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Sweden—a learning society? The education system's performance in an international perspective

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Summary

■ This paper describes the performance of Sweden's education system. Sweden is compared to its main competitors on international markets and to some potentially new competitors in Asia, Latin America, and eastern and central Europe. Through these international comparisons, Sweden's education system is quantitatively and qualitatively evaluated in relation to basic education and lifelong learning dimensions. Data that describe recent developments in Sweden supplement the comparisons. Areas covered are human capital stocks, human capital flows, and the labour market, i.e., returns to education and training.

Sweden has a well-educated population and has started the transition toward a system that adapts to lifelong learning requirements. But there are weaknesses in the system, for example, the number of young people who enrol in tertiary education is low, and the proportion of science graduates in the young labour force is modest.

Private incentives to invest in education and training seem to be low for young people and adults. Main returns from education and training investments may be greater employment opportunities and not higher earnings.

The concluding section briefly addresses policy alternatives regarding how to achieve: an expansion of tertiary education, an efficient combination of teaching and research in higher education, and appropriate investments incentives. ■

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During the recent election campaign in Sweden, diverging views about the performance of the education system were aired. People even said it might be necessary to set up an impartial commission to find out the truth about the state of the system. This paper offers a basic overview of the achievements of the education system. It takes a benchmarking approach, using international comparisons.

International comparisons can be helpful in bringing education results of a specific country into perspective. But there are 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 been developed. When data exist, quality problems frequently arise. And available statistics are not necessarily reliable, relevant, and comparable.

Most data relate to formal education and training. It is relatively easy to find figures for education stocks and flows measured by years of schooling, proportions of an age group at different levels of education, and numbers of students who pass certain exams. Sometimes, but more rarely, quality of the education is indicated. What did the students learn? How did their attitudes change? Results based on employment, occupations, and earnings of students after education and training often exist, but such results are not just from the effects of previous education and training; many other factors also influence results. Generally, there will be more information about the education and training of young people than of adults; more about formal education than non-formal education; more on education and training inside schools rather than outside schools—and even less about informal learning.

To ensure as relevant data as possible, it may be necessary to try different types of indicators, follow their development over time, remove obsolete ones, and add better ones as the field develops.

This paper reports results from a third follow-up study in a series that started in 1992 (Sohlman, 1992, 1996) in which readily accessible international statistics are used for comparative purposes. And it is interesting to note what progress was made during this rather short period. Today, education, training, and lifelong learning are at the centre of political interest. This is also reflected in the availability of statistics. But much still remains to be done to match the new focus on lifelong learning, which largely means informal learning and on-the-job training.

The OECD is an important source of information about education and training. An advantage using OECD statistics is that member countries are very active in developing and putting these statistics together.

This paper concentrates on economic issues—education and training as factors of growth and economic development.

Sweden is compared to 14 countries that are its main competitors on international markets; all belong to the group of OECD countries with the highest GDP per capita. To check what is happening in potentially new competitor countries, data are added for a few new members and partners in the OECD; these countries are in Asia, Latin America, and eastern and central Europe. Figures for some additional new competitor countries that participate in the UNESCO/OECD World Education Indicators (WEI) programme are also reported (OECD, 1998a):

- Group one, 15 countries—*main competitors* (Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, Switzerland, the UK, and US)
- Group two, 6 countries—*new competitors* (Czech Republic, Hungary, Poland, Russian Federation, Korea, and Mexico)
- Group three, 13 countries—*WEI countries* (Argentina, Brazil, Chile, China, India, Indonesia, Israel, Jordan, Malaysia, Paraguay, Philippines, Thailand, and Uruguay).

Sections 1 and 2 contain comparisons that deal with the labour supply and different types of education and training. Section 3 discusses the interaction of supply and demand on the labour market and the resulting effects in terms of employment and earnings.

1. Human capital stocks

Let us first have a look at the *formal education of the population ages 25-64* in 1996 (OECD, 1998a). Looking at the percentage of the population that has completed tertiary education, non-university tertiary education, and university-level education, respectively, Sweden:

- Shares ranks 3 and 4 (with Norway), regarding the proportion of the population that has completed tertiary education among the main competitor (group-one) countries
- Ranks 1 among the new competitor (group-two) and WEI (group-three) countries. Only Canada and the US have (in descending order) higher proportions than Sweden. (Here, we have data for 14 countries in group one. In group two, there are data for four countries and in group three, for eight countries. In the first case, data for Japan are missing and in the second case, for the Russian Federation and Mexico.)

Dividing tertiary education into non-university tertiary education and university-level education, Sweden has more of its population concentrated on the former level than on the latter level and:

- Ranks 2 for non-university tertiary education among group-one countries and ranks 1 among countries in groups two and three. Here, only Canada has a proportion higher than Sweden.
- Shares ranks 6-8 (with Germany and the UK) for university-level education among group-one countries and shares ranks 2 and 3 (with Hungry) among group-two countries. Here, the US, the Netherlands, Canada, Norway, Denmark, and Korea have higher proportions than Sweden.

When making the same comparisons for women and men separately, results for women are more often better than results for men in Sweden, when comparing women and men in different countries. So to a certain extent, achievements of women explain the good average results for the population in Sweden.

The expansion of higher education started rather late in Sweden. But during the 1960s and 1970s, there was rapid growth in the proportion of the population that completed higher education. It approached that of the highest-ranking OECD countries. But in the 1980s and the 1990s, this development came to a halt. Enrolments in higher education were at a standstill during the late 1970s and the 1980s in Sweden.

Expansion resumed again in the late 1980s and 1990s (Sohlman, 1992, 1996; Brandell, 1998).

The effects of these changes can be seen in Sweden's relative position within age groups. In 1996, after comparing the proportion having completed university-level tertiary education in Sweden with proportions in group-one countries, Sweden ranked:

- 11-12 for ages 25-34
- 7-8 for ages 35-44
- 4-5 for ages 45-54
- 5 for ages 55-64.

For earlier years, there is an even more pronounced inverted U-shaped pattern over the age groups. Here, Sweden has a rather low ranking in older age groups, a better ranking in middle age groups, and a lower ranking in younger age groups (Sohlman, 1996). For group two, in 1996, Sweden normally outperforms them except for young people. For ages 25-34, Korea and Hungry (group two) as well as Paraguay and Uruguay (group three) have higher proportions than Sweden (OECD, 1998a).

While the average rank improved for Sweden during the 1960s and 1970s, not much happened during the 1980s and first half of the 1990s. In 1989, compared to group-one countries, Sweden ranked 4 for the proportion of the population having completed tertiary education, which was about the same as in 1996, as previously noted. Looking closer at the figures, the resumed expansion of higher education in Sweden in the late 1980s and 1990s is revealed in the amount of *increase* in the proportion of the population having completed higher education. Between 1989 and 1992, the increase was only one percentage point; it was three percentage points between 1992 and 1996. The latter figure is rather high in international comparisons but not high enough to change the overall Swedish ranking.

With high labour force participation, even in low education groups (cf. Section 3.1), the Swedish rank for *education in the labour force* is lower than for education in the population. In 1996, the Swedish rank for tertiary education and university-level education *in the labour force* was 4-5 and 8-10, respectively, among group-one countries, which is lower than for education in the population where the corresponding figures were 3-4 and 6-8 (OECD, 1998a).

For younger age groups, there is another interesting time series. It is concerned with the number of *science graduates per person in the labour force,*

ages 25-34, and it further underlines the low Swedish rank for young people. Comparing group-one countries in 1996, Sweden ranked 9 for university-level graduates and 7 for non-university graduates (OECD, 1998e). In 1995, Sweden ranked 10 for university-level graduates and 8 for non-university graduates. Here, the results for women are not better than results for men; they are worse. Female university graduates in Sweden rank 10 and non-university graduates rank 9, while the corresponding ranks for men are 9 and 8 (OECD, 1997a).

For 1996, we have data for 10-12 countries and for 1995, for 12-13 countries depending on what ranks you look at. In 1995, Belgium, Canada, Denmark, Finland, Germany, Japan, Norway, the UK, and US consistently outperform Sweden. Austria, the Netherlands, and Switzerland normally show proportions lower than Sweden. No data are available for France and Italy.

Using the entire time series for 1988-1996, one might conclude that France also ranks higher than Sweden, while Italy ranks lower. Since 1988, the Swedish ranking has remained about the same, although in relative terms, the differences have diminished somewhat especially since 1992 when, for example, comparing Sweden and the UK and Japan, the two leading countries (OECD, 1998a; cf. also NUTEK, 1999).

To compare Sweden with group-two countries, we can use data for 1996 for the Czech Republic, Hungary, and Korea and for 1994, for Poland. Among these countries, Sweden ranks 3 after Hungary and Korea (OECD, 1997a; OECD, 1998a; Sohlman, 1996).

A total stock measure, which to some extent corresponds to 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, 1995 is the latest year for which Swedish data are available. In 1995, Sweden ranked 2 among 12, group-two countries for which data for 1995 were also published. If we use the entire 1975-1996 time series, Sweden can be estimated to rank 2 or 3 among the 15 group-one countries, only Japan and perhaps the US surpass Sweden.

Making the same operation for group-two countries Sweden could be ranked 1 among the five countries for which data were available, i.e., all except the Russian Federation.

For *total R&D personnel*, the Swedish rank is as impressive. Making use of the 1989-1996 time series, Sweden can be ranked 1 among group-one and group-two countries. Here, there are data for 14 group-

one countries, i.e., all but the US and for five group-two countries, i.e., all but the Russian Federation (OECD, 1997e; OECD, 1998d; Sohlman, 1996).

For researchers and R&D personnel, here we note a good total stock result for Sweden and a better result for the total population than for the young age groups, in the same way as was previously noted for higher education in the population. But for researchers and R&D personnel, the excellent Swedish stock results even relate to the labour force. For higher education, stock results were not that good for higher education in the labour force especially not for university-level education. Differences among generations are apparently even bigger regarding researchers than higher education in general.

The large proportion of researchers in the labour force in Sweden corresponds to an important amount of GDP being devoted to expenditure on R&D. The latest Swedish figure (for 1995) in the OECD's 1990-1997 time series is actually the highest one noted for any countries compared in this study during that period (OECD,1994b; OECD 1997e; OECD 1998d). The Swedish distribution of these expenditures across R&D sectors is also interesting (sectors include business enterprise, higher education, government, and private non-profit). In Sweden, like in most other OECD countries, the business enterprise sector does most of the research, more or less closely followed by higher education, the government, and finally the private non-profit sector, which is normally very small. For the 1990-1997 time series, exceptions to these general patterns are in Finland, France, Poland, the Czech Republic, Hungary, Korea, and Mexico, where the government sector is bigger than the higher education sector (when comparing 15 group-one countries and five group-two countries for which data exist).

In Mexico, the government sector and the higher education sector are larger than the business enterprise sector. The non-profit sector is also the smallest in Mexico. While following the general pattern, a rather *small* government R&D sector and rather *big* business enterprise and higher education sectors characterise Sweden (OECD, 1994b; OECD, 1997e; OECD, 1998d). Right now, the Swedish higher education sector is apparently more concerned with R&D activities than with producing new R&D personnel—compared to higher education sectors in other OECD 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? Development of skills and competencies that might be learned at school but are not necessarily learned there? Is Swedish performance better or worse regarding informal learning?

At least one instrument measures one aspect of the population's skills and competencies in different countries, i.e., the *International Adult Literacy Study* (IALS) tests, which measure literacy skills. By now, tests have been done in 12 countries—Belgium (Flanders), Germany, Sweden, Switzerland, Ireland, Australia, New Zealand, Canada, Poland, the Netherlands, UK, and US. Testing was done in 1994/1995 (OECD, 1995c; OECD, 1997b; OECD, 1997d; OECD, 1998a).

In the IALS, literacy is measured according to three scales: a prose scale, a document scale, and a quantitative scale. Five proficiency levels are identified for each scale. But only combined data for the two highest levels are reported, because the numbers performing at the highest skill level are small (under 5% in most countries). In Sweden, level 3 corresponds to the level that students are supposed to have acquired by the end of compulsory education (i.e., after nine years of schooling).

No matter which way results are measured and compared, they show that the functional literacy level is very high in Sweden.

- On average. For all scales, Sweden has a lower proportion of its population ages 16-65 on the lowest proficiency level and a proportion on the two highest levels higher than other countries.
- By education level. For example, the mean score on the quantitative scale for adults ages 25-65 was higher in Sweden than in other countries except among people with university education. Here, Canada had a better result than Sweden.
- By occupation. Another example: the proportion of skilled craft workers and machine operators on literacy levels 3-5 was 74% in Sweden (the highest figure among participating countries), 32% in the US, and 20% in Poland (the lowest figure noted).

Young people in Sweden tend to have test scores that are better than young people in other countries, but the results are not that much better—compared to results for older age groups in Sweden and other countries (OECD, 1998a; Sohlman, 1996).

But when IALS results were presented in Sweden, the media paid little attention to the very good Swedish results—compared to results

in other countries. Instead, it concentrated on the shocking fact that 25% of the adult population was below level 3.

To summarise, one may conclude that in international comparisons, Sweden's population seems to have rather high education and training levels, quantitatively and qualitatively. The only evidence that contradicts this conclusion is the Swedish ranking for university-level education in the labour force and more generally, in the young age groups.

People with university-level education are relatively rare in the Swedish labour force because labour force participation is higher in Sweden than in most other OECD countries—particularly in groups with low education backgrounds. But population statistics usually underestimate the education level of adults. Current adult education adds to the education level of the labour force even though these effects are not always registered in stock statistics—a fact we discuss further in Section 2.2.

In Sweden, 20th century education expansion started by concentrating on lower education levels. But by the time those born in the 1940s reached the universities (about 1958-1968), Sweden was among the leading OECD countries, even at the university level. Since the 1960s, university expansion has continued in most OECD countries. But in Sweden, enrolments stood still during most of the 1980s, which partly explains why Sweden lost its leading rank for the young generations that are eligible for university education during the 1980s. Since the 1980s, expansion has resumed but apparently has not resulted in a remarkable change in the Swedish international position for young age groups—at least not by 1996.

The next section discusses recent developments regarding student recruitment to tertiary education in more detail. Tertiary education is not only concerned with education but also R&D and the dissemination of R&D results. Now the higher education sector in Sweden stands for an important part of current R&D. High pressure on the higher education sector to teach and to produce and disseminate research results may be difficult to reconcile.

2. Human capital formation—the flows

There are many different ways to measure human capital formation among young people and adults. This section presents survey results regarding current education for young people and adults.

2.1. Education for young people

One way to get an overview of current investments in young people is to look at *expected years of formal education* for a child. Table 1 shows how Sweden ranks for expected years of education, based on head counts (full-time and part-time students) for a child, age 5, in 1996.

Table 1. Sweden's rankings for expected years of part-time and full-time formal education for a child age 5 (1996).

	Group one *Main competitors*	Group two *New competitors*	Group three *WEI countries*
Women	1/13	1/3	1/8
Men	3/13	1/3	1/8

Notes: The figures before the slash (/) denote Sweden's rank or its shared rank. The figures after the slash denote the number of countries participating in each comparison. In comparisons for group-one countries, Sweden is included as one of the countries compared. So in group one, the highest possible rank for Sweden is 15. In the other two groups, Sweden is not included as one of the countries in each group. So Sweden can have a higher rank than the number of countries participating in a given comparison.

Source: OECD (1998a).

Women in Sweden are at the top. For men, Belgium and the Netherlands (group one) have a higher rank. The excellent Swedish results are mainly due to comparatively heavy investments in upper secondary education. So a child (age 5) in Sweden can expect a long schooling period compared to children in other countries even though the normal starting age for formal full-time education is age 7 in Sweden. But an important part of this education is part time. Concentrating on just full-time students, Table 2 shows quite a different ranking picture for Sweden for different education levels.

Table 2. Sweden's rankings for expected years of formal, full-time education for a child age 5 (1996).

	Group one *Main competitors*	Group two *New competitors*	Group three *WEI countries*
Primary and lower secondary	8-10/15	1-2/5	6/10
Upper secondary	6/14	2/5	1/9
Tertiary	11-12/13	2/4	1-3/7
All levels (including pre-school from age 5)	7/13	1/4	1/8

Notes: See Table 1; same source.

Compared to the main competitors, the best Swedish results are again at the upper secondary level. But here, Sweden has only an average rank. At primary and lower secondary and at tertiary levels, the Swedish rank is even lower: 8-10 out of 15 and 11-12 out of 13 compared main competitor countries.

Two new competitors surpass Sweden: the Czech Republic, at the upper secondary level and Korea, at tertiary level. The Philippines and Uruguay (WEI countries) are on the same level as Sweden on the tertiary level, even though their average expected education levels are below the Swedish level.

Table 3 shows Sweden's rankings for expected years of tertiary education for a person age 17. The rankings are better for women than for men, better for full-time and part-time than for full-time only—but on the whole, rather low.

Table 3. Sweden's rankings for expected years of tertiary education for a person age 17 (1996).

	Group one *Main competitors*	Group two *New competitors*	Group three *WEI countries*
Full time & part time	9-10/13	2/5	1/8
Women	7-8/13	1/3	1/8
Men	12/13	2/3	1/8
Full time only	11-12/13	2/4	1/6

Notes: See Table 1; same source.

Given these figures, one might expect that Swedish education costs would be rather low but, on the contrary, current costs for education are quite high. In 1996, direct public expenditure for education institutions, as a percentage of GDP, was 6.6%. The corresponding figure for public *and* private expenditure was 6.7%. After Norway with 6.8%, Sweden (and Finland) has the highest rank for direct public expenditure as a percentage of GDP among the 15 group-one countries. In groups two and three, only Israel has a rank higher than Sweden (7.0%). For public *and* private costs, Sweden's ranking is a little bit lower but only within group one. In that case, Denmark (7.1%) and Canada (7.0%) have a rank higher than Sweden. And the US, at 6.7%, is on the same level as Sweden. But here, there are only data for 11 group-one countries.

High per-pupil expenditure can be a quality indicator. But in Sweden, education costs do not seem to be related to other quality indicators such as *teaching hours* or *teachers' salaries*. Table 4 shows Sweden's rank for teaching hours in primary and secondary education in 1992, 1994, and 1996. Across these years, Sweden's rank has remained at a very low level.

Table 4. Sweden's rank: teaching hours per year in public institutions by education level, (1992, 1994 and 1996)

	Country group	Primary	Lower secondary	Upper secondary *General*	Upper secondary *Vocational*
1992	One	10/10	11/11	9/9	6-7/7
1994	One	11/11	11/11	8/10	6-7/8
1996	One	11/11	11/11	8/10	6-7/8
	Two	3/3	3/4	3/4	2/4
	Three	10/9	8/9	10/9	7/8

Notes: See Table 1.

Sources: OECD (1995a); OECD (1996a); OECD (1997a); OECD (1998a).

The OECD collected data about annual statutory teachers' salaries in public institutions at the primary level and lower and upper secondary levels (for general programmes and for vocational programmes). Table 5 shows Sweden's rank for starting salaries and salaries after 15 year of experience—in relation to GDP per capita in 1995 and 1996. In this context, salaries in Sweden are quite low. Compared to group-

one countries, starting salaries are especially low. In this respect, Sweden's rank did not changed much between 1995 and 1996 nor when going back to 1992 (OECD, 1995a). But between 1995 and 1996, there is some improvement in Sweden's rank, especially for experienced teachers—compared to experienced teachers in the other group-one countries.

An explanation for the rather repetitive 2/4 figures in 1996 is that in comparisons with group two, Sweden ranks lower than Korea and higher than the Czech Republic, Hungary and the Russian Federation.

Table 5. Sweden's ranks regarding ratio of annual statutory teachers' salaries to per capita GDP in public institutions by education level (1995-96).

Group one, *main competitors*

	Primary		Lower secondary		Upper secondary			
					General		*Vocational*	
Salaries	Starting	After 15 yrs.	Starting	After 15 yrs.	Starting	After 15 yrs.	Starting	After 15 yrs.
1995	11-12/12	11/12	10-11/12	11/12	9-10/11	10/11	8-10/11	9-10/11
1996	11-12/13	5-9/13	9-11/13	5-10/13	8-10/13	10-11/13	8-9/11	7-9/11

Group two, *new competitors*

	Primary		Lower secondary		Upper secondary			
					General		*Vocational*	
Salaries	Starting	After 15 yrs.	Starting	After 15 yrs.	Starting	After 15 yrs.	Starting	After 15 yrs.
1995	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/3
1996	2/4	4-5/4	2/4	4-5/4	2/4	2/4	2/4	2/4

Group three, *WEI countries*

	Primary		Lower secondary		Upper secondary			
					General		*Vocational*	
Salaries	Starting	After 15 yrs.	Starting	After 15 yrs.	Starting	After 15 yrs.	Starting	After 15 yrs.
1996	5-6/9	6-7/9	6/9	7/9	5/9	7/9	4-5/6	4/6

Notes: See Table 1.

Source: OECD (1997a); OECD (1998a).

After this digression into education costs and potential quality indicators, let us go back to participation in education. In Sweden, com-

pulsory schooling starts at age 7. In looking at *participation by single year of age*, participation in Sweden is:

- Normally low before age 7
- High for ages 7-18 (associated with primary and secondary education)
- Low for ages 19-20 (associated with early participation in tertiary education)
- Higher for older age groups.

For 1996, Table 6 describes Sweden's ranking when comparing participation by different (sometimes overlapping) age groups.

Table 6. Sweden's ranking: participation by age (1996).

Ages	Group one *Main competitors*	Group two *New competitors*	Group three *WEI countries*
18	1/13	1/5	1/9
19	13/13	3-4/5	3-4/8
20	12/13	3/5	1/8
20-29	5/13	1/5	1/7
20-39	1/10	1/3	1/5
40-	3/10	1/1	1/4

Notes: See Table 1; same source.

Over the years, the dip in participation by the end of secondary education seems to shift upward. In 1996, participation is very high in Sweden up to age 18 but then falls down and only picks up at age 24. In the early 1990s, participation was not that high for ages 16-18, but picked up by age 22 (OECD, 1995a; OECD, 1996a; OECD, 1997a; OECD, 1998a). Military service after the end of secondary schooling is one explanatory factor for boys. But there are also indications that in Sweden, young people spend more time in secondary education and transfer later to higher education than in other countries. If a distinction is made between total participation and participation in tertiary education by single age groups 18, 19, and 20, then Sweden shows very low (but growing) participation in tertiary education in these age groups; see Table 7.

Table 7. Sweden's ranking: total participation and participation in tertiary education by age (1996).

Age	Total participation	Tertiary education participation
Group one, *main competitors*		
18	1/13	11-13/13
19	13/13	10/13
20	12/13	10/13
Group two, *new competitors*		
18	1/5	6/5
19	3-4/5	5/5
20	3/5	4/5
Group three, *WEI countries*		
18	1/9	8-10/9
19	3-4/8	6/8
20	1/8	3/8

Notes: See Table 1; same source.

Regarding age of new entrants in tertiary education, we can compare the age at the 20th, 50th and 80th percentile for 1995. In Sweden, 20% of the new entrants are below age 20, 50% below age 22 and 80% below age 29. Among group-one countries, only Norway and Denmark have students older than Sweden at the 50th percentile and only Norway at the 80th.

The lack of young students in tertiary education can be further illustrated by comparing Sweden and Finland. Among the EU countries, Finland has the highest proportion of the population in higher education. Participation in tertiary education for groups ages 38 and above is higher in Sweden than in Finland. But if overall participation in tertiary education in Sweden would have been at the same level as in Finland in 1995, the number of students in tertiary education would have been about 350,000 instead of 250,000 (Brandell, 1998).

Besides the long study programmes, Swedish universities and university colleges provide short study programmes and single courses. It is common for adults to participate in these regular offerings, particularly in single courses. About 30% of the students in non-graduate programmes were ages 30 or above in 1995. In one study, students in tertiary education were classified as either traditional or non-traditional students. Here, traditional students were defined as young students (having embarked on tertiary studies before age 24), full-time students, and students who had not had long breaks in their educational careers.

Applying this definition to tertiary education in Sweden in 1995, it was found that 53% of the students were traditional and 47% non-traditional (Brandell, 1998).

There is little information about the median age of tertiary-level graduates. Often, the median age has been found to be high in Sweden, Denmark, and Finland. In 1996, for non-university programmes, Sweden ranked number 1 for median age (out of six group-one countries). For short, first university degree programmes, Sweden ranked 3 after Denmark and Finland (out of seven group-one countries) and for long, first-degree programmes Sweden ranked highest after Austria, Denmark, and Finland (out of eight group-one countries) (OECD, 1998a).

Now turning to the *types of education programmes* the students follow at different education levels, the only programmes that can be compared at upper secondary level are general/theoretical and vocational/technical programmes. In 1996, about 45% of the students in Sweden were enrolled in general programmes and 55% in vocational/technical programmes. Compared internationally, the Swedish proportion of general programmes is not that low as perhaps might be expected given the rather low transfer rates to higher education; Sweden ranks 3-4 in group one and 4 in group two. Here, the comparisons include all group-one countries except Canada and the US (where these distinctions among programmes are no longer made in the OECD statistics) and all group-two countries. Compared to the 11 group-three countries for which data are available, Sweden's proportion is the lowest (OECD, 1998a).

Looking closer at Sweden's figures, during the 1980s and early 1990s, there was a tendency for the proportion of *general/theoretical* programmes and *science and technology* programmes to fall. But during the 1990s, they have stabilised—the *former* around the 40-45% level of the students and the *latter* around the 15-20% level. During the same period, the corresponding proportion for women in science and technology programmes has fluctuated around 10-15% (Skolverket, 1995b; Skolverket, 1998).

For tertiary education, the distribution of qualifications by subject categories at non-university and university levels can be compared using OECD statistics. Table 8 shows Sweden's rankings in 1996, where data at the university level mainly relate to all group-one countries (except France) and only a few group-two countries.

Table 8. Sweden's rank regarding qualifications by subjects (1996).

	Group one *Main competitors*		Group two *New competitors*	
	Non-university	University	Non-university	University
Humanities/general	10/11	9/14	1/2	2/2
Law and business	8/11	10/14	3/2	3/2
Medical science	3/11	2-3/14	1/3	1/3
Natural science	6-8/10	12-13/14	2/2	4/3
Mathematics and computer science	3-4/9	3-5/13	-	1/2
Engineering and architecture	1/9	6-7/14	2/3	4/3

Notes: See Table 1; same source.

At the university level, compared to group one, Sweden's lowest rank is in natural science, and its highest is in medical science. On the whole, students in Sweden seem to be distributed across subjects about the same way as in other countries. Group-two countries seem to favour natural science and engineering more than Sweden (and the other OECD countries).

In 1996, the percentage proportion of women awarded qualifications by subjects at the university level, showed a very skewed distribution for Sweden with:

- 74% in medical science
- 73% in humanities/general studies
- 52% in law and business
- 50% in natural science
- 22% in mathematics and computer science and in engineering and architecture (OECD, 1998a).

But this is not very different from situations in other countries.

The only Swedish figures that somewhat stand out as high in 1966, compared to those in group-one countries, are figures for law and business and humanities/general studies. Natural science figures are also somewhat high and mathematics and computer science, somewhat low.

For the total proportion of degrees in technical- and science-oriented subjects for women and men (engineering and architecture,

mathematics and computer science, natural science and medical science), Sweden ranks 4 among the 14 group-one countries that can be compared for 1996.

Sweden has participated in several *international tests* of student achievements. If we concentrate on tests for students ages 13-14, results are available for 1982 in mathematics and science, for 1991 in literacy, and for 1995 in mathematics and science.

Table 9. International test results for students ages 13-14 (1982, 1991, and 1995).

	1995		1991	1982	
	Math	Science	Literacy	Math	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
US	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

Notes:

*Flemish/French Community.

Countries were grouped into three categories where number 1 denotes countries with the best and number 3 countries with the worst test results.

Sources: OECD (1993); OECD (1996a).

Compared to group-one countries, Sweden's results for literacy are very good. Mathematics and science results improved between 1982 and 1995. By 1995, they were on an average level. There are only mathematics and science test results for group-two countries. The Czech Republic, Korea, and Hungary have better test results than

Sweden, while the Russian Federation is on about the same level as Sweden.

To summarise this section, the flow statistics confirm population-statistics information, namely, that young people (after age 18) participate to a lesser degree in education in Sweden than in many other countries. Moreover, students in Sweden stay on for a rather long time in secondary education and transfer at an older age to higher education, and they return more frequently to higher education at a later stage than in other countries.

As Section 1 discusses, despite recent expansion of higher education, Sweden's rank has not improved regarding university-level tertiary education for young people. Based on statistics for current participation in this section, this fact may be explained to some extent by the phenomenon that almost 50% of the students in tertiary education are adult learners.

Students in Sweden seem to be distributed across subjects about the same way as in other countries at secondary and tertiary levels. If the number of young science and engineering students seems too low in Sweden, comparisons with group-one countries suggest that generally low tertiary-education participation might be one reason why (OECD, 1998a). Another reason might be the low proportion of students (especially women) who choose science and engineering programmes in secondary education.

Group-two countries favour natural science and engineering studies more than wealthier OECD countries.

Education costs in Sweden are high compared to costs in other countries. However, costs are apparently not related to quality indicators, such as teaching hours and teachers' salaries. But as judged by international test results, the quality of basic Swedish education seems to be high or on an average level.

2.2. Education for adults

In Sweden, the formal, organised part of adult education consists of popular education (including folk high schools and the study circles sponsored by study associations), municipal adult education, employment training, employer-sponsored training, and recurrent education in tertiary education.

Initially, some attempts were made to produce international statistics for these areas: employment training and job-related education and training. The IALS study was the first to produce comparable general adult education and training statistics. So let us first have a look at some of the figures from that study.

The IALS study contains information about adult education and training in Belgium, Canada, Netherlands, Sweden, Switzerland, the UK, and US (group-one countries) plus Poland (group-two country). Table 10 shows that Sweden ranks 1 most of the time, except for men in the youngest age group and at higher educational and literacy levels, where Switzerland, the UK, and US have higher participation rates compared to Sweden.

Compared to other countries, participation disparities among groups in Sweden are very low, considering individuals with similar initial education and on similar literacy levels. For a country with more equal distribution of opportunities, it may be difficult to uphold a high rank at all levels. This is illustrated in the case of Sweden, compared to other countries that invest more heavily at the top.

Sweden is the only country in which, on average, women have a higher participation rate than men and in which participation does not decrease with age but increases up to ages 35-44 and remains at a high level for ages 45-54.

Table 10. Percentage of adults ages 25-64 who participate in education and training in Sweden and Sweden's rank regarding adult participation in education and training, by gender, age group, education level, and literacy (1994-1995).

Ages	**25-34**	**35-44**	**45-54**	**55-64**	**All**
Sweden					
Women & men	56	61	58	38	54
Women	54	64	62	40	56
Men	57	58	54	37	53
Rank					
Women & men	1	1	1	1	1
Women	1	1	1	1	1
Men	1-2	1	1	1	1

Education level	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**All**
Sweden	29	46	56	66	70	54
Rank						
Women & men	1	1	1	1-2	2	1
Women	1	1	1	2	2	1
Men	1	1	1	1	3	1

Literacy level	**(1)**	**(2)**	**(3)**	**(4)**	**All**
Sweden	31	42	57	62	54
Rank	1	1	1	1	1

Notes:

- Education level: (1) Less than lower secondary education; (2) Lower secondary education; (3) Upper secondary education; (4) Non-university education and (5) University education.
- Literacy level: (1) IALS level 1; (2) IALS level 2; (3) IALS level 3 and (4) IALS level 4/5.

Source: OECD (1998a).

Sweden's high rates of adult education and training participation are also confirmed by studies on *job-related education and training* in which Sweden normally has been observed to have one of the highest participation rates (OECD, 1995a; OECD, 1996a; OECD, 1997a). But participation says nothing about duration of training periods. And there are some indications that the duration may be shorter in Sweden than in other countries (OECD, 1996c).

Sweden used to be known for its active labour market policies, in which *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 apprenticeships and related forms of general youth training.

During the 1990-1997 period, all group-one and group-two countries experienced somewhat pronounced labour market problems. But the extent to which they had recourse to these three training measures varied. Judging by participant inflows within a given year as a percentage of the labour force the same year, seven countries used labour market training extensively for unemployed adults and those at risk. Each of the following countries reached at least 3% of its labour force for one or more years during the period. The figure within parentheses refers to the highest value during the 1990-1997 period: Finland (5.2%), Denmark (4.6%), Sweden (3.9%), France (3.8%), Germany (3.7%), Norway (3.6%) and Belgium (3.1%) (OECD, 1994a; OECD, 1995b; OECD, 1996b; OECD, 1997c; OECD, 1998c).

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 parentheses refers to the highest value during the 1990-1997 period. Next, but at a much lower level, France and Sweden had values of 1.9% and 1.4%, respectively. Similarly, support for apprenticship and related forms of general youth training was only extensively used in two group-one countries: Italy (3.3%) and France (2.1%) plus Poland (2.3%), which is in group two. These labour market training data refer to all group-one and group-two countries in this study, except the Russian Federation and Mexico.

For *popular education* and *municipal adult education*, separate international comparisons are difficult to make. But to illustrate the importance of alternative types of education, it can be mentioned that in 1997 about 2.8 million residents in Sweden (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 annually (Rubenson, 1996).

Based on the information in a government report (SOU 1999:39), the number of full-time, full-year adult participants in formal education and training in 1998 can be estimated at:

- Municipal adult education, 174,000
- Folk high schools, 34,000
- Other state financed adult education at primary and secondary levels (including education for immigrants), 15,000
- Tertiary education, 120,000
- Employment training, 42,000
- Employer sponsored training, 68,000.

To highlight the importance of these figures within a Swedish context, note that one age cohort in Sweden consists of roughly 100,000 people. Municipal adult education (primary and secondary levels) and tertiary education provide education for more than one age cohort.

The effects of some recently initiated policy programmes are included in the previous figures: the Adult Education Initiative and the KY programme as well as on-going expansion of higher education. In addition, the new organisation of upper secondary education aims to better prepare young people for lifelong learning. At the upper secondary level, all programmes now have a three-year duration. All students completing these programmes are eligible for tertiary education. Earlier, the vocationally oriented programmes lasted for only two years and did not qualify for tertiary education.

Quantitatively, the most important new programme is the *Adult Education Initiative* (AEI). It is a five-year programme that started in 1997. The main target group consists of the unemployed and employees who lack or have only partial upper secondary education. Municipalities can apply for special state grants that cover costs for providing about 100,000 full-time full-year places. There are also state grants for the folk high schools to provide 10,000 places of this type. Special financial aid is also offered to adults who participate in the programme.

The *KY programme* is aimed at advanced vocational training at the post-secondary level. KY programme courses are planned and arranged through partnership between education providers and employers. Normally, the courses last for two years, and one-third of the time is supposed to be spent at a work place. The number of

places will increase from a current 6,000 to 12,000. The experimental phase of the programme will end in 2001 (KY Committee, 1998).

Perhaps the most interesting feature of these programmes is not on the quantitative side. The programmes are also supposed to develop the *infrastructure* of the education system, i.e., mechanisms that make the system work more efficiently. *Local governments* are much more involved in *planning* their participation in the AEI programme than they have been in planning their normal education activities (SOU 1998:51; SOU 1999:39). Since the decentralisation of the responsibility for primary, secondary, and adult education to the municipalities in 1991, local governments should be engaged in education planning and evaluation but so far, the involvement has been difficult to establish. It took some time before a majority of the municipalities had a school plan and even by 1995, only about 10% had evaluated their total plan (Skolverket, 1995a; Skolverket, 1996; Skolverket, 1997). The importance attached to the AEI programme by local politicians has meant a lot for general awareness of the importance of education and particularly adult education.

Another new aspect of this adult education programme is its direct link to the labour market. For some time now, municipalities have expressed an interest in taking over more of the labour market policy from national bodies. Often, municipalities have general economic development plans, and the adult education programme is often linked to those plans and used as an *instrument for development.*

As part of their normal education activities, the municipalities have been expected to engage in *communication*, *counselling*, *recruitment*, *outreach*, and *validation activities*. Judging from their efforts to develop these activities, their work in these fields must have been rather rudimentary. Or perhaps now, the challenges are bigger and taken more seriously with the new programme.

Often planning is associated with organisations that have launched communication, counselling, open-house learning, and *distance learning* services. Their operations are called info techs, info centres, knowledge centres, education centres, and so on. Some municipalities have several local study centres equipped with modern ICT; they use the centres for studies at primary, secondary and tertiary levels. These centres often evaluate students' needs and interests and then develop required individualised education plans.

In the AEI programme, municipalities use different types of education suppliers. *External education suppliers* accounted for 13% of

the course volume provided in 1997, which a big change considering that external suppliers were hardly used earlier. They are expected to bring new ideas about the organisation of education, introductory and vocational courses, and teaching methods into traditional municipal units.

To summarise, in international comparisons, participation in adult education and training and labour market-related training is high in Sweden. But we know less (in comparative terms) about the types and duration of adult education and training.

Young people tend to participate less in tertiary education in Sweden, but adults participate more than in other countries. So far, the net effect on the population's education level from these opposing tendencies has been difficult to judge and relate to international comparisons. Formal qualifications are not always awarded or even sought by adults. So the contribution of adult education and training to the level of formal education of the population will be statistically underestimated and probably more so in Sweden where adult education is more frequent than in other countries.

3. The labour market: returns to education and training

3.1. Employment and unemployment

This section provides an overview of the labour market situation for different education groups through estimates of the expected number of years: employed, outside the labour force, and unemployed. Table 11 reports results of these OECD calculations for different countries. The results refer to the situation in 1996 and the population ages 25-64 (OECD, 1998a).

Normally, the expected number of years in employment correlates positively with education attainment, while the expected number of years out of employment and in unemployment correlates negatively with education level. This is also the case in the countries compared in this study. For the 14 group-one countries (all but Japan) and the four group-two countries (all but the Russian Federation and Mexico) for

which data are available, the only more notable exceptions are in Italy and Korea. In Italy, the expected number of years in unemployment is higher for people with tertiary education than for people with secondary education (for women and men). In Korea, the expected number of years in unemployment does not exactly follow the education level for women or men. In group-three countries, for which data were reported, the general pattern is the same as in other countries, but there are more exceptions to the general rule in group-three countries.

In Sweden, the relationship between education and employment does not deviate from the normal one. But the high employment-expectation levels and the low levels of expected years out of the labour force make Sweden stand out.

This is especially true for women and for low levels of education attainment. For women, Sweden ranks 1 in employment expectations for below and on the upper secondary level, and it ranks 2 in tertiary education among group-one countries. It ranks 1 in all instances among group-two countries. For men, the corresponding ranks for corresponding education levels are: 3, 7, and 6-7 for group-one countries and 2 and 3 for group-two countries, as shown in Table 11.

Unemployment rose to comparatively high levels in Sweden during the 1990s. This means that the level for the expected number of years of unemployment is rather high for calculations based on the situation in 1996. For men, unemployment is high on upper secondary and tertiary levels, compared to group-one and group-two countries. For women, unemployment is high on levels below and on upper secondary, compared to group-one countries and on the tertiary level, compared to group-two countries.

During the 1990s, unemployment for women in Sweden has most often been lower than for men, when comparing different education levels and age groups. Table 11 shows this; the expected number of years in unemployment is lower for women than for men at higher education levels. In many European countries, the opposite situation has prevailed while, for example, in the UK, Canada, and the US, men (as in Sweden) more often experienced higher unemployment than women (OECD, 1997a; OECD 1998a; Sohlman, 1996).

Table 11. Expected years employed, outside the labour force, and unemployed, women and men, ages 25-64, by education level in Sweden and Sweden's ranks (1996).

Women

	Expected yrs. employed			Expected yrs. outside labour force			Expected yrs. unemployed		
Education level	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Sweden	25.3	30.5	34.2	10.9	6.7	4.3	3.8	2.8	1.5
Rank									
Group one	1/14	1/14	2/14	14/14	14/14	14/14	3/14	3-4/14	6/14
Group two	1/4	1/4	1/4	5/4	5/4	5/4	2/4	2/4	1/4
Group three	2/6	1/6	1/6	8/7	8/7	8/7	1/6	1/6	1-3/6

Men

	Expected yrs. employed			Expected yrs. outside labour force			Expected yrs. unemployed		
Education level	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Sweden	29.6	31.7	34.3	6.6	4.8	3.7	3.8	3.5	2.0
Rank									
Group one	3/14	7/14	6-7/14	13/14	12/14	11/14	6/14	2/14	3-4/14
Group two	2/4	3/4	3/4	4/4	4/4	3/4	3/ 4	1/ 4	1/4
Group three	7/6	6/6	6/6	2/7	4/7	3/7	1/6	1/6	2/6

Notes: Education level: (1) below upper secondary education; (2) Upper secondary education; and (3) Tertiary education. See Table 1 for rank descriptions.

Source: OECD (1998a).

There are few comparative studies of the effects of adult education and training on unemployment. The few, small Swedish studies that exist show that a main change, if not the main change in the situation of individuals before and after participation in formal adult education at the secondary level is increased participation in further education. Adult education at this level probably increases employment for the unemployed as much as employment training—maybe even more (SOU 1998:51; SOU 1999:39).

3.2. Education and earnings

International earnings data are often more readily available and easier to update than analyses of the rates of returns to education. Earnings ratios for different education groups can give a rough indication about the economic returns to education, but they must be interpreted with care. Often the data do not contain specific age groups, and earnings are measured as average earnings for broad educational categories. Moreover, earnings generally are measured before taxes and excluding study grants.

Table 12 shows Sweden's ranking regarding relative earnings for different age and education groups. The figures relate to women and men ages 25-64 and 30-44 with income from employment in 1992, 1994, 1995, and 1996. Here, earnings are defined as annual earnings (income from work before taxes) and are calculated as mean earnings of persons at a given education-attainment level.

In all countries and for all age groups in Table 12, earnings normally increase with education level. Earnings differentials in Sweden are relatively small in international comparisons of people with upper secondary education and education below upper secondary education (high ranking figures for the ratio below upper secondary/upper secondary as shown in column 1). This holds for women and men and across 1992-1996. Comparing people with non-university tertiary education and university-level education to people with upper secondary education as shown in columns 2 and 3, the earnings differentials are also small in Sweden for women but more on an average level for men.

Austria, Belgium, and Japan (group-one countries) are systematically missing in the comparisons for 1996. Moreover, for the non-university level there are no data for Italy and the Netherlands. For 1995, OECD data are only available for the Czech Republic (group two), and for 1996, for the Czech Republic and Hungary (group two).

With these figures, it's hard to see a definite development over time in Sweden's ranking. But there may be a small improvement in the relative earnings at higher education levels in 1996. A similar phenomenon was observed for experienced teachers in Section 1.

Table 12. Sweden's ranking for relative earnings of persons, ages 25-64 and 30-44, with income from employment, by education-attainment level and gender (1992, 1994, 1995 and 1996)

	Men			Women		
Education level	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Group one, *main competitor countries*						
Ages 25-64						
1992	2-3/14	6/11	8/14	2/14	8/11	8/14
1994	3/14	6/11	5-6/14	2/14	8/11	9/14
1995	2-3/12	8/11	5/12	2/12	10/11	10/12
1996	2/12	7/10	6/12	2/12	9/10	9/12
Ages 30-44						
1995	3/12	7/11	6/12	3-4/11	10/11	10/12
1996	1/12	4-5/10	6/12	2/12	8/10	10/12
Group two, *new competitor countries*						
Ages 25-64						
1995	1/1	-	1-2/1	1/1	-	2/1
1996	1/2	-	2/2	1/2	-	3/2
Ages 30-44						
1995	1/1	-	2/1	1/1	-	2/1
1996	1/2	-	2/2	1/2	-	3/2

Notes: Education level: (1) below upper secondary/upper secondary; (2) Non-university tertiary/upper secondary; and (3) University tertiary/upper secondary. See Table 1 regarding ranking.

Sources: OECD (1995a); OECD (1996a); OECD (1997a); OECD (1998a).

In 1996, the mean annual earnings of women, as a percentage of mean annual earnings of men, varied around 65-70% in Sweden. Compared to other countries for the same years and education levels previously presented for ages 30-44 and 55-64, Sweden doesn't rank particularly high. In most instances, Sweden ranks 4 or 5. Its highest ranks are in 1996 when its ranking for low-education groups is 2-3. This ranking is successively lower on higher education levels, and Sweden ends up at 6-7 on the university-education level for ages 30-44 and at rank 4 for ages 55-64—compared to 12 and 11 group-one countries, respectively (OECD, 1998a).

Based on cross-section earnings data of the type previously presented, the OECD has calculated approximate internal *rates of return* at different education levels and has started to make more elaborate calculations. In the first case, more countries and education levels can be compared as shown in Table 13. These calculations are based on income from work before taxes; they do not include social-security contributions. As such, they do not exactly represent private or social returns to education.

Private returns should account for study assistance and should be based on earnings after income taxes. Social returns should include social-security contributions. In countries such as Sweden, with a compressed wage scale and high social-security contributions, the relation between gross earnings (as measured) and social returns may be less strong than in other countries, and gross earnings do not capture non-financial returns to education in any country. In addition, average earnings and costs data for the education groups are used and the included costs are only direct costs for education institutions. Moreover, these OECD calculations do not reflect differences between education groups regarding labour force participation and unemployment.

Table 13. Internal rates of return at different education levels, by gender (1995).

	Men			*Women*		
Levels	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
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
UK	14	5	13	19	14	19
Canada	13	23	17	16	28	29
US	26	9	13	23	11	13
Swedish ranking	*7-8/12*	*8/10*	*11/12*	*9-10/12*	*10/10*	*10-12/12*
Czech Republic	22	-	9	14	-	7

Notes: (1) upper secondary education, (2) non-university tertiary education, and (3) university tertiary education.

Source: OECD (1997a).

In looking at the level and pattern of returns across education groups for women and men, there are few common characteristics.

- In some countries, the returns fall with education level and in others, they rise with education level. In other countries, they first rise and then fall with education attainment, while in still others they first fall and then rise with education level. Sweden belongs to the latter type of countries.
- In most countries, the pattern of returns across education groups is the same for women and men and returns are as high or higher for women than for men at upper secondary and non-university tertiary levels, while at the university tertiary level, the opposite situation prevails. But in Sweden, the returns to women are lower than to men at all levels.

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

In comparing the level of returns in Sweden and other countries, it is generally rather low in Sweden especially for women and at the university level. And for earning ratios, Sweden's ranking is also a bit better for men than for women.

Table 14 shows rate of returns calculations for university-level education. Here, social, private, and fiscal returns are distinguished. Private returns were estimated on the basis of additional income of individuals for a given education level over a working life time, including social transfers and non-labour income after deduction of income taxes and social-security contributions—compared with private costs for tuition and earnings foregone. Fiscal returns are based on the estimated lifetime value of additional income-tax receipts and social security contributions less social transfers for those who complete university education—compared to public costs for educating a university student and the taxes lost on earnings foregone during the study period. Social rates of returns are a combination (weighted average) of private and fiscal returns. They exclude externalities or spill-over effects (OECD, 1998a).

The Swedish fiscal rates are the lowest observed. This also applies to the social rate of return for women. The social rates for men do not vary very much among the compared countries. Sweden, Belgium, and

Canada are at the same level (9%). Denmark is at 8%, and the US, at 10%. Only France stands out a little at 13%.

Unfortunately, for technical reasons, no private returns could be calculated for Sweden. Because social rates of returns are a weighted average of private and fiscal returns, private rates should be at least 9% for men and 7% for women in Sweden. In this case, the highest figures are in France and Canada for women and men. Belgium also shows a high figure for men and the US, for women.

Table 14. Estimates of private, fiscal, and social rates of return to education at the university tertiary level, by gender (1995).

	Men			*Women*		
Country	**Private**	**Fiscal**	**Social**	**Private**	**Fiscal**	**Social**
Belgium	14	9	9	8	13	9
Canada	14	7	9	21	7	11
Denmark	8	8	8	7	8	8
France	20	11	13	28	9	13
Sweden	-	6	9	-	4	7
US	11	9	10	12	9	11

Source: OECD (1998a).

Compared to Sweden, France, Canada, the US, and UK have been noted to have especially high returns to university education (and high earnings differentials between university and lower education groups); see Tables 12-14. Italy, Germany, and Denmark are on the low side with Sweden (Sohlman, 1996).

Summaries of Swedish studies about returns to education are in Sohlman (1996), SOU 1996:164, and SOU 1998:51. They point out that during the 1960s, 1970s, and 1980s, returns to education fell in Sweden, but during the 1980s they tended to stabilise. Whether they have risen since then still seems a bit uncertain, but some indications point to an increase in returns over the 1990-1995 period, especially for technicians and the private sector (NUTEK, 1999). Similar tendencies were observed in other countries as well, but with an earlier, more pronounced upturn than in Sweden. This applies, e.g., to Canada, the US, and UK (OECD, 1996a; Psacharopoulos, 1993).

As in the OECD calculations reported in Table 13, normally, a U-shaped pattern for returns over education groups has been found in the Swedish studies and lower returns for women than for men. Also,

returns were higher in the private sector than in the public sector. Actually, in one study based on earnings data for 1995, the rates of return to tertiary education only reach or exceed the 10% level in the private sector and in education groups, such as engineers, economists, lawyers, and science graduates (SACO, 1997).

In the public sector, the returns are often negative and at most, 8% (for medical doctors). These calculations were based on:

- Earnings excluding taxes
- Study assistance during the education period
- People who are working full time.

It has been estimated that rates of return to tertiary education would increase by one percentage point if variations among education groups with regards to unemployment are accounted for (Olsson, 1998). Tertiary education has also been shown to improve young people's opportunities to get jobs and to stay in qualified jobs (NUTEK, 1998).

3.3. Returns to work related training

Sohlman (1996), SOU 1996:164, SOU 1998:51, SOU 1999:39 contain summaries of Swedish studies about returns to training in working life and summaries of some international comparison. In Sweden and other countries, training often (but not always) increases *productivity* at the work place. At least in Sweden, these effects seem to be linked to changes in the organisation of work.

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 effects of specific on-the-job training. The earnings effects of on-the-job training fell during the 1960s and 1970s but stabilised during the 1980s 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.

In studies made during the 1970s, returns to *training for the unemployed* were generally positive and rather large in Sweden. But the results of studies done during the 1980s and 1990s 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 downturns, especially because there has been a tendency to increase this type of training during such periods. Also, the positive effects of employment

training were observed to be more important for groups with weak positions on the labour market, i.e., in the case of Sweden, for people with a low formal education background, immigrants, and the disabled.

Very few Swedish studies are concerned with the returns to *adult and recurrent tertiary education.* Important positive returns as well as negative returns were 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 (NUTEK, 1998).

3.4. The demand for educated people

The previously presented data show that the supply of highly educated people increased in Sweden. Returns as well as interest in higher education among young people fell—facts that may be interpreted as indicating that demand lagged behind supply. This reading of the data can be supplemented with suggestions from different authors regarding several additional explanatory factors that certainly contributed to this development but probably didn't determine it (Sohlman, 1996):

- Quantitative restrictions to admissions in tertiary education were introduced at the end of the 1960s, which probably decreased enrolments
- The wage-formation process; here, unions and employers might have had an interest in keeping down wages of people with tertiary education
- Market power that might have led to rather low wages for certain graduates, e.g., engineers (a few, dominating employers)
- Lowering of the quality of the labour force with tertiary education, i.e., with low returns to higher education, less-able students will enrol, and quality is thus lowered.

Several 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 the blue collar trade union (LO), 20% of their members saw themselves as overqualified for their present job, while 60% judged that they had the qualifications needed and another 20% stated that they needed more knowledge for their present job (LO, 1995).

- The IALS study showed that in Sweden, employees did not use their literacy capacity to any higher extent than employees did in other countries, despite the fact that their literacy level is substantially higher. 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 incentives for employees to use their competencies are also lacking (NUTEK, 1999; SOU 1998:51).

It is also easy to find several general indicators that point at negative trends as far as the development of demand goes (Sohlman, 1996). Here are a few updated trends:

- The lack of jobs. Unemployment has risen dramatically in Sweden at the same time as labour force participation rate has decreased. In 1997, there were 550,000 (12%) fewer people employed than in 1990 (LO, 1998).
- GDP per capita. According to the OECD statistics for 1998, Sweden was the 18th richest country in the OECD measured by GDP per capita using Purchasing Power Parities. In 1989, Sweden was the 5th richest OECD country (OECD, 1991; OECD, 1999). Among the OECD countries that are richer than Sweden in 1998, we find all group-one countries specified in this paper (except the UK, although the UK is next to Sweden in GDP ranking) plus Australia, Iceland, Ireland, and Luxembourg.
- Low investment ratio. In 1996, total gross fixed-capital formation was 15% of GDP, of which investments in machinery and equipment stood for 8 percentage points (OECD, 1998f).

Some authors have argued that economic growth has been relatively low in Sweden lately because of the lack of people with tertiary education, especially technicians and science graduates (Sohlman, 1996). One recent study (NUTEK, 1999) points to Sweden's industrial structure and, relative to other countries, its lack of 80,000 people with university tertiary education (2% of the labour force). But during the past few years, knowledge-based industries seem to have started to grow and expand more quickly than in other countries. For example, Sweden has advanced from shared ranks 5-8 for trade coverage ratios (exports/imports) for high-tech industries in 1993 to ranks 2-3 for the

same industries in 1995 (NUTEK, 1999; Sohlman, 1996; OECD, 1995d; OECD, 1996d; OECD, 1997f; OECD, 1998f).

Still, 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? Did better employment opportunities provide incentives enough? If lacking supply slowed down the economic expansion, why didn't returns increase or increase earlier?

4. Concluding remarks

4.1. The supply of education

In international comparisons, the population in Sweden apparently has rather high education and training levels—quantitatively and qualitatively, and the education system is adapting to lifelong learning requirements. Upper secondary schools aim at better preparing students for lifelong learning. There are more opportunities for adults to return to education and training at secondary and tertiary levels. A lot of experimentation is going on locally to create more flexible learning environments. By international standards, participation by adults in employer-sponsored and labour market training is also quite high in Sweden.

Young people, in general, and young science graduates, in particular, are not at the forefront, which may be more problematic. In Sweden, young people, at least after age 18, participate to a lesser degree in education than in many other countries. They stay on for quite a long time in secondary education, transfer at a fairly older age to higher education, but return more frequently to higher education later on. Due to these opposing tendencies, the net quantitative effect on the population's education level—compared to other countries—has been difficult to calculate. Given current knowledge, it is even more difficult to judge the value of education at different ages. If education and training only depreciate slowly, then investments at an early age would be more profitable than at an older age. If not, recurrent education may be a better strategy.

Another indication of a broad, rather than an elitist approach, was noted when adult education and training in Sweden was compared to other countries. Sweden tended to have a better position in low

education and literacy groups than in high education and literacy groups.

The distribution of students in Sweden across subjects doesn't largely deviate from what is found in other countries at secondary or tertiary levels.

If the number of young science and engineering students seems too low in Sweden, comparisons with group-one countries suggest that generally low tertiary-education participation might be one reason why. Another reason might be the low proportion of students (especially women) who choose science and engineering programmes in secondary education.

Judging from international tests in literacy, mathematics, and science, the quality of basic education in Sweden is very good (measured by literacy standards) and on an average level (measured by mathematics and science standards). But current costs for education are high and apparently not related to other quality indicators, such as teaching hours and teachers' salaries.

In Sweden, tertiary education covers the teaching of young people and adults, R&D, and the dissemination of the results of R&D. The higher education sector is responsible for an important part of current R&D.

4.2. Incentives for investing in education and training

Employment correlates positively with education attainment and unemployment correlates negatively with education attainment in Sweden and other countries. High employment rates, especially for women and for people with low education levels, make Sweden stand out. But here, the important Swedish adult education sector plays a very significant role, which is not always considered in population statistics.

Swedish earnings differentials are often relatively small. Comparing the returns to education level in Sweden to other countries, earnings differentials are generally low, especially for women and for university graduates. France, Canada, the UK, and US have higher returns to university education (and greater earnings differentials for the university graduates) than Sweden. Italy, Germany, and Denmark are on the low side with Sweden.

During the 1960s, 1970s, and early 1980s, the returns to education fell in Sweden but then tended to stabilise. There are some indications that they have increased during the 1990s. The earnings effects of on-the-job training also fell during the 1960s and 1970s but stabilised dur-

ing the 1980s and later on probably increased. They also seem to be relatively low in Sweden.

In studies done in the 1970s, returns to training for the unemployed were generally positive and rather large in Sweden. But the results of studies done in the 1980s and 1990s 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 weak positions on the labour market, i.e., in Sweden's case, people with low formal education, immigrants, and the disabled.

For adult and recurrent tertiary education, important positive returns as well as negative returns were 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.

Private incentives to invest in education and training seem to be rather weak in Sweden for young people and adults. The main returns to individuals for investments in education may be greater employment opportunities and not higher earnings.

In many respects, women in Sweden have a better position than women in other countries. This applies, e.g., to their education level in the population, their participation in current education, their employment, and their unemployment level. But it does not apply to:

- Young science graduates in the labour force; here women in Sweden compare less well with men in Sweden, in comparison with their counterparts in other countries.
- Earnings-related issues such as:

  —Earnings ratios (tertiary education/upper secondary education) where ratios are small for women in Sweden but more on an average level for men

  —Earnings of women as a percentage of earnings of men; here Sweden does not rank particularly high, at least not at higher education levels

  —Returns to education that are lower for women than for men in Sweden at upper secondary, non-university tertiary and university tertiary levels.

4.3. Policy discussion

The international comparisons suggest that if Sweden has the ambition to stay a leading knowledge-based society several policy issues should be addressed.

Perhaps the participation of young people in tertiary education, especially in the fields of science and technology, should increase. If that is the case, several alternatives must be considered. Should this expansion be a net increase in enrolments or achieved at the expense of, e.g., adults? Should it be geared at education, where the returns seem to be highest (private sector technicians, engineers, economists, lawyers, and science graduates)? Should private financing be increased and state financing reduced?

Tertiary education has three important tasks in Sweden:

- Teach young students and adults participating in recurrent education
- Conduct research
- Disseminate the results of R&D to other actors in society.

Is the combination of the three tasks and is the volume of each task correct? If the pressure on the tertiary education sector to teach, produce research, and disseminate research results is too high, then one might, for instance, consider moving either some research or some teaching of adults or some of both out of the tertiary sector.

Another interesting question that might be discussed is if it is possible to get more quality out of the money that is invested in education, for example, in primary and secondary education.

Regarding traditional adult education, recurrent education at tertiary levels, employment training, and employer-sponsored training (judging from the high participation level), Sweden seems to have embarked on a lifelong learning strategy—and much earlier than other countries. This strategy must be closely followed and evaluated. One aspect to be considered is the balance that should be struck between broad investments and more elitist investments in a lifelong learning strategy.

The incentive structure is an important area for further research. For total enrolments so far, the low returns to investments in education and training do not seem to have caused problems in Sweden in the sense that available places in education settings have normally been filled. The extent to which this is related to high unemployment during the 1990s must be investigated. For distributional reasons, it may be

reasonable with returns to tertiary education that are not too high. But here, women in Sweden could constitute a group that is mostly affected, which is disturbing. Moreover, for efficient use of resources, such a system may also have serious drawbacks. How are students to chose efficiently among different fields of study and between studying and not studying? How is the financial burden on the state to be kept within reasonable limits?

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