Summary

Over the next 10 to 12 years, the number of persons aged 20 to 64 will increase. The trend will turn after that, but in the year 2020 there will still be 45 000 more working age individuals than today, according to Statistics Sweden's forecasts. Assuming that the labour force participation rate returns to the same level as before the economic crisis of the 1990s, the so-called "dependency ratio" (total population divided by the number of gainfully employed) will remain approximately the same for the next 15 years. After that, however, the dependency ratio will gradually increase. The greatest problems will arise during the 2020s, when the large cohorts from the 1960s have retired and have been replaced in the labour market by substantially smaller cohorts.

The already large shortages of personnel with training in health and social care will become even greater, unless interest in such education increases. There will also be shortages of teachers and people with technical education in the long run. In contrast, there will be a growing surplus of individuals with humanistic and artistic qualifications, as well as a surplus of individuals with general educational qualifications, i.e., compulsory school or upper secondary school education in the social sciences or natural sciences.

Population

The number of pensioners (persons aged 65 years or older) will increase rapidly when the large numbers of persons born in the 1940s retire. By the year 2010 there will be an additional 200 000 pensioners. After another 10 years there will be a half million more pensioners than today - approximately 2 million in total compared to the slightly more than 1.5 million of today. The number of very old persons (85 years and over) will not increase as rapidly over the next 20 years, but starting in the middle of the 2020s there will be a much greater increase.

The wide variations in the birth rate over the last 10 to 15 years have already had and will continue to have major consequences for the need for personnel in child care and schooling. The population in the 0 to 19 years age group is projected to continually decrease through the year 2014, at which point it will be almost exactly 2 million, slightly less than 140 000 lower than in the year 2001. An increase is projected after that, such that the population in this age group will be only 50 000 lower in the year 2020 compared to today. It is important to remember, however, that these population projections are particularly uncertain over such a long time period, since they concern people who are not yet born.

The number of persons aged 20 to 64 years is projected to increase continually over the next 10 to 12 years, and reach slightly more than 5.3 million individuals at its peak. This is nearly 100 000 individuals or 1.9 per cent more than in the year 2001. Thereafter the number will decrease, although there will still be roughly 45 000 more working age individuals in 2020 than today.

This redistribution among age groups implies that the ratio between the total population and the working age population (sometimes called the dependency

burden or the dependency ratio) will be nearly unchanged over the next 10 years. Then it will increase rapidly through 2020, after which the increase will continue for at least 10 more years.

Population by age groups, 1980–2030
Numbers in thousands, and age distribution in per cent

Year	Total	Years of age		
		0–19	20–64	65–
1980	8 318	26,4	57,3	16,3
1990	8 591	24,6	57,7	17,7
2000	8 883	24,1	58,7	17,2
2001	8 909	24,0	58,8	17,2
2010	9 114	22,7	58,5	18,8
2020	9 407	22,2	56,1	21,7
2030	9 623	22,4	54,0	23,6

The labour force

During the first three years of the 1990s, the number of persons employed decreased by slightly more than half a million, according to Statistics Sweden's labour force surveys (AKU). The number of unemployed increased at the same time, although not to the same extent, since the number not actively looking for work (who were thus not regarded as being unemployed) also increased. Thereafter both the number of persons employed and the number of unemployed remained essentially constant from 1993 up to 1997, when there was a marked increase in the number of persons employed, and a similarly marked decrease in the number of unemployed. This positive development continued until autumn 2001, when the number of employed persons stopped increasing and the number of unemployed stopped decreasing.

Between 1997 and 2001, the number of employed persons increased by approximately 320 000. This is certainly a remarkable increase, but it is still much less than the decrease that occurred during the first years of the 1990s. One should also remember that the working age population increased by 285 000 individuals between 1990 and 2001. A comparison with 1990 is not completely fair, however, since the labour market was still overheated then even if economic conditions had just turned, and the number of students has increased sharply since 1990. Part of this increase should probably be considered a result of the circumstances of the labour market (particularly the Adult Education

Initiative[1]), while the increase in the number of students in higher education is more likely a permanent change.

The dramatic fluctuations during the 1990s were preceded by an unusually long economic boom during much of the 1980s. Between 1983 and 1990 the number of employed persons increased by roughly 330 000. Women made up two-thirds of this increase.

It is no easy task to predict the next two decades based on the developments during the last two decades. It is difficult to find something that can be considered a "normal" situation for the labour market during the last 20 years, which means that simple trend analyses do not provide much direction for the future. One important question regards which of the changes during the 1990s are likely to have permanent consequences for unemployment and people's participation in working life, and which are more temporary. Another question regards the long run implications for labour market participation of the new pension system – where the pension is based on lifetime income – in combination with the fact that an increasing number of people are spending increasing amounts of time in school.

Our calculations assume that the labour force participation rate (the share of the population that is working or is looking for work) will gradually increase among 35 to 54 year olds, such that by the end of the forecast period it will have reached the same level as before the economic crisis of the 1990s. The main reason for this assumption is that the new pension system, combined with delayed entry into the labour force as a result of increased participation in education, will increase the need to be gainfully employed for as many years as possible between the ages of 35 and 54. The alternative is to retire later. We assume that the labour force participation rate for individuals aged 55 to 64 will remain constant. At least for men in this age group, this implies a break in the long-term downward trend, which also can be explained by the fact that pensions in the new system are based on lifetime income.

Together with an assumption of 4 per cent unemployment, the above implies an increase in the number of employed persons by approximately 120 000 through the year 2020. There will then be a total of 4.36 million employed persons. This is also approximately 120 000 more than if we had assumed the same labour

[1] Governmental initiative that gave adults the right to complete upper secondary education

force participation rates as in 2000. The projected increase thus completely follows from the assumption that the labour force participation rate will increase.

Since we anticipate increased labour force participation and an unchanged unemployment rate during the forecast period, the "dependency ratio", calculated as the total population divided by the number of employed, will have a more favourable trend than if we had only considered the size of the population in different age groups. The dependency burden calculated using our assumptions will be lower than or at the same level as now through 2015. Only after 2015 there will be a noticeable increase, which will continue at least through 2030.

Number of employed among 16 to 64 year olds, 1976–2020. Numbers are forecasts from 2002.


Millions
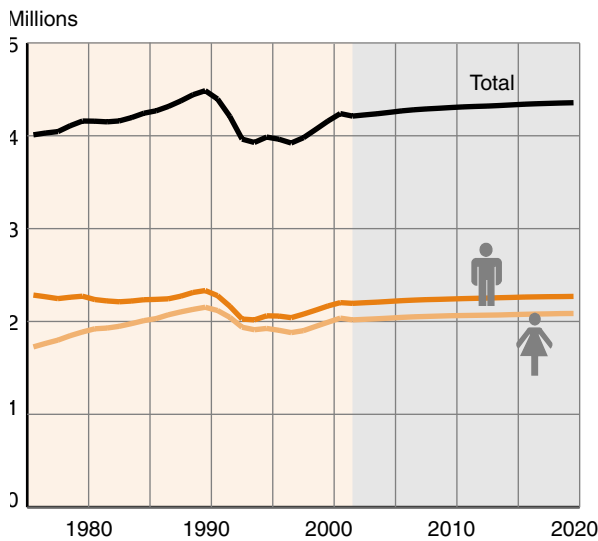
Industries

Employment in *manufacturing industries* will continue to decline, mostly following its long-term downward trend, from 800 000 today to 650 000 in 2020. We can however expect large variations among the different sectors. Employment in the *construction industry* is predicted to increase after the 30 per cent decrease during the 1990s, but will not reach the same high level as in 1990. The number of employed in *agriculture and forestry* is expected to fall by half through the year 2020.

Within the *private service sector,* the number of employed is projected to increase from 1.5 million in 1999 to close to 1.7 million in the year 2020. The increase will mainly occur in consultancy services focusing on the business sector. In contrast,

employment in retail trade, banking, and financial operations is expected to decrease.

In the *public sector* – child care, school, health and medical care, care of the elderly, etc. – it is assumed that employment growth will generally follow changes in the number of persons in the age groups that use the different services in these subsectors. An increase in personnel ratios is also assumed after the large cutbacks during the 1990s. Elder care requires a large increase in personnel over the current level of staff. Altogether, employment in the public sector (or rather for the activities that are currently mainly run under public management) is projected to increase by 270 000 individuals through the year 2020, at which time it will amount to 1.54 million individuals.

Number of gainfully employed individuals, 1985–2020, by industrial branches

Thousands
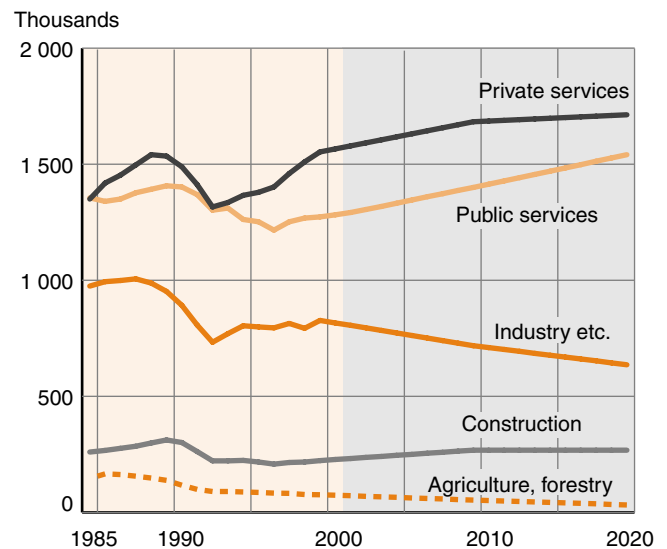
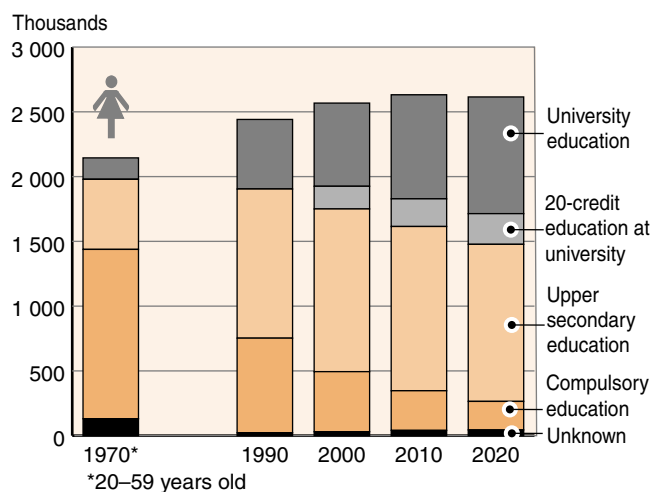### Education levels of population

Thirty years ago, six of ten working age individuals had completed at most elementary or compulsory school. The equivalent share today is two out of ten. Slightly more than one fourth had upper secondary education, compared with half today. The share of the population with post secondary education has increased from less than 10 per cent to 30 per cent today.

The past 30 years have thus witnessed a radical increase in the education levels of the population. The development over the next 20 years is unlikely to be equally dramatic. The share with post secondary

education will however increase to close to four of ten, and the share with only elementary or compulsory school education will decrease to one in ten. The share with upper secondary education is expected to remain the same, that is, about 50 per cent.

Forecasts of the future must naturally be based on a large number of assumptions. We have assumed a generally unchanged educational system. In practise this implies, among other things, that virtually all youth are assumed to begin upper secondary school. We also assume that the number of new students in higher education will remain at its current level. Other forms of education are also assumed to continue at their current size, with the exception of the Adult

Educational levels of the population aged 20 to 64 years, 1970-2020. Women

Thousands

*20–59 years old

Educational levels of the population aged 20 to 64 years, 1970-2020. Men

Thousands

* 20–59 years old
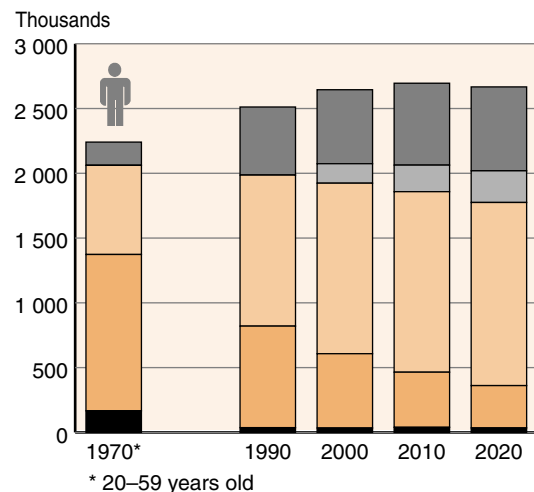
Education Initiative, which is assumed to be clearly smaller in the future.

Shortages and surpluses of labour in the next 20 years

Looking *ten years ahead* , the labour market for those with post secondary and upper secondary education will in general be fairly balanced. In contrast, we expect a large surplus of labour with only elementary or compulsory school education, if the education structure within different sectors of the economy continues to change at the same rate as during the 1990s (*alternative A*). If, on the other hand, the changes in the education structure only occur half as quickly as during the 1990s (*alternative B*), there will generally be a balance between supply and demand for labour with only obligatory levels of education. This is due to the fact that not only demand but also supply will decrease quickly, since many persons with lower levels of education will retire.

Looking *twenty years ahead* there is the possibility of a shortage of labour with upper secondary and post secondary education. Demand for labour with only compulsory school education will be virtually nonexistent if the educational structure of the labour market continues to change at the same rate as during the 1990s. Youth that do not continue on to upper secondary education will find it increasingly difficult to succeed in the labour market.

The results for different educational *levels* do not actually provide much information about what may happen in terms of equilibrium in the labour market, since educational programmes within each level are so different and thus not particularly interchangeable at the labour market. On the other hand, the results can indicate whether the educational system as a whole is fairly well proportioned. From the perspective of the labour market, it is more interesting to compare future supply and demand for labour across *fields* of education.

Such a comparison shows that the shortage of *teachers* as a whole will increase, but the development is different for different categories of teachers as a result of the large variations in the size of age groups. Up to 2010, the need for teachers in upper secondary school will increase dramatically, while afterwards it will decrease equally quickly over a few years. A comprehensive redistribution of educational capacity among different categories of teachers will be

inescapable in the long run, if some form of equilibrium between supply and demand is to be reached for the different categories.

There will be a surplus of labour with *humanistic or artistic* education. The surplus will be greatest for those with upper secondary education, that is, the aesthetic programme. This programme has been very popular among young persons, but so far the possibilities of finding work that uses these qualifications have been few.

Through the year 2010, the supply and demand for labour with *social science oriented education* will balance each other fairly well, but over a longer time frame there is the likelihood of a shortage of labour. The shortage will be greatest among those with upper secondary education.

If the educational structure of personnel within different economic sectors continues to change at the same rate as during the 1990s, there will be a shortage of labour with *natural sciences/technical education*. If the rate of change is half as great, however, there should be a relatively good balance between supply and demand. The shortage is predicted mostly among labour with upper secondary education in this area, but here there is probably a certain interchangeability among workers with different educational levels.

The shortage of personnel with *health and medical care education* will increase and be quite extensive in the long run. This is because demand will increase at the same time as suppl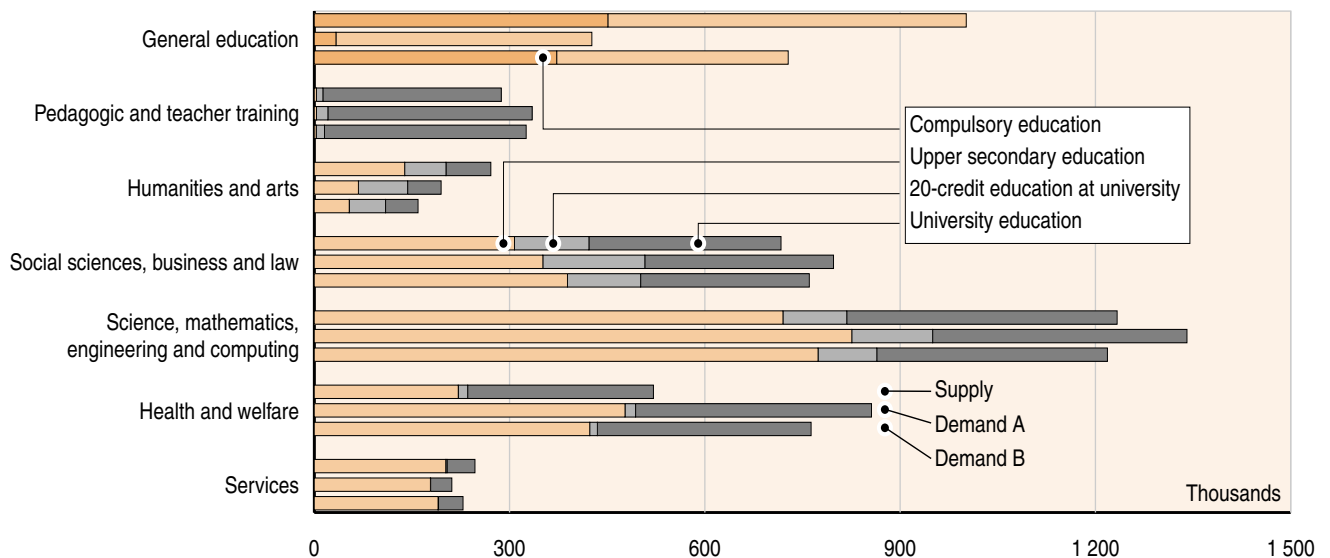y decreases. The shortage will occur mainly among individuals with health and social care education at the upper secondary school level, but the shortage can also be large even for nurses, even though the educational capacity has increased. Demand will increase above all for care of the elderly, but also to a certain extent for health and medical care. The number of people retiring from the health and social care sector will be high, and the number of new students in the upper secondary school health care programmes has decreased drastically during the last decade. This means that the supply of personnel with upper secondary level health care education will decline by a third through the year 2020, if the share of young persons that choose health care education in upper secondary school remains at its current level.

The supply will be much greater than the demand for workers with *general education*, i.e., compulsory school, and social science or natural sciences at upper secondary level. This is true for the outlook both 10 years and 20 years from now, and the surplus will increase over time.

Type of projections

It is appropriate to comment here on how projections of this kind should be interpreted and used. First, we wish to emphasise that they are no more than projections and not forecasts in the pure sense of the word, i.e., predictions about *the most likely* development. One should be aware that calculations of this kind must always be based on a limited number of

Supply of and demand for personnel in 2020, by education

Thousands

Legend:
- Compulsory education
- Upper secondary education
- 20-credit education at university
- University education

- Supply
- Demand A
- Demand B

assumptions, which means that complex interactions among a large number of factors are reduced to a simplified picture where only a small number of factors are allowed to determine the outcome. Forecasting can thus be said to involve choosing the most important factors for inclusion in the models.

As regards supply, we have consciously chosen to illustrate the *consequences* when there are no changes in the educational system and no changes in the "educational behavioural patterns" of individuals. Estimates of demand can essentially be described as being based on *an analysis of requirements*. What, in some sense, is an optimal distribution among industries for a level of aggregate employment (which is mainly estimated based on individuals' behaviour) given certain assumptions regarding technical developments and world trade? In the next stage the consequences of these requirements are calculated and expressed in educational terms. What types and levels of education should the labour force in different industries have?

The aim of our projections is to highlight the imbalances that could result if young persons in upper secondary school and higher education make the same educational choices as before, at the same time as demand for labour with different educational qualifications is determined by changes in economic development. It is to be hoped that the projections could thus help bring about changes in individual's choice of education and state allocation of educational resources that could lead to better balance in the labour market.

These projections do not take into account possible future behavioural adjustments. We know that such adjustments will occur, but forecasting how is extremely difficult, if not impossible, and is also not the underlying aim of the projections.

Methods used for the projections

Calculations of future *demand* for educated workers are based on estimates of economic development through the year 2020. This step in the calculations results in a forecast of future employment in different industries. To move from demand for workers in different industries to demand for different educational categories, it is necessary to make assumptions about how the educational structure of workers will change in different industries. Two alternative assumptions have been used. The first assumes that changes will continue at the same rate as during the 1990s, while the second scenario assumes that changes will occur at half the rate of the 1990s.

Projections of the future *supply* of persons by education are derived from statistics on education levels of the population from 2000 and are in principle based on the assumption that the education system will remain unchanged over the projection period and that educational choices made by young persons and the proportions completing different forms of education also remain unchanged.