does this mean that young people transfer later to higher education in Sweden than in other countries? Do they spend more time in secondary education? If the participation by single age groups 18, 19 and 20 is divided into participation in upper secondary and tertiary education Sweden shows a very low (but growing) participation in tertiary education in these age groups. Measured by rankings we have the following results:

	Total participation		Participation in tertiary education	
	main competitors	new competitors	main competitors	new competitors
18	1	1	8-10	5
19	13	2	9	4
20	11	2	8	2

As for the age of new entrants in tertiary education, we can compare the age at the 20th, 50th and 80th percentile. In Sweden 20 per cent of the new entrants are below 20 years of age, 50 per cent below 22 years of age and 80 percent below 29 years of age. Only Norway and Denmark have older students than Sweden at the 50th percentile and only Norway at the 80th.

Comparing beyond the age of 24 there are, in 1995, the following rankings for Sweden as far as participation in tertiary education is concerned:

	Main competitors	New competitors
18-21	10	3
22-25	9	1
26-29	8	1
30-39	2	1

In this case 13 of the main competitors and 5 of the new competitors are compared. For the age group 30-39 the figures are for total participation in formal education not only tertiary education. In the latter case we are, however, more in the realm of adult education which we shall come back to in section 4.2.

The lack of young students in tertiary education can be further illustrated by comparing Sweden and Finland. Among the EU countries Finland is the country which has the highest proportion of the population in higher education. The rate of participation in tertiary education in age groups 38 years of age and above are higher in Sweden than in Finland. Still, if the over all rate of participation in Sweden should have been at the same level as in Finland there should have been approximately 350 000 students in tertiary education in stead of roughly 250 000 in the autumn of 1995 (Brandell, 1998).

For typical tertiary-level graduates the median age is about average in Sweden. For non-university programmes Sweden ranks number 4 as to median age (out of 7 main competitor countries), for short first university degree programmes number 3 (out of 6 main competitor countries) and for long first degree programmes number 4 (out of 8 main competitor countries) (OECD, 1997a).

Summing up, the flow statistics confirm the information that populations statistics hinted at, namely that young people (after the age of 18) participate to a lesser degree in education in Sweden than in many other countries. Moreover, Swedish students stay on for a rather long time in secondary education and transfer at a rather old age to higher education. They seem to pass their exams at an average age but return more frequently to higher education at an older age than in other countries.

Now turning to what *type of educational programmes* the students follow at different educational levels, the only programmes that can be distinguished and compared at upper secondary level are general/theoretical and vocational/technical programmes. In 1995 about 45 per cent of the students in Sweden were enrolled in general programmes and 55 percent in vocational/technical programmes. Comparing internationally the Swedish share of general programmes is not that low as might perhaps have been expected given the rather low transfer rates to higher education, Sweden ranking number 5-6 among the main competitors and number 3 among the new competitors. In this case the comparisons include all the main competitors except Canada and the USA (were these distinctions between programmes are no longer made in the OECD statistics) and all the new competitors (OECD, 1997a).

Looking closer at the Swedish figures, you will find that during the 1980ies and early 1990ies there was a tendency for the share of general/theoretical programmes as well as science and technology programmes to fall. However, during the 1990ies they have stabilised, the former around the level of 40-45 percent of the students and the latter around the level of 15-20 percent. During the same period the corresponding share for women in science and technology programmes has fluctuated around 10-15 per cent (Skolverket, 1995b; 1998).

For tertiary education the distribution of qualifications by subject categories can be compared using OECD statistics. In 1995 we have the following rankings for Sweden:

	Main competitors		New competitors	
	Non-university	University	Non-university	University
Humanities/general	4-5	5-7	1	3
Law and business	9	9	2	1
Medical science	3	8-9	1	3

Natural science, mathematics and computer science	9	6	2	4-5
Engineering and architecture	4	6-7	2	4

In this case data relate to all of the main competitors (except France) and 5 of the new competitors i.e. all of them except Mexico and Poland (OECD, 1997a).

At the university level compared to with the main competitors the lowest Swedish ranking position is in law and business and the highest in humanities and general subjects but on the whole the Swedish students seem to be distributed over the subject matters more or less in the same way as in other countries. So from this perspective, if the number of science graduates is judged to too low in Sweden, the general level of participation in tertiary education should rather be blamed. However, the new competitor countries seem on average to have favoured science and technical studies more than the richer OECD countries (OECD, 1997a).

Looking at the percentage share of women awarded qualifications by subject categories at the university level we have the following results for Sweden:

Humanities/general	71
Law and business	51
Medical science	62
Natural science	49
Mathematics and computer science	21
Engineering and architecture	22

which is, of course, a very skewed distribution but not much more so than in other countries. The only Swedish figures that stick out somewhat in this case compared to the main competitors are those for law and business, humanities, natural science, engineering and architecture that are all a little bit on the high side. On the one hand Swedish women thus seem to add to the high concentration to humanities and general studies. On the other hand, without their contribution the result would have been an even lower position for Sweden in law and business, natural science, engineering and architecture (OECD, 1997a).

Summing up, the Swedish students seem to be rather normally distributed over subject areas both at secondary and tertiary level as far as the data go. If for one reason or other, the number of science students is judged to be too low in Sweden, the comparisons with the main competitor countries tend to indicate the general level of participation in tertiary education as a critical factor and maybe also the number of students, especially women, opting for science and technical programmes in upper secondary education. The new competitor countries seem, however, to favour science and technical studies more than the richer OECD countries.

If the share of people in the Swedish population with science and technology education is to increase, apparently, it has to increase due to:

- an earlier general lack of interest in higher education
- an earlier lack of interest in higher education of the science and technology type
- a present lack of interest in such education in upper secondary schools.

Sweden has participated in a number of *international tests* of students achievements. If we concentrate on test results for students 13/14 years old, results are available for 1982 in mathematics and science, for 1991 in literacy and in 1995 again in mathematics and science. In the following table the test results of the different countries have been summarised by grouping them into three categories where number 1 contains countries with the best test results and number 3 countries with the worst test results.

	1995		1991	1982	
	mathematics	science	literacy	mathematics	science
Japan	1	1	-	1	1
Switzerland	1	3	1	1	1
Belgium Fl/Fr*	1/2	2/3	3	2	-
Austria	2	1	-	-	-
Canada	2	3	3	2	2
France	2	3	2	2	2
Netherlands	2	1	3	1	1
Sweden	2	2	1	3	2
Denmark	3	3	3	-	-
England/Scotland	3	1/3	-	2	2
Germany	3	3	3	-	-
Norway	3	3	3	-	2
Unites States	3	3	2	3	2
Finland	-	-	1	2	2
Italy	-	-	3	2	2
Czech Republic	1	1	-	-	-
Korea	1	1	-	-	-
Hungary	1	1	-	-	-
Russian Federation	2	2	-	-	-
Sweden	2	2	1	3	2

*Flemish/French Community

Compared to the main competitor countries the Swedish results for literacy are very good. The mathematics and science results improved between 1982 and 1995. By 1995 they were at an average level. For the new competitors there are only test results in mathematics and science. The Czech Republic, Korea and Hungary have better test results than Sweden in these subjects while the Russian Federation is at about the same level as Sweden (OECD, 1993; 1996a).

4.2 Education for adults

In Sweden the formal, organised part of adult education consists of

- popular education including the folk high schools and the study circles of the study associations

- municipal adult education

- employment training

- employer sponsored training

- recurrent education in tertiary education.

The only areas where some serious attempts have been made to make internationally comparable statistics available are employment training and job-related education and training. So let us first have at look at some of the figures in these two fields.

Table 1 describes participation in *job-related education and training*. For some countries the reference period is 12 months, for Sweden 6 months and for a few other countries 4 weeks. Comparing Sweden with the countries having a longer reference period, it is interesting to note that except for Finland the Swedish rate of participation is the highest one. Another striking Swedish feature is the rather low disparity in participation rates between groups according to initial education.

Table 1. Participation of the employed population 25-64 years of age in job-related education and training (per cent)

		Total	Primary	Secondary	Non-university tertiary	University tertiary
During the 12-month period preceding the survey						
Finland	1995	45	31	44	61	65
France	1994	40	28	42	72	57
Germany	1994	33	15	28	43	50
Norway	1991	37	17	33	57	
Switzerland	1996	35	13	35	53	48
Canada	1993	28	12	25	35	43
USA	1995	34	13	24	36	49
During the 6-month period preceding the survey						
Sweden	1996	42	27	37	57	61
During the 4 week period preceding the survey						
Austria	1995	8	3	8	13	14
Belgium	1994	3	1	2	4	6
Denmark	1995	15	5	14	18	24
Italy	1995	1	1	2	..	3
UK	1995	12	4	10	22	23

Sources: OECD (1995a; 1996a; 1997a).

Of course, the rate of participation doesn't say anything about the duration of the training period. There are some indications that the duration is rather short in Sweden (OECD, 1996c).

Sweden used to be known for its active labour market policies where *employment training* was an important component. In the OECD statistics for labour market programmes three training related measures can be distinguished:

- labour market training for unemployed adults and those at risk

- labour market training for employed adults

- support for apprenticeship and related forms of general youth training.

During the period 1990-1997 all the countries covered in this study experienced some more or less pronounced labour market problems. However, the extent to which they had recourse to these three training measures varied. Judged by participant inflows as a percentage of the labour force there are seven countries that used labour market training for unemployed adults and those at risk extensively reaching at least 3 percent of the labour force for one or more years during the period: Finland (5.2%), Denmark (4.6%), Sweden (3.9%), France (3.8%), Germany (3.7%), Norway (3.6%) and Belgium (3.1%) where the figure within parenthesis refers to the highest value during the 1990-1997 period (OECD, 1994a; 1995b; 1996b; 1997c; 1998a). In absolute terms the maximum level in Sweden corresponded to150 000 persons per year or 60 000 persons on a full-time full-year basis.

Only two countries arranged labour market training on a large scale for employed adults: Denmark (9.3%) and Belgium (6.2%) where again the figure within parenthesis refers to the highest value during the 1990-1997 period. Next, but at a much lower level, France and Sweden are to be found with 1.9% and 1.4% respectively. Similarly, support for apprenticeship and related forms of general youth training was only extensively recurred to by two of the main competitor countries: Italy (3.3%) and France (2.1%) plus Poland (2.3%) among the new competitor countries. These labour market training data refer to all countries covered in this study except the Russian Federation and Mexico (OECD, 1994a; 1995b; 1996b; 1997c; 1998a).

Summarising so far, one might say that at least participation in labour market related training seems to be quite high in Sweden. As we saw above adults are also participating to a large extent in tertiary education in Sweden. Besides the long study programmes Swedish universities and university colleges provide both short study programmes and single courses. It is common for adults to participate in these regular offerings, in particular in the single courses. Approximately 30 % of the students in non graduate programmes were 30 years or older in 1995. Students in tertiary education have in one study been classified as ”traditional” or ”non-traditional” students. Traditional students are in this case young students (having embarked on tertiary studies before the age of 24), full-time students and students who have not had any long beaks in their study career. Applying this definition to tertiary education in Sweden in 1995, it was found that 53 per cent of the students were ”traditional” and 47 per cent ”non-traditional” (Brandell, 1998).

As for *popular education* and *municipal adult education* international comparisons are difficult to make. Still, to illustrate the importance of alternative educational avenues, it can be mentioned that in 1991 just about 14 % of the population 18-75 years of age had achieved their highest educational level through various forms of adult education (folk high schools, municipal adult education, labour market training, enterprise training etc.) (SOU 1993:85). As another illustration it can be added that in 1997 some 2,8 million Swedes (out of a population of close to 9 million) participated in 340 000 study circles. More than 10% of the adult population participates in one or several study circles each year (Rubenson, 1996).

Based on the information in SOU 1998:51 and Brandell (1998) the number of full-time, full-year adult participants in formal education and training in 1995/1996 can be estimated at:

Municipal adult education	107 000	
Folk high schools	34 000	
Other state financed adult education at primary and secondary level (including education for immigrants)		26 000
Tertiary education	110 000	
Employment training	46 000	
Employer sponsored training	75 000	

To shed some light on the importance of these figures in the Swedish context it can be mentioned that one age cohort in Sweden consists of roughly 100 000 individuals.

Several recently initiated policy programmes will further increase the possibilities for adults to participate in adult education and training: the Adult Education Initiative, the KY-programme and the on-going expansion of higher education and the reform of upper secondary education.

Quantitatively, the most important programme is the AEI, the *Adult Education Initiative*. It is a five year programme that started in 1997. The target group is in the first place the unemployed and those employees who lack or have only partial upper secondary education. The municipalities can apply for special state grants that cover the costs of providing approximately 100 000 full-time full-year study places. There are also state grants for the folk high schools to provide 10 000 more study places. Special financial facilities are also offered the adults participating in the programme.

The *KY-programme* is aimed at advanced vocational training at post secondary level. It was actually launched before the AEI but is now financed under the same umbrella as the AEI. The courses belonging to the KY-programme are planned and arranged as a partnership between educational providers and employers. Normally they last for two years and one third of the time is supposed to be spent at a work place. The number of study places is planned to increase from currently 6 000 to 12 000. The experimental phase of the programme is to last up to the year 2001 (KY Committee, 1998).

As for *higher education* an expansion of study places has started and is to continue according to present plans to the year 2000. By then 60 000 more study places will be provided than in 1995.

It is also worth mentioning that at *secondary level* all programmes young people now follow in upper secondary schools have a duration of three years (also the vocationally oriented programmes). All students carrying through these programmes will be eligible for tertiary education. Earlier the vocationally oriented programmes lasted for only two years and did not qualify for tertiary education.

The most interesting feature with these programmes is perhaps not their quantitative side, the number of training slots. They are also supposed to develop the *infrastructure* of the educational system i.e. the mechanisms that make the system work more efficiently. This is

maybe most pronounced with the AEI where the municipalities are requested to promote reform of adult education and:

- to analyse the local labour market and to consult with the social partners and the public employment services when drawing up their applications for state grants.

- to make an inventory of the education and training needs of individuals. An individual study and action plan has to be established for each individual participating in the programme.

- to choose the course organisers that meet the requirements of the target group and local conditions in the most efficient way.

- to develop new forms of information and outreach activities as well as new counselling methods and new techniques for assessment and recognition of prior learning.

- to develop new teaching methods including, for example, distance learning and different combinations of theoretical studies and practical applications.

- to engage in local monitoring and evaluation.

It has already been noted that the *local governments* are much more involved in *planning* their participation in the AEI programme than they have been in planning their normal educational activities (SOU 1998:51). Since the decentralisation of the responsibility for primary, secondary and adult education to the municipalities in 1991 the local government should be engaged in educational planning and evaluation but that involvement has been difficult to establish. It took some time until a majority of the municipalities had a school plan and even in 1995 only around 10% had evaluated it in its entirety (Skolverket, 1995a, 1996, 1997). The importance attached to the AEI programme by the local politicians has meant a lot for the general awareness of the importance of adult education and the status of adult education.

Another new aspects of this adult education programme is its direct link to the labour market. The municipalities have already since some time expressed an interest in taking over more of the labour market policy from national bodies. Municipalities often have some general economic development plan and the adult education programme is rather linked to that plan than to the school plan for the municipality and used as an *instrument for development*.

As part of their normal educational activities the municipalities have since earlier been expected to engage in *information, counselling, recruitment, outreach and validation activities*. Judging from their efforts to reorganise, co-ordinate and develop these activities their work in these fields must have been rather rudimentary earlier and/or the challenges bigger and taken more seriously with the new programme. These plans for reorganisation are often linked to pre-existing bodies that under different labels - Infotechs, Infocenters, Knowledge centres, Educational centres etc. - have started to develop information, counselling and open house learning activities, to serve as a basis for distant learning and to provide introductory courses for the programme. They will often also make the investigations as to the educational needs and interests of individuals and work out the required individual study plans.

In the AEI the municipalities use different types of educational providers. The *"external" educational providers* stood for 13 per cent of the volume of courses provided already in 1997

which a big change bearing in mind that external providers were hardly used at all earlier. They are expected to bring new impulses to the traditional municipal units with respect to the organisation of education, introductory and vocational courses and teaching methods.

Distance learning is also developing in many municipalities. Some municipalities have created local study centres with modern ICT equipment in different places in the municipality. They are often used as a basis for studies at different educational levels - primary, secondary and tertiary level.

Summing up:

- The AEI programme contributes both to the qualitative development of the infrastructure for recurrent and compensatory adult education and to the quantitative evolution of the training for adults.
- The KY-programme develops the infrastructure for lifelong learning in working life as well as its quantitative growth.
- The expansion of higher education also contributes quantitatively and qualitatively to lifelong learning given its bias in favour of adults.
- The new organisation of upper secondary education aims at better preparing young people for lifelong learning.

5. The labour market - returns to education and training

5.1 Employment and labour force participation

A summary view of the situation on the labour market for various educational groups is given by estimates of the expected number of years in employment, unemployment and outside the labour market for each of them. The results of such calculations made by the OECD for different countries are reported below. They refer to the situation prevailing in 1995 and the population aged 25 and 64 (OECD, 1997a).

Normally, the expected number of years in employment varies positively with educational attainment while the expected number of years out of employment and in unemployment varies negatively with educational level. This is also the case in the countries compared in this study. For the 14 main competitor countries (all of them except Japan) and the 4 new competitors (all of them except Hungry, the Russian Federation and Mexico) for which data are available the only notable exceptions are found in Italy, Germany and Korea. In Italy the expected number of years in unemployment is higher for individuals with tertiary education than for individuals with secondary education (both for women and for men). In Germany the expected number of years in unemployment is higher for women with upper secondary education than for women with lower secondary education. In Korea the expected number of years in employment is lower and the expected number of years out of the labour force higher for women with upper secondary education than for women with lower secondary education.

In Sweden the relationship between education and employment does not deviate from the normal one. However, what is remarkable for Sweden are the high levels of employment expectations and the low levels of expected years out of the labour force. This is especially true for women and for low levels of educational attainment. For women Sweden has ranking number 1 for employment expectations for lower secondary education and number 1-2 for tertiary education among the main competitor countries and number 1 in both instances among the now competitor countries. For men the corresponding figures are: 2 and 4-7 for the main competitors and 2 and 3 for the new competitors (OECD, 1997a).

The rate of unemployment has risen to comparatively high levels in Sweden during the 1990ties. This means that the level for the expected numbers of years of unemployment are rather high for calculations based on the situation in 1995. Sweden has the following ranking numbers:

comparing the main competitor countries

women	men
3-5 for lower secondary education	4-7 for lower secondary education
2-5 for upper secondary education	2-7 for upper secondary education
7-14 for tertiary education	2-8 for tertiary education

comparing the new competitor countries

women	men
1-2 for lower secondary education	2 for lower secondary education
1-2 for upper secondary education	1-2 for upper secondary education
1-2 for tertiary education	1 for tertiary education.

Looking closer at the rate of unemployment for women and men and different age groups, of course, you do not always find a strict negative relationship between the rate unemployment and educational level. During the 1990ties (in for instance 1991, 1992 and 1995) most exceptions have, however, been concentrated to young people and comparing non-university tertiary education and university- level education where the latter level of education has not always implied a lower rate of unemployment. The situation is similar for the relationship between education and labour force participation (OECD, 1997a; Sohlman, 1996).

Also in more detailed Swedish studies some exceptions to the rule that the rate of unemployment falls with educational level have been found comparing primary, lower and upper secondary education as well as comparing non-university tertiary education and university-level education (OECD, 1997a; Sohlman, 1996; SOU 1998:51). Unemployment in Sweden has also been noted to be more related to the risk of becoming unemployed than to the duration of unemployment and it is rather the former than the latter factor that is linked to educational level (SOU 1998:51).

During the 1990ties the rate of unemployment of women in Sweden has in most instances been lower than that of men comparing different educational groups and age groups. In many European countries the opposite situation has prevailed while in, for example, the United Kingdom, Canada and the United States men, like in Sweden, more often have had a higher rate of unemployment than women (OECD, 1997a; Sohlman, 1996).

There are few comparative studies of the effects of adult education and training on unemployment. The few, small Swedish studies that exist show that the main change in the situation of individuals before and after participation in formal adult education at secondary level is increased participation in further education. For the unemployed, participation in formal adult education at secondary level, employment also increases and that to an extent that seems to be at least as high as for participants in employment training (SOU 1998:51).

5.2 Education and earnings

Earnings normally increase with educational level. This is also what the OECD figures for relative earnings by level of educational attainment shows for persons aged 25-64 and 30-44 with income from employment in 1992, 1994 and 1995 - both for women and for men. As for Swedish wage differences they are relatively small comparing individuals with an educational level below that of upper secondary education and individuals with upper secondary education both for women and for men. Comparing individuals with non-university tertiary education and university-level education with individuals with upper secondary education the earnings differences are also small in Sweden for women but more at an average level for men. We have the following rankings for Sweden where columns (1), (2) and (3) compare the earnings of individuals below upper secondary level, at non-university tertiary level and university-level with those of individuals at upper secondary level respectively:

Men			Women		
(1)	(2)	(3)	(1)	(2)	(3)
Main competitor countries					
1992, persons aged 25-64					
2-3/14	6/11	8/14	2/14	8/11	8/14
1994, persons aged 25-64					
3/14	6/11	5-6/11	2/14	8/11	9/14
1995, persons aged 25-64					
2-3/12	8/11	5/12	2/12	10/11	10/12
1995, persons aged 30-44					
3/12	7/11	6/12	3-4/11	10/11	10/12
New competitor countries					
1995, persons aged 25-64					
1/2	-	1-2/2	1/2	-	2/2
1995, persons aged 30-44					
1/2	-	2/2	1/2	-	2/2

Sources: OECD (1995a; 1996a; 1997a).

As above the first figure/figures in each cell denotes the Swedish ranking number/shared ranking numbers and the figure after the slash the number of countries (including Sweden) participating in each comparison. The only new competitor country for which OECD data are available in this case is the Czech Republic.

Looking at the earnings of women as a percentage of those of men for the same years, age groups and educational levels you find that Sweden doesn't rank particularly high, in most instances having ranking number 5 or 6. The highest Swedish ranking numbers are found in 1995. In that year for persons aged 55-64 and for all levels of education combined Sweden has ranking number 2 and for upper secondary education ranking number 3 (OECD, 1997a).

For one specific professional group more precise comparisons can be made by means of comparative OECD statistics and that is for teachers. Data about annual statutory teachers' salaries in public institutions at the primary level, the lower and the upper secondary level (for general programmes as well as for vocational programmes) have been collected by the OECD for 1992 and 1995. The salaries are measured in equivalent US dollars and converted by using Purchasing Power Parities. The starting salaries and salaries after 15 year of experience (in 1992 maximum salaries) are related to GDP per capita. In this context the Swedish salaries stand out as very low. In 1995 we have the following rankings for Sweden

Main competitor countries

primary		lower secondary		upper secondary general		upper secondary vocational	
starting salaries	salaries after 15 years	starting salaries	salaries after 15 years	starting salaries	salaries after 15 years	starting salaries	salaries after 15 years
11-12/12	11/12	10-11/12	11/12	9-10/11	10/11	8-10/11	9-10/11

New competitor countries

primary		lower secondary		upper secondary general		upper secondary vocational	
starting salaries	salaries after 15 years	starting salaries	salaries after 15 years	starting salaries	salaries after 15 years	starting salaries	salaries after 15 years
2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/3

Source: OECD (1997a).

The reality concealed by the repetitive figures for new competitors is Sweden ranking lower than Korea and higher than the Czech Republic.

The Swedish position has not changed much since 1992 (OECD, 1995a).

Based on cross section earnings data of the type presented above the OECD has calculated approximate internal *rates of return* at different educational levels. Table 2 summarises the results of these calculations. They are based on gross earnings (excluding employer tax contributions). In that respect they do not represent private returns to education as they ought to be based on earnings net of taxes and take account of study assistance during education which was not done in the OECD study. On the other hand, in countries like Sweden with a compressed wage scale and high employer tax contributions the relation between gross earnings as measured and social returns may be less strong than in other countries and, of course, gross earnings do not capture non financial returns to education in any country. Neither are differences between educational groups in labour force participation and unemployment reflected in the OECD calculations. Also average earnings and costs data for the educational groups are used and the costs included are only direct costs on educational institutions.

Table 2. Internal rates of return at different levels of education by gender (1995).

	Men			*Women*		
Country	**Upper secondary education**	**Non-university tertiary education**	**University-level tertiary education**	**Upper secondary education**	**Non-university tertiary education**	**University-level education**
Denmark	10	5	11	12	5	9
Finland	10	11	15	8	12	14
France	14	18	14	14	20	13
Germany	6	17	11	6	9	8
Italy	10	-	10	10	-	5
Netherlands	14	-	11	24	-	11
Norway	11	9	12	17	8	13
Sweden	11	7	8	10	4	5
Switzerland	19	27	6	22	18	5
United Kingdom	14	5	13	19	14	19
Canada	13	23	17	16	28	29
Unites States	26	9	13	23	11	13
Czech Republic	22	-	9	14	-	7

Source: OECD (1997a).

Looking at the level and pattern of returns over educational groups for women and men it can be noted that there are few common characteristics.

- In some countries the returns fall with educational level and in some they rise with educational level. In other countries they first rise and then fall with educational attainment while in still others they first fall and then rise with educational level. Sweden belongs to the latter type of countries.

- In most countries the pattern of returns over educational groups is the same for women and men.

- In most countries the returns are as high or higher for women as for men at upper secondary level and non-university tertiary level while at university-level tertiary level the opposite situation prevails. However, in Sweden the returns to women are lower than to men at all three levels.

Discussing these results, the OECD used a benchmark of 10 per cent. In Sweden only the returns to upper secondary education reach that level. In two countries is it reached for all three levels for both women and men and that is in France and Canada. It may be added that for the two levels registered in the Netherlands this level is also reached both for women and men.

Comparing the level of returns in Sweden to those in other countries it can be noted that they are generally rather low especially for women and at the university level. Countries that frequently have been noted to have higher returns to education (and higher earnings differences between educational groups) than Sweden in 1995 and earlier are France, the USA, Canada, the UK and the Netherlands. On the low side together with Sweden you will often find Italy, Germany and Denmark (Sohlman, 1996).

In Sohlman (1996), SOU 1996:27 and SOU 1998:51 summaries of Swedish studies concerning returns to education can be found. They point to the fact that during the 1960ties, 1970ties and 1980ties returns to education fell in Sweden but during the 1980ties they tended to stabilise. Whether they have risen since still seems a bit uncertain but there are some indications pointing to an increase in returns over the 1990-1995 period especially for technicians and in the private sector (NUTEK, 1998b).

As in the OECD calculations normally a U-shaped pattern for returns over educational groups is reported in the Swedish studies as well as lower returns for women than for men. Also, returns have been found to be higher in the private sector than the public sector. Actually, in one study based on earnings data for 1995 only in the private sector and for educational groups such as engineers, economists, lawyers and science graduates do the rates of return to tertiary education reach or exceed the level of 10 per cent. In the public sector the returns are often negative and at most 8 per cent for medical doctors. These calculations were based on earnings net of taxes and including study assistance during the educational period and made for individuals working full time. It has been estimated that taking into account variations between educational groups as to unemployment would increase the rates of return to tertiary education by one percentage point (Olsson, 1998). Tertiary education has also been shown to improve the chances for young people to get a job and to stay in a qualifying job (NUTEK, 1998a).

5.3 Returns to work related training

In Sohlman (1996), SOU 1996:27 and SOU 1998:51 summaries of Swedish studies concerning returns to training in working life can be found together with some international comparisons. In Sweden as well as in other countries training has often (but not always) been found to increase *productivity* at the work place. At least in Sweden, these effects seem to be linked to changes in the work organisation.

As for the effects of *on-the-job training* and of specific versus general on-the-job training most Swedish studies suggest that the earnings effects of general on-the-job training are more important than those of specific on-the-job training. The earnings effects of on-the-job training

fell during the 1960ties and 1970ties but stabilised during the 1980ties and later probably increased. They seem to be relatively low in Sweden compared with the earnings effects in other countries as far as these comparisons go.

Labour turn over in firms has been rather low in Sweden more like in Japan than in the USA. Employers also appear to stand for most of the financing of on-the-job training in Sweden.

In studies made during the 1970ties returns to *training for the unemployed* were generally found to be positive and rather large in Sweden. However, the results of studies made during the 1980ties and 1990ties have been more varied and even negative effects of employment training on earnings have been noted. As in other countries it has proved difficult to preserve the positive effects of employment training during economic down-turns especially as there has been a tendency to increase this type of training during such periods. Also the positive effects of employment training have been observed to be more important for groups with a weak position on the labour market, i.e. in case of Sweden, people with low formal education, immigrants and the disabled.

There are very few Swedish studies concerned with the returns to *adult and recurrent tertiary education*. Important positive returns as well as negative returns have been reported. Recent empirically based studies seem to suggest that the most important effects of adult and recurrent tertiary education are on the risks of becoming unemployed and not so much on earnings.

5.4 Demand for educated people

So far the supply of labour with different types of qualifications and their earnings have been described. What about demand? A straight forward interpretation of the Swedish data presented above may be the following: the supply of highly educated people increased and with demand lagging returns to education fell as did interest in higher education. This reading of the data can be reconciled with a number of additional explanatory factors suggested by different authors that certainly contributed to the development but probably didn't determine it (Sohlman, 1996):

- the numerous clauses introduced by the end of the 1960ties in tertiary education
- the wage formation process where both unions and employers might have had an interest in keeping down the wages of individuals with tertiary education
- the market power of few and dominating employers that might have resulted in rather low wages for certain types of graduates e.g. engineers
- a quantitative head count that might exaggerate the increase in the supply of labour with tertiary education not taking into account changes in the quality of the supply and hours worked.

A number of competence related indicators also point to a slack demand, for instance, the fact that employers do not fully use the capacity of their employees:

- In an investigation made by LO, the blue collar trade union, 20 per cent of their members saw themselves as overqualified for their present job while 60 per cent judged that they had the qualifications needed and another 20 per cent stated that they needed more knowledge for their present job (LO, 1995)

- The IALS study showed that employees did not use their literacy capacity to any higher extent in Sweden than other countries. Even though the work organisation seems to be more flexible and decentralised in Sweden than in most other countries apparently the demand for competence is not especially pronounced. At the same time earnings are more related to experience than to formal education or literacy level in Sweden than in other countries. This means that the incentives for the employees to manifest their competencies are also lacking (NUTEK, 1998c; SOU 1998:51).

It is also easy to find a number of general indicators pointing at negative trends as far as the development of demand goes as discussed in Sohlman (1996). Just to mention and update a few of them:

- The lack of jobs. The rate of unemployment has risen dramatically in Sweden at the same time as the rate of labour force participation has decreased. In 1997 there were 550 000 fewer people employed than in 1990 (i.e. 12 per cent fewer than in 1990) (LO, 1998).

- GDP per capita. According to the OECD statistics for 1996 Sweden was the 16th richest country in the OECD measured by GDP per capita using Purchasing Power Parities. Back in 1989 Sweden was the 5th richest OECD country (OECD, 1991; OECD, 1998c). Among the OECD countries that are richer than Sweden in 1996 we find all main competitors (except Finland and the UK though they are rather close to Sweden) plus Australia, Luxembourg and Iceland.

- Low investment ratio. In 1996 total gross fixed capital formation was 15 per cent of GDP of which investments in machinery and equipment stood for 8 per cent points (OECD, 1998c).

Some authors have, however, argued that it is because of the lack of people with tertiary education, especially technicians and science graduates, that recently economic growth in Swedish has been so relatively low (Sohlman, 1996). One new study (NUTEK, 1998b) points to the Swedish structure of industries and, relative to other countries, a lack of people with long tertiary education of 80 000 (2% of the labour force). With 80 000 more employees with long tertiary education their share of the labour force would increase from presently 13 per cent to 15 percent (LO, 1998).

Recently the knowledge based industries also seem to have started to grow and to expand more quickly than in other countries. Sweden has, for example, advance from shared ranking number 5-8 for trade coverage ratios (exports/imports) for high-tech industries in 1993 to 2-3 for the same industries in 1995 (NUTEK, 1998b; Sohlman, 1996; OECD, 1995d, 1996d, 1997f, 1998c).

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However, there seems to be some inconsistencies in both interpretations. If demand was lacking why did the supply of educated people continue to expand for such a long time when the returns were falling? If lacking supply slowed down the economic expansion, why didn't returns increase or increase earlier?

6. Concluding remarks

The supply of education

Comparing internationally the Swedish population apparently has a high level of education and training both quantitatively and qualitatively and the educational system is adapting to the requirements of lifelong learning.

More problematic may be the fact the it is not the young generation, the young science graduates that are at the forefront. In Sweden young people, at least after the age of 18, participate to a lesser degree in education than in many other countries. They stay on for quite a long time in secondary education and transfer at a fairly old age to higher education. However, they seem to pass their exams at an average age and return more frequently to higher education at an older age.

The Swedish students seem to be rather normally distributed over subject areas both at secondary and tertiary level. If, for one reason or other, the number of science students is judged to too low in Sweden, the comparisons with the main competitor countries tend to indicate the general level of participation in tertiary education as a critical factor and maybe also the number of students, especially women, opting for science and technical programmes in upper secondary education.

Judged by international test in literacy and mathematics and science, the quality of basic education in Sweden is very good measured by literacy standards and at an average level measured by mathematics and science standards. But current costs for education are important though neither teaching hours nor teachers' salaries are very high.

Participation by adults in labour market related training, traditional adult education and recurrent tertiary education is quite high in Sweden as indicated by the following estimates for full-time, full-year participation in 1995/1996 (keeping in mind that one age cohort consists of roughly 100 000 individuals):

Municipal adult education	107 000
Folk high schools	34 000
Other state financed adult education at primary and secondary level (including education for immigrants)	26 000
Tertiary education	110 000
Employment training	46 000
Employer sponsored training	75 000

Several recently initiated policy programmes will further increase the possibilities for adults to participate education and training:

- the Adult Education Initiative - approximately 100 000 study places at upper secondary level
- the KY-programme - approximately 10 000 study places at post secondary level
- the expansion of higher education - where maybe 30 000 study places will be taken up by adults.

The tertiary education is not only concerned with education but also research and development as well as the dissemination of the results of research and development. In Sweden the higher education sector stands for an important part of current research and development.

Incentives for investing in education and training

Employment varies positively and unemployment negatively with educational attainment in Sweden as well as in other countries. Remarkable for Sweden are the high rates of employment especially for women and for individuals with a low level of education.

Swedish earnings differences between educational groups are often relatively small. Comparing individuals with tertiary education and individuals with upper secondary education the earnings differences are small for women but more at an average level for men.

Teacher salaries at primary and secondary level are very low in Sweden both at start and after 15 years of experience. They are a little bit higher at upper secondary level and for vocational teachers.

Comparing the level of returns to education in Sweden with those in other countries they have generally been found to be rather low especially for women and at the university level. Countries that frequently have been noted to have higher returns to education (and greater earnings differences between educational groups) than Sweden are France, the USA, Canada, the UK and the Netherlands. On the low side together with Sweden are often found Italy, Germany and Denmark.

During the 1960ties, 1970ties and early 1980ties the returns to education fell in Sweden but then tended to stabilise. Whether they have risen by now still seems slightly uncertain.

The earnings effects of on-the-job training also fell during the 1960ties and 1970ties but stabilised during the 1980ties and later on probably increased. They too seem to be relatively low in Sweden.

In studies made during the 1970ties returns to training for the unemployed were generally found to be positive and rather large in Sweden. However, the results of studies made during the 1980ties and 1990ties have been more varied and even negative effects of employment training on earnings have been noted. As in other countries the positive effects of employment training have been observed to be more important for groups with a weak position on the labour market, i.e. in case of Sweden, people with low formal education, immigrants and the disabled.

As for adult and recurrent tertiary education important positive returns as well as negative returns have been reported in Sweden. Recent studies suggest that the most important effects of adult and recurrent tertiary education may be on the risks of becoming unemployed and not so much on earnings.

The private incentives to invest in education and training thus seem to be rather weak both for young people and for adults in Sweden. The main returns to individuals of investments in education may be higher chances of employment not higher earnings.

In many respects Swedish women have a better position than women in other countries. This holds e.g. for:

- their educational level in the total adult population
- their participation in current education
- their rate of employment
- their level of unemployment.

But it doesn't hold for

- young science graduates in the labour force where Swedish women compare less well than Swedish men with their counterparts in other countries.
- various earnings aspects
  - earnings differences tertiary education/upper secondary education where the differences are small in Sweden for women but more at an average level for men
  - earnings of women as a percentage of those of men where Sweden doesn't rank particularly high
  - returns to education that are lower for women than for men in Sweden both at upper secondary level, non-university tertiary level and university-level tertiary education.

Policy discussion

The international comparisons suggest that if Sweden has the ambition to stay a leading knowledge based society it will have to increase the participation of young people in tertiary education, especially in the fields of science and technology. But this may be a goal for the long run. As long as the incentives for tertiary education are not higher it may be a risky and costly affair for the state to try to raise participation in higher education.

As for traditional adult education, recurrent education at tertiary level, employment training and employer sponsored training many aspects still remain to be studied. Still, it seems important to try to uphold the present level of education and training given the expected needs for further training and lifelong learning in working life. However, also in these fields the incentive structure is of great importance for an efficient use of resources.

Tertiary education has three important tasks in Sweden

- to teach young students and adults participating in recurrent education
- to do research
- to disseminate the results of research and development to other actors in the society.

These activities have to be considered simultaneously. High pressure on the tertiary education sector both as to teaching and producing and disseminating research results may be difficult to combine.

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